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# "Great Expectatrics: Great Papers, Great Journals, Great Econometrics"


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# Great Expectatrics:
# Great Papers, Great Journals, Great Econometrics*

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## Abstract

The paper discusses alternative Research Assessment Measures (RAM), with an emphasis on the Thomson Reuters ISI Web of Science database (hereafter ISI). The various ISI RAM that are calculated annually or updated daily are defined and analysed, including the classic 2-year impact factor (2YIF), 5-year impact factor (5YIF), Immediacy (or zero-year impact factor (0YIF)), Eigenfactor score, Article Influence, C3PO (Citation Performance Per Paper Online), h-index, Zinfluence, and PI-BETA (Papers Ignored - By Even The Authors). The ISI RAM data are analysed for 8 leading econometrics journals and 4 leading statistics journals. The application to econometrics can be used as a template for other areas in economics, for other scientific disciplines, and as a benchmark for newer journals in a range of disciplines. In addition to evaluating high quality research in leading econometrics journals, the paper also compares econometrics and statistics, alternative RAM, highlights the similarities and differences in alternative RAM criteria, finds that several ISI RAM capture similar performance characteristics for the leading econometrics and statistics journals while the new PI-BETA criterion is not highly correlated with any of the other ISI RAM, and hence conveys additional information regarding ISI RAM, highlights major research areas in leading journals in econometrics, and discusses some likely future uses of RAM.

**Keywords:** Research assessment measures, impact factors, Immediacy, Eigenfactor score, Article influence, h-index, C3PO, Zinfluence, PI-BETA.

**JEL Classifications**:

*Great papers appear in great journals*

*All great journals publish great papers*

*Not all papers in great journals are great*

**In Memory of Clive Granger**

## 1. Introduction

Defining and evaluating high quality research are fundamental to the scientific paradigm. Rankings exercises are here to stay, and are essential to evaluate the research performance of individuals, as well as to ascertain the quality of academic journals. The research performance of individuals can be crucial for hiring, firing, tenure and promotion decisions. In the absence of suitable information, the quality of a journal may be used as a proxy for the research quality of academic papers.

The perennial question as to which came first, the chicken or the egg, also applies to whether the quality of an academic paper is more important than the journal in which it was published, and whether the quality of a journal defines the quality of a paper.

Some Research Assessment Measures (RAM) are subscription based, while others can be downloaded free of charge from the Internet. A gold standard database for generating RAM is the Thomson Reuters ISI Web of Science database (hereafter ISI). This paper examines the importance of ranking RAM, emphasizes the importance of RAM as viable rankings criteria, highlights the usefulness of existing RAM from Thomson Reuters ISI (hereafter ISI RAM), and evaluates the usefulness of a new RAM criterion.

The empirical analysis of ISI RAM presented in this paper concentrates on 8 leading econometrics journals, which are compared with 4 leading statistics journals. The application to econometrics can be used as a template for other areas in economics, for other scientific disciplines, and as a benchmark for newer journals in a range of disciplines. In addition to evaluating high quality research in econometrics, the paper also compares alternative RAM, and highlights the similarities and differences of alternative RAM criteria.

The plan of the remainder of the paper is as follows. Section 2 discusses alternative RAM, with an emphasis on the Thomson Reuters ISI Web of Science database. Various ISI RAM that are calculated annually or updated daily are defined and analysed, including the 2-year impact factor (2YIF), 5-year impact factor (5YIF), Immediacy (or zero-year impact factor (0YIF)), Eigenfactor score, Article Influence, C3PO (Citation Performance Per Paper Online), h-index, Zinfluence, and PI-BETA (Papers Ignored - By Even The Authors). Section 3 discusses the ISI RAM data for 8 leading econometrics journals and 4 leading statistics journals. Section 4 analyses the ISI RAM data, while Section 5 summarizes the outcomes and discusses some future uses of ISI RAM.

## 2. Research Assessment Measures (RAM)

Several Research Assessment Measures (RAM) criteria are available for recording research performance. Some of these measures are subscription based, while others are downloadable free from the Internet. Alternative sources of RAM are discussed below.

### 2.1 Thomson Reuters ISI Web of Science

The Thomson Reuters ISI Web of Science database is available to subscribers. Although books and non-ISI journals are not included in the database, a wide range of leading journals is included in the ISI database for an extended period. According to ISI Web of Science (2010): “Authoritative, multidisciplinary content covers over 10,000 of the highest impact journals worldwide, including Open Access journals and over 110,000 conference proceedings.” For the 2008 Journal Citations Report year, with the ISI RAM being reported in 2009, there were 209 journals in the Economics category. The explanations given online are typically very helpful, and the broad range of performance criteria may readily be modified to measure research productivity and citations impact of academic researchers and ISI recognised journals. In short, ISI is credible and accessible.

Alternative excellent databases include the Social Science Research Network (SSRN) database, which includes a very large number of working papers and publications in the social sciences (including economics, finance, accounting and business), the Research Papers in Economics (RePEc) database for economics, the Scopus subscription-based database, and free Internet databases, such as Google Scholar. Each of these databases has their strengths and limitations, but ISI would seem to establish the 'gold standard' database for purposes of generating RAM for journals in a wide range of disciplines for an extended period.

## 2.2 Definitions of ISI RAM

### 2.2.1 Annual ISI RAM

With one exception, ISI RAM is reported separately for sciences and social sciences, and may be computed annually or updated daily. ISI RAM is reported for ISI journals, where an ISI journal is defined as:

**Definition 1:**

**An ISI journal is a journal recognized by ISI and for which ISI RAM is reported.**

Annual ISI RAM is calculated for a Journal Citations Reports (JCR) calendar year, which is defined as:

**Definition 2:**

**A JCR year is the calendar year BEFORE the annual ISI RAM is released (usually in mid-year).**

Thus, for the JCR year 2008, the annual ISI RAM was released in mid-2009.

The ISI RAM are given as follows:

**(i) 2YIF ( = Impact Factor) (calculated annually)**

The classic 2-year impact factor (2YIF) of an ISI journal is typically referred to as “THE impact factor”, and is used widely by journals and publishers in promoting journals. For a JCR year, the 2YIF of an ISI journal is defined as:

**Definition 3:**
**2YIF = Total citations in a JCR year to papers published in an ISI journal in the previous 2 years/Total papers published in an ISI journal in the previous 2 years.**

Thus, for the JCR year 2008, total citations are for papers published in years 2006 and 2007, as are the total papers published in an ISI journal.

**(ii) 5YIF (calculated annually)**

The 5-year impact factor (5YIF) of an ISI journal is an alternative impact factor that is more suitable for those disciplines where a longer gestation period is required, such that 2 years is too short a time for published papers to become well cited. For a JCR year, the 5YIF of an ISI journal is defined as:

**Definition 4:**
**5YIF = Total citations in a JCR year to papers published in an ISI journal in the previous 5 years/Total papers published in an ISI journal in the previous 5 years.**

Thus, for the JCR year 2008, total citations are for papers published in years 2003, 2004, 2005, 2006 and 2007, as are the total papers published in an ISI journal.

**(iii) Immediacy (calculated annually)**

Immediacy is intended for comparing journals that specialize in cutting-edge research, and is, in effect, a zero-year impact factor (0YIF) of an ISI journal. For a JCR year, Immediacy of an ISI journal is defined as:

**Definition 5:**

**Immediacy = Total citations to papers published in an ISI journal in a JCR year/Total papers published in an ISI journal in a JCR year.**

Thus, for the JCR year 2008, total citations are for papers published in year 2008, as are the total papers published in an ISI journal.

**(iv) Eigenfactor Score and Article Influence (calculated annually)**

Since 2007, ISI has reported two RAM, namely the Eigenfactor score and Article Influence score. The Eigenfactor score is a modified 5YIF, and the Article Influence score is a standardized Eigenfactor score. For a JCR year, the Eigenfactor score of an ISI journal is defined as:

**Definition 6:**

**Eigenfactor score = a modified 5YIF, which aggregates citations to ISI journals in both the sciences and social sciences, eliminates journal self-citations, and**

**“weights each reference according to a stochastic measure of the amount of time researchers spend reading the journal” (ISI, 2010).**

Eliminating journal self-citations is becoming increasingly important given the apparent inflation in journal self-citations across many ISI journals in recent years.

The Article Influence score measures the relative importance of an ISI journal on a per-article basis. Normalization ensures that the sum total of articles from all journals is 1, and the mean Article Influence score is 1.00.

For a JCR year, Article Influence of an ISI journal is defined as:

**Definition 7:**
**Article Influence = Eigenfactor score divided by the fraction of all ISI articles published by the ISI journal.**

Article Influence might be more appropriately called a **ST**andardized **I**mpact **F**actor **F**or **F**ive **Y**ears.

### 2.2.2 Daily Updated ISI RAM

Other ISI RAM can be updated daily, and are reported for a given day in the current year rather than the JCR year.

**(v) C3PO (updated daily)**

ISI reports the mean number of citations for an ISI journal, namely total citations up to a given day divided by the number of papers published in an ISI journal up to the same day, as the “average” number of citations. In order to distinguish the mean from the median and mode, the C3PO of an ISI journal on any given day is defined as:

**Definition 8:**

**C3PO (Citation Performance Per Paper Online) = Total citations to an ISI journal in ISI/Total papers published in an ISI journal.**

Thus, C3PO for 28 April 2010 is based on total citations and total papers up to and including 28 April 2010.

[Note: C3PO should not be confused with C-3PO, the Star Wars android.]

**(vi) h-index (updated daily)**

Although the h-index (Hirsch, 2005)) was originally intended to assess the research productivity and citations impact of academic researchers, it can also be used to assess the impact of publications in ISI journals. The h-index of an ISI journal on any given day is based on cited and citing papers, including self citations of ISI journals, and is defined as:

**Definition 9:**

**h-index = each of h papers in an ISI journal has been cited at least h times in ISI journals.**

Thus, the h-index for 28 April 2010 is based on total citations and total papers up to and including 28 April 2010.

### 2.3 Reasons for presenting a new RAM (updated daily)

Existing RAM as performance criteria focus on papers that are actually cited at least once, including self-citations by one or more authors, and on the frequency of such citations. To date, there does not seem to be a RAM that measures the number of papers in a journal that have never been cited. The lack of citations of a published paper, especially over an extended period, must surely detract from the quality of a journal by exposing: (i) what might be considered as incorrect decisions by the editorial board of a journal; and (ii) the lost opportunities of papers that might have been cited had they not been rejected in favour of papers that are ignored by the profession.

For this reason, we define a paper with Zinfluence as follows:

**Definition 10:**

**Zinfluence = zero influence, based on zero citations in ISI journals.**

Zinfluence can be measured by the **PI-BETA (= Papers Ignored (PI) - By Even The Authors (BETA))** ratio, and is calculated for an ISI journal on any given day as:

**Definition 11:**

**PI-BETA = Number of Zinfluence papers in an ISI journal/Total papers published in an ISI journal.**

Thus, PI-BETA for 28 April 2010 is based on Zinfluence and total papers up to and including 28 April 2010.

### 2.5 Caveats regarding ISI RAM

Although ISI RAM can be very useful and informative, it is worth emphasizing that it is not entirely free of measurement error. The following caveats should be carefully considered before using ISI RAM. The inclusion of all articles in an ISI journal includes papers, abstracts and book reviews, and possibly even conference reviews, software reports, and letters to the editor. This may explain, at least in part, the noticeable changes over time in terms of fewer abstracts and book reviews in some ISI journals, at least in the Economics category.

It is also important to note that correct ISI citations can be affected by misspellings of the titles of journals and names of authors; incorrect use of author's initials; and incorrect year of publication, volume number, and/or the starting page number of the ISI journal article. Only those citations that are correct in every respect will be attributed correctly to the cited author. Otherwise, any error will lead to a different citation, such that the total citations of a publication for a particular author will be too low. We hasten to add that any such missing in action (MIA) citations is the responsibility of the citing author(s), and not of ISI.

Two examples that highlight MIA citations are as follows: (1) the specification test of J.A. Hausman (Econometrica, 1978, 46(6), 1251-1271), has citations variously recorded under J. Hausman and J.A. Hausman, and with numerous variations in the year, volume, and starting page number, leading to an additional 118 citations relative to 2,495 correct citations, with an error rate of almost 5%; and (2) the cointegration analysis paper of R.F. Engle and C.W.J. Granger (Econometrica, 1987, 55(2), 251-276), has citations variously recorded under R. Engle and R.F. Engle, and with numerous variations in the year, volume, and starting page number, leading to an additional 205 citations relative to 4,252 correct citations, with an error rate of almost 5%. We did not check for spelling variations on the names of any authors, otherwise the permutations would be neverending.

Further caveats relate to the date of downloading ISI RAM, as daily updates will change the h-index, C3PO and PI-BETA scores. The time period for downloading ISI RAM should also be noted as all the ISI RAM will change annually. Finally, the specific time of day (or night) at which the daily ISI updates takes place can change the data period, with 1988-2010 seemingly being the default option when the full database is not accessible. For journals such as Nature and Science, which have a high frequency of publication and also publish a large number of articles, the default option for daily ISI RAM updates would seem to be four years at most. Otherwise, the threshold of 10,000 articles for purposes of daily ISI RAM updates will be exceeded.

## 3. ISI RAM Data

The primary purpose of this section is to evaluate great papers and great journal in econometrics. The 8 leading econometrics journals chosen from the ISI Economics category for inclusion in the ISI RAM analysis are as follows:

**<u>8 leading econometrics journals</u>**

(i) Econometrica
(ii) Review of Economics and Statistics (REStat)
(iii) Journal of Econometrics (J. Econometrics)
(iv) Econometric Theory (ET)
(v) Journal of Business & Economic Statistics (JBES)
(vi) Journal of Applied Econometrics (J. Applied Econometrics)
(vii) Econometric Reviews
(viii) Econometrics Journal

For purposes of comparison with the 8 leading econometrics journals, the following 4 leading statistics journals chosen from the ISI Statistics & Probability category are also considered:

**<u>4 leading statistics journals</u>**

(i) Annals of Statistics (Annals)
(ii) Biometrika
(iii) Journal of the American Statistical Association (JASA)
(iv) Journal of the Royal Statistical Society, Series B (JRSSB)

Only articles from ISI Web of Science are included in the citation data. The ISI RAM data for the econometrics and statistics journals were downloaded from ISI as follows. Data for the econometrics journals were downloaded from ISI on 28 April 2010 for all citations for 1988-2010, so that citations are counted from 1988 for all papers published in an ISI journal from its inception. Econometric Reviews and Econometrics Journal have been included in ISI for only 2 years, so that the ISI RAM data are reported only in Table 1. The data for the economics and statistics journals in Table 17 were downloaded from ISI on 19 May 2010 for all citations for 1988-2010.

The data for the 4 statistics journals were downloaded from ISI on 19 May 2010 for all citations for 1988-2010, so that citations are counted from 1988 for all papers published in an ISI journal from its inception, except for JASA. As ISI does not provide daily updates for more than 10,000 articles for purposes of calculating the h-index, C3PO and PI-BETA, the ISI data for JASA is for the period 1955-2010.

## 4. Analysis of ISI RAM data

Table 1 gives the ISI RAM for 8 econometrics and 4 statistics journals. The 2YIF for the 12 journals are in line with what would be expected of leading journals in the two fields. The 5YIF figures, and hence also Article Influence, are not available for Econometric Reviews and Econometrics Journal as they have been ISI journals for less than three years. In all cases, 5YIF exceeds 2YIF, sometimes considerably, though for JBES the difference is small. For a journal that has been in ISI for less than 3 years, Econometric Reviews has a respectable 2YIF. The Immediacy (or 0YIF) is amazingly high for Econometric Reviews, followed distantly by Annals, JRSSB and REStat. The h-index for Econometrica is high at 201, followed closely by JASA and Biometrika, then by Annals, J. Econometrics, JRSSB and REStat. C3PO is high for JRSSB, followed by Econometrica, Biometrika, JASA, Annals and J. Econometrics. Article Influence is highest for Econometrica, followed distantly by REStat, JRSSB, JASA and Annals.

The PI-BETA scores in Table 1 are revealing. The two newest entrants in the table have high scores as they do not include papers older than two years for purposes of scoring citations. Econometrica has PI-BETA of 0.407, which indicates that 40.7% of all articles in the journal (that is, 2770 of 6798) have never been cited. Only slightly higher is ET, where the PI-BETA of 0.418 shows that 41.8% (or 556 of 1329) articles have never been cited. Not far behind is JASA, with PI-BETA of 0.327 which shows that 32.7% of articles in the journal have never been cited. At the other end of the spectrum, PI-BETA of Annals and Biometrika show that a relatively low 10.4% and 11.5%, respectively, of their published papers have never been cited. Thus, it is clear that not all papers in great journals are great. In particular, the modal citation for most of these ISI journals is zero, and the median citation is typically one.

The simple correlations for the 7 ISI RAM for the 6 econometrics and 4 statistics journals are given in Table 2, with Econometric Reviews and Econometrics Journal excluded as their ISI RAM data only cover a 2-year period. The correlations for the pairs (2YIF, 5YIF), (2YIF, Article Influence), and (5YIF, Article Influence) are very high at 0.967, 0.932 and 0.923, respectively. Thus, the 2-year and 5-year impact factors are highly correlated with each other, and each is also highly correlated with Article Influence. Overall, 2YIF, 5YIF and Article Influence seem to be capturing similar ISI RAM for the leading econometrics and statistics journals combined, whereas Immediacy and the new PI-BETA are not highly correlated with any of the other five ISI RAM.

As the aggregation of the ISI RAM for econometrics and statistics might be masking some differences between the two disciplines, the simple correlations are recalculated separately in Tables 3 and 4, respectively. The simple correlations for the 7 ISI RAM for the 6 econometrics journals are given in Table 3. As in the case of Table 2, the correlations for the three pairs (2YIF, 5YIF), (2YIF, Article Influence), and (5YIF, Article Influence) are very high at 0.961, 0.969 and 0.972, respectively. The correlations for the pairs (2YIF, h-index), (5YIF, h-index), (2YIF, C3PO), (5YIF, C3PO), (h-index, Article Influence) and (h-index, C3PO) are also very high. In short, 2YIF, 5YIF, h-index, C3PO and Article Influence seem to be capturing similar ISI RAM for the leading econometrics journals, whereas Immediacy and PI-BETA are not highly correlated with any of the other five ISI RAM criteria.

Table 4 reports the simple correlations for the 7 ISI RAM for the 4 statistics journals. As in the case of Table 2, the correlations for the three pairs (2YIF, 5YIF), (2YIF, Article Influence), and (5YIF, Article Influence) are extremely high at 0.993, 0.996 and 0.985, respectively. The correlation for the pair (h-index, Immediacy) is large and negative at -0.900, which suggests that cutting-edge research with high Immediacy will be negatively correlated with the h-index. In summary, 2YIF, 5YIF and Article Influence are virtually interchangeable ISI RAM for the 4 leading statistics journals, and PI-BETA is not highly correlated with any of the other six ISI RAM criteria.

The 25 most highly cited econometrics and economics papers in Econometrica since its inception are given in Table 5. The table speaks for itself. It is interesting that 17 of the 25 most highly cited and influential papers in Econometrica are in econometric theory, and that 9 of the 17 econometrics papers are related to time series analysis. There are 8 Nobel Laureates in the list of 25 most highly cited papers, including highly technical and novel papers on econometrics and economic theory.

Table 6 provides the 25 most highly cited econometrics and economics papers in REStat since its inception.  This table also speaks volumes. There is an eclectic mixture of theoretical and applied economics, econometrics and statistics papers, with 8 Nobel Laureates in the list of 25 most highly cited papers, including four sole-authored economic theory papers by Paul Samuelson. The celebrated CES production function (paper 6) has two Nobel Laureates as co-authors.

The 25 most highly cited papers in Journal of Econometrics since its inception are given in Table 7. More than one-half of the novel contributions are in time series, with virtually all of the influential time series papers related to unit roots and cointegration, with two papers on univariate conditional volatility models, namely papers 1 and 3. Clive Granger has four papers in this list, and Robert Engle has two.

Table 8 presents the 25 most highly cited econometrics papers in Econometric Theory since its inception. The 15 papers on theoretical time series (namely, 9 on univariate and multivariate volatility and 6 on cointegration), and other influential papers on asymptotic theory, panel data, model specification and estimation methods, are technically proficient, insightful and innovative contributions to econometric theory.

The 25 most highly cited econometrics papers in JBES since its inception are given in Table 9. The 15 papers on theoretical times series (namely 10 on unit roots and cointegration, and 4 on stochastic volatility and conditional volatility models), and other influential papers on predictive accuracy, inference, vector autoregressions, and structural change, are novel contributions to econometric theory.

Table 10 gives the 25 most highly cited theoretical and applied econometrics papers in Journal of Applied Econometrics since its inception. Highly innovative papers on a variety of challenging topics is presented, including 4 papers on univariate and multivariate conditional volatility models, and novel papers on discrete choice, structural change, economic growth, convergence, and business cycles.

It is clear that these great Laureates, great authors and great papers make each of these six econometrics journals truly great.

Many significant papers in statistical theory have been widely cited in leading econometrics journals, and this is shown in Tables 11-14 where the 10 most highly cited papers in 4 leading statistics journals are given. The first paper in Annals of Statistics in Table 11 would be known to most empirical economists and econometrics as the originator of the Schwarz Bayesian information criterion (BIC). The second paper by Efron on the bootstrap and the jackknife is also widely known and cited.

Biometrika has produced many classic papers, including the Shapiro-Wilk test of normality (paper 2 in Table 12), and the renowned Phillips-Perron test of a unit root (paper 7). Although not reported here, the classic Durbin and Watson DW test papers in 1950 and 1951 have garnered 721 and 807 citations, respectively. This is all the more impressive when it is clear that the DW test is so familiar and so widely used that it requires no citation to the original contributions.

The 10 most highly cited papers in JASA in Table 13 reveal an incredible 34,010 citations to the Kaplan-Meier nonparametric estimator. Paper 4 by Dickey and Fuller in 1979 was a forerunner of the significant (Augmented) DF test in Econometrica in 1981, and has been even more frequently cited. Paper 9 by Zellner is the widely-used, influential and efficient seemingly unrelated regression equations (SURE) estimator. Both the DF test and SURE estimator have become so familiar to practitioners, especially in econometrics, that it is somewhat surprising to see that they are still being cited.

Table 14 presents the 10 most highly cited papers in JRSSB. Not surprisingly, three of the ten papers are by D.R. Cox, including papers 1 and 2, the first of which on life tables has an amazing 24,475 citations. Paper 2 is the delightfully-named Box-Cox transformation, which has been especially widely used in empirical economics and econometrics. The **RE**gression **S**pecification **E**rror **T**est (RESET) of Ramsey (paper 7) is now an essential diagnostic check of functional form in any econometrics computer software package. The classic Cox test of separate models (paper 9) is the origin of the non-nested testing literature in econometrics.

Each of these classic papers by great authors makes these 4 statistics journals truly great.

The 100 most highly cited papers in econometrics are listed in Table 15 according to author, year, journal and number of citations. The table gives a veritable Who's Who of leading authors and classic papers in the profession. Econometrica has 64 papers in the 100 most highly cited papers in econometrics, with 9 of the top 10, 16 of 20, 24 of 30, 29 of 40, 35 of 50, 44 of 60, 51 of 70, 55 of 80, and 59 of 90. It goes without saying that Econometrica is monumentally significant to the development of econometrics.

Authors with two or more papers in the 100 most highly cited papers in econometrics are presented in Table 16 according to the number of papers and the number of sole-authored papers. This list also shows 6 Nobel Laureates, namely R.F. Engle, C.W.J. Granger, J.J. Heckman, J. Tobin, D. McFadden, and R.M. Solow. K.J. Arrow has one citation for the CES production function (with Solow as one of the three co-authors), but his significant lifetime contributions to economic theory would not be regarded as econometric in nature. The table also suggests that what many if not most Nobel Laureates say is true, namely that it helps to have great co-authors. Only Tobin has 3 sole-authored papers from 3 in the list, while Heckman has 3 papers of 4 in the list that are sole-authored, and Solow has 1 of 2 papers in the list that is sole-authored.

Finally, some highly cited econometrics papers in journals that were not considered in this paper are given in Table 17. In the Review of Economic Studies, the Arellano-

Bond panel data estimator, the Breusch-Pagan Lagrange multiplier paper with applications to model specification, and Phillips-Hansen test for instrumental variables regression and I(1) processes, have 1495, 583 and 536 citations, respectively. Oxford Bulletin of Economics and Statistics has the Johansen and Juselius estimation and inference of cointegration, the Osterwald-Lenum asymptotic distribution of the cointegration rank test, and Granger's analysis of cointegrated economic variables, with 1692, 671 and 549 citations, respectively. International Economic Review has Pagan's analysis of generated regressors, and L.-F. Lee's simultaneous equations limited dependent variable model, with 575 and 441 citations, respectively.

## 5. Conclusion

The paper discussed alternative Research Assessment Measures (RAM), with an emphasis on the Thomson Reuters ISI Web of Science (hereafter ISI) database. Alternative ISI RAM that are calculated annually or updated daily were defined and analysed, including the classic 2-year impact factor (2YIF), 5-year impact factor (5YIF), Immediacy (or zero-year impact factor (0YIF)), Eigenfactor score, Article Influence, h-index, C3PO (Citation Performance Per Paper Online), Zinfluence, and the new PI-BETA (Papers Ignored - By Even The Authors) criterion.

The ISI RAM data were analysed for 8 leading econometrics journals and 4 leading statistics journals. The application to econometrics and statistics could be used as a template for other areas in the ISI Economics category, ISI Statistics & Probability category, for other scientific disciplines, and as a benchmark for newer journals in a range of disciplines.

In addition to evaluating high quality research in leading econometrics journals, the paper also compared econometrics and statistics, alternative RAM, highlighted the similarities and differences in alternative RAM criteria, found that several ISI RAM captured similar performance characteristics for the leading econometrics and statistics journals, determined that the new PI-BETA criterion was not highly correlated with any of the other ISI RAM, and hence conveyed additional information regarding ISI RAM, and highlighted major research areas in leading journals in econometrics.

Likely future uses of RAM include using ISI RAM criteria for research assessment exercises, and as input into academic appointments and promotions. Conundrums such as whether or not it is better to publish in a journal with: (i) high rather than low two-year impact factor; (ii) high rather than low five-year impact factor; (iii) high rather than low Immedaicy; (iv) high rather than low h-index; (v) high rather than low C3PO; (vi) low rather than high PI-BETA; and (vii) high rather than low Article Influence; as such choices may increase the probability of being cited, on average.

On the basis of the frequent appearance of Nobel Laureates in a few great journals in econometrics, the ISI RAM would also seem to be useful in predicting future Nobel Laureates in Economic Sciences, and the areas of research that are likely to be considered for such an award.

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**Table 1**

**Research Assessment Measures (RAM) for 8 Econometrics and 4 Statistics Journals**

| Journal | 2YIF | 5YIF | h-index | C3PO | PI-BETA (measures Zinfluence) | Immediacy (0YIF) | Article Influence |
|---|---|---|---|---|---|---|---|
| **Econometric Reviews** | 1.220 | - | 9 | 2.71 | 0.444 | 1.880 | - |
| **Econometric Theory** | 0.768 | 1.349 | 48 | 7.75 | 0.418 | 0.185 | 1.311 |
| **Econometrics Journal** | 0.750 | - | 7 | 1.55 | 0.591 | 0.065 | - |
| **Econometrica** | 3.865 | 4.943 | 201 | 35.02 | 0.407 | 0.255 | 7.243 |
| **J. Applied Econometrics** | 1.274 | 1.971 | 48 | 11.30 | 0.259 | 0.125 | 1.595 |
| **JBES** | 1.848 | 2.033 | 71 | 16.13 | 0.235 | 0.346 | 1.966 |
| **REStat** | 2.233 | 3.630 | 103 | 16.65 | 0.203 | 0.492 | 3.887 |
| **J. Econometrics** | 1.790 | 2.625 | 110 | 22.79 | 0.132 | 0.211 | 2.284 |
| **Annals of Statistics** | 2.307 | 3.094 | 133 | 27.33 | 0.104 | 0.614 | 2.998 |
| **Biometrika** | 1.405 | 1.887 | 165 | 31.65 | 0.115 | 0.307 | 1.787 |
| **JASA** | 2.394 | 3.462 | 190 | 27.63 | 0.327 | 0.187 | 3.013 |
| **JRSSB** | 2.835 | 3.943 | 104 | 44.93 | 0.175 | 0.551 | 3.476 |

**Note:** Data for econometrics (statistics) journals downloaded from ISI on 28 April 2010 (19 May 2010) for all citations for 1988-2010. Econometric Reviews and Econometrics Journal have been included in ISI for only2 years.

## Table 2

**Correlation Matrix for 6 Econometrics and 4 Statistics Journals**

| **RAM** | **2YIF** | **5YIF** | **h-index** | **C3PO** | **PI-BETA** | **Immediacy (0YIF)** | **Article Influence** |
|---|---|---|---|---|---|---|---|
| **2YIF** | - | | | | | | |
| **5YIF** | 0.967 | - | | | | | |
| **h-index** | 0.675 | 0.646 | - | | | | |
| **C3PO** | 0.717 | 0.676 | 0.674 | - | | | |
| **PI-BETA** | 0.118 | 0.116 | 0.017 | -0.280 | - | | |
| **Immediacy (0YIF)** | 0.360 | 0.367 | 0.069 | 0.447 | -0.560 | - | |
| **Article Influence** | 0.932 | 0.923 | 0.642 | 0.534 | 0.308 | 0.211 | - |

**Note:** Data for econometrics (statistics) journals downloaded from ISI on 28 April 2010 (19 May 2010) for all citations for 1988-2010. Econometric Reviews and Econometrics Journal are not included as the data only cover a 2-year period.

**Table 3**

**Correlation Matrix for 6 Econometrics Journals**

| **RAM** | **2YIF** | **5YIF** | **h-index** | **C3PO** | **PI-BETA** | **Immediacy (0YIF)** | **Article Influence** |
|---|---|---|---|---|---|---|---|
| **2YIF** | - | | | | | | |
| **5YIF** | 0.961 | - | | | | | |
| **h-index** | 0.960 | 0.944 | - | | | | |
| **C3PO** | 0.940 | 0.886 | 0.974 | - | | | |
| **PI-BETA** | 0.166 | 0.112 | 0.189 | 0.066 | - | | |
| **Immediacy (0YIF)** | 0.335 | 0.400 | 0.219 | 0.136 | -0.300 | - | |
| **Article Influence** | 0.969 | 0.972 | 0.955 | 0.886 | 0.327 | 0.300 | - |

**Note:** Data downloaded from ISI on 28 April 2010. Econometric Reviews and Econometrics Journal are not included as the data only cover a 2-year period.

## Table 4

## Correlation Matrix for 4 Statistics Journals

| **RAM** | **2YIF** | **5YIF** | **h-index** | **C3PO** | **PI-BETA** | **Immediacy (0YIF)** | **Article Influence** |
|---|---|---|---|---|---|---|---|
| **2YIF** | - | | | | | | |
| **5YIF** | 0.993 | - | | | | | |
| **h-index** | -0.518 | -0.430 | - | | | | |
| **C3PO** | 0.472 | 0.450 | -0.741 | - | | | |
| **PI-BETA** | 0.368 | 0.470 | 0.561 | -0.132 | - | | |
| **Immediacy (0YIF)** | 0.412 | 0.305 | -0.900 | 0.373 | -0.685 | - | |
| **Article Influence** | 0.996 | 0.985 | -0.505 | 0.400 | 0.349 | 0.440 | - |

**Note:** Data downloaded from ISI on 19 May 2010.

**Table 5**

**25 Most Highly Cited Papers in Econometrica**

| Rank | Author(s) | Title | Year | Citations |
|---|---|---|---|---|
| 1 | D. Kahneman, A. Tversky | Prospect Theory - Analysis of Decision Under Risk | 1979 | 5,844 |
| 2 | H. White | A Heteroskedasticity-Consistent Covariance-Matrix Estimator and a Direct Test for Heteroskedasticity | 1980 | 5,416 |
| 3 | R.F. Engle, C.W.J. Granger | Cointegration and Error Correction - Representation, Estimation, and Testing | 1987 | 4,252 |
| 4 | J.J. Heckman | Sample Selection Bias as a Specification Error | 1979 | 3,966 |
| 5 | R.F. Engle | Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation | 1982 | 3,035 |
| 6 | J.A. Hausman | Specification Tests in Econometrics | 1978 | 2,495 |
| 7 | W.K. Newey, K.D. West | A Simple, Positive Semidefinite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix | 1987 | 2,295 |
| 8 | L.P. Hansen | Large Sample Properties of Generalized-Method of Moments Estimators | 1982 | 2,095 |
| 9 | D.A. Dickey, W.A. Fuller | Likelihood Ratio Statistics for Autoregressive Time-Series with a Unit-Root | 1981 | 1,887 |
| 10 | J.W. Pratt | Risk-Aversion in the Small and In the Large | 1964 | 1,680 |
| 11 | G.C. Chow | Tests of Equality Between Sets of Coefficients in 2 Linear Regressions | 1960 | 1,575 |
| 12 | J.F. Nash | The Bargaining Problem | 1950 | 1,517 |

| | | | | |
|---|---|---|---|---|
| 13 | C.A. Sims | Macroeconomics and Reality | 1980 | 1,514 |
| 14 | S. Johansen | Estimation and Hypothesis-Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models | 1991 | 1,433 |
| 15 | P. Perron | The Great Crash, The Oil Price Shock, and the Unit-Root Hypothesis | 1989 | 1,326 |
| 16 | H. White | Maximum-Likelihood Estimation of Mis-Specified Models | 1982 | 1,304 |
| 17 | J.C. Cox,<br>J.E. Ingersoll,<br>S.A. Ross | A Theory of the Term Structure of Interest-Rates | 1985 | 1,219 |
| 18 | J.F. Muth | Rational-Expectations and the Theory of Price Movements | 1961 | 1,184 |
| 19 | A. Rubinstein | Perfect Equilibrium in a Bargaining Model | 1982 | 1,154 |
| 20 | J.D. Hamilton | A New Approach to the Economic-Analysis of Nonstationary Time-Series and the Business-Cycle | 1989 | 1,139 |
| 21 | J. Tobin | Estimation of Relationships for Limited Dependent-Variables | 1958 | 1,121 |
| 22 | R. Koenker,<br>G. Bassett | Regression Quantiles | 1978 | 1,022 |
| 23 | A.S. Kyle | Continuous Auctions and Insider Trading | 1985 | 1,015 |
| 24 | F.E. Kydland,<br>E.C. Prescott | Time To Build and Aggregate Fluctuations | 1982 | 987 |
| 25 | D.B. Nelson | Conditional Heteroskedasticity in Asset Returns - A New Approach | 1991 | 973 |

**Note:** Data downloaded from ISI on 28 April 2010.

**Table 6**

**25 Most Highly Cited Papers in Review of Economics and Statistics**

| Rank | Author(s) | Title | Year | Citations |
|---|---|---|---|---|
| 1 | J. Lintner | The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets | 1965 | 1,319 |
| 2 | R.M. Solow | Technical Change and the Aggregate Production Function | 1957 | 1,298 |
| 3 | P.A. Samuelson | The Pure Theory of Public Expenditure | 1954 | 1,129 |
| 4 | L.R. Christenson, D.W. Jorgenson, L.J. Lau | Transcendental Logarithmic Production Frontiers | 1973 | 654 |
| 5 | R.C. Merton | Lifetime Portfolio Selection under Uncertainty - Continuous-Time Case | 1969 | 591 |
| 6 | K.J. Arrow, H.B. Chenery, B.S. Minhas, R.M. Solow | Capital-Labor Substitution and Economic-Efficiency | 1961 | 589 |
| 7 | E.R. Berndt, D.O. Wood | Technology, Prices, and Derived Demand for Energy | 1975 | 438 |
| 8 | T. Bollerslev | A Conditionally Heteroskedastic Time-Series Model for Speculative Prices and Rates of Return | 1987 | 413 |
| 9 | J.F. McDonald, R.A. Moffitt | The Uses of Tobit Analysis | 1980 | 411 |
| 10 | B.R. Moulton | An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units | 1990 | 373 |
| 11 | J. Tobin | The Interest-Elasticity of Transactions Demand for Cash | 1956 | 370 |
| 12 | T. Bollerslev | Modeling the Coherence in Short-Run Nominal Exchange-Rates - A | 1990 | 357 |

| | | | | |
|---|---|---|---|---|
| | | Multivariate Generalized ARCH Model | | |
| 13 | P.A. Samuelson | Lifetime Portfolio Selection by Dynamic Stochastic Programming | 1969 | 351 |
| 14 | M. Olson,<br>R. Zeckhauser | Economic Theory of Alliances | 1966 | 329 |
| 15= | I. Krinsky,<br>A.L. Robb | On Approximating the Statistical Properties of Elasticities | 1986 | 313 |
| 15= | D.E. Farrar,<br>R.R. Glauber | Multicollinearity in Regression Analysis - Problem Revisited | 1967 | 313 |
| 17 | H.S. Houthakker,<br>S.P. Magee | Income And Price Elasticities in World Trade | 1969 | 277 |
| 18 | P.A. Samuelson | Theoretical Notes on Trade Problems | 1964 | 274 |
| 19 | W. Leontief | Environmental Repercussions and Economic Structure - Input-Output Approach | 1970 | 272 |
| 20= | J.H. Bergstrand | The Gravity Equation in International-Trade - Some Microeconomic Foundations and Empirical-Evidence | 1985 | 271 |
| 20= | P.A. Samuelson | Diagrammatic Exposition Of A Theory Of Public Expenditure | 1955 | 271 |
| 22 | R.C. Fair | Effect of Economic Events on Votes for President | 1978 | 242 |
| 23 | M. Baxter,<br>R.G. King | Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series | 1999 | 240 |
| 24 | W.S. Comanor,<br>T.A. Wilson | Advertising Market Structure and Performance | 1967 | 236 |
| 25 | M.E. Porter | Structure within Industries and Companies Performance | 1979 | 232 |

**Note:** Data downloaded from ISI on 28 April 2010.

**Table 7**

**25 Most Highly Cited Papers in Journal of Econometrics**

| Rank | Author(s) | Title | Year | Citations |
|---|---|---|---|---|
| 1 | T. Bollerslev | Generalized Autoregressive Conditional Heteroskedasticity | 1986 | 2,370 |
| 2 | D. Kwiatkowski, P.C.B. Phillips, P. Schmidt, Y.C. Shin | Testing The Null Hypothesis of Stationarity Against The Alternative of a Unit-Root - How Sure are we that Economic Time-Series have a Unit-Root | 1992 | 1,211 |
| 3 | T. Bollerslev, R.Y. Chou, K.F. Kroner | ARCH Modeling in Finance - A Review of the Theory and Empirical-Evidence | 1992 | 859 |
| 4 | R. Blundell, S. Bonds | Initial Conditions and Moment Restrictions in Dynamic Panel Data Models | 1998 | 666 |
| 5 | R.F. Engle, B.S. Yoo | Forecasting and Testing in Co-Integrated Systems | 1987 | 641 |
| 6 | K.S. Im, M.H. Pesaran, Y. Shin | Testing for Unit Roots in Heterogeneous Panels | 2003 | 528 |
| 7 | J. Jondrow, C.A.K. Lovell, I.S. Materov, P. Schmidt | On the Estimation of Technical Inefficiency in the Stochastic Frontier Production Function Model | 1982 | 519 |
| 8 | M. Arellano, O. Bover | Another Look at the Instrumental Variable Estimation of Error-Components Models | 1995 | 514 |
| 9 | W.L. Goffe, G.D. Ferrier, J. Rogers | Global Optimization of Statistical Functions with Simulated Annealing | 1994 | 499 |
| 10 | S. Hylleberg, R.F. Engle, C.W.J. Granger, B.S. Yoo | Seasonal Integration and Cointegration | 1990 | 424 |
| 11 | A. Levin, C.F. Lin, C.S.J. Chu | Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties | 2002 | 387 |

| | | | | |
|---|---|---|---|---|
| 12 | C.W.J. Granger | Some Properties of Time-Series Data and their use in Econometric-Model Specification | 1981 | 386 |
| 13 | P.C.B. Phillips | Understanding Spurious Regressions in Econometrics | 1986 | 372 |
| 14= | S. Johansen, K. Juselius | Testing Structural Hypotheses In a Multivariate Cointegration Analysis of the PPP and the UIP for UK | 1992 | 358 |
| 14= | C.W.J. Granger | Some Recent Developments in a Concept of Causality | 1988 | 358 |
| 16 | L.M. Seiford, R.M. Thrall | Recent Developments in DEA - the Mathematical-Programming Approach to Frontier Analysis | 1990 | 348 |
| 17 | B.R. Moulton | Random Group Effects and the Precision of Regression Estimates | 1986 | 326 |
| 18 | A. Charnes, W.W. Cooper, B. Golany, L. Seiford, J. Stitz | Foundations of Data Envelopment Analysis for Pareto-Koopmans Efficient Empirical Production-Functions | 1985 | 308 |
| 19 | C.W.J. Granger | Long Memory Relationships and the Aggregation of Dynamic-Models | 1980 | 301 |
| 20 | T. Amemiya | Tobit Models - A Survey | 1984 | 286 |
| 21 | R.T. Baillie | Long memory processes and Fractional Integration in Econometrics | 1986 | 283 |
| 22 | J.L. Powell | Least Absolute Deviations Estimation for the Censored Regression-Model | 1984 | 275 |
| 23 | Z. Griliches, J.A. Hausman | Errors in Variables in Panel Data | 1986 | 268 |
| 24 | M.H. Pesaran, R. Smith | Estimating Long-Run Relationships from Dynamic Heterogeneous Panels | 1995 | 266 |
| 25 | F.R. Forsund, C.A.K. Lovell, P. Schmidt | A Survey of Frontier Production-Functions and of their Relationship to Efficiency Measurement | 1980 | 263 |

**Note:** Data downloaded from ISI on 28 April 2010.

**Table 8**

**25 Most Highly Cited Papers in Econometric Theory**

| Rank | Author(s) | Title | Year | Citations |
|---|---|---|---|---|
| 1 | R.F. Engle, K.F. Kroner | Multivariate Simultaneous Generalized ARCH | 1995 | 351 |
| 2 | D.B. Nelson | Stationarity and Persistence in the GARCH(1,1) Model | 1990 | 208 |
| 3 | A.R. Gallant, G. Tauchen | Which Moments to Match? | 1996 | 203 |
| 4= | P. Saikkonen | Asymptotically Efficient Estimation of Cointegration Regressions | 1991 | 198 |
| 4= | J.Y. Park, P.C.B. Phillips | Statistical-Inference in Regressions with Integrated Processes .1. | 1988 | 198 |
| 6 | J.Y. Park, P.C.B. Phillips | Statistical-Inference in Regressions with Integrated Processes .2. | 1989 | 142 |
| 7 | S.W. Lee, B.E. Hansen | Asymptotic Theory for the GARCH(1,1) Quasi-Maximum Likelihood Estimator | 1994 | 131 |
| 8 | P. Pedroni | Panel Cointegration: Asymptotic and Finite Sample Properties of Pooled Time Series Tests with an Application to the PPP Hypothesis | 2004 | 122 |
| 9 | D. Pollard | Asymptotics for Least Absolute Deviation Regression-Estimators | 1991 | 116 |
| 10 | S. Chib, E. Greenberg | Markov Chain Monte Carlo Simulation Methods in Econometrics | 1996 | 103 |
| 11 | Y.C. Shin | A Residual-Based Test of the Null of Cointegration against the Alternative of no Cointegration | 1994 | 101 |
| 12 | P.C.B. Phillips | Partially Identified Econometric-Models | 1989 | 100 |
| 13 | E. Masry, D. Tjostheim | Nonparametric-Estimation and Identification Of Nonlinear ARCH Time-Series - Strong-Convergence | 1995 | 99 |

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|---|---|---|---|---|
| | | and Asymptotic Normality | | |
| 14 | J.M. Wooldridge | A Unified Approach to Robust, Regression-Based Specification Tests | 1990 | 90 |
| 15 | S.Q. Ling, M. McAleer | Asymptotic Theory for a Vector ARMA-GARCH Model | 2003 | 87 |
| 16= | S.Q. Ling, M. McAleer | Necessary and Sufficient Moment Conditions for the GARCH(r,s) and Asymmetric Power GARCH(r,s) Models | 2002 | 82 |
| 16= | M. Carrasco, X.H. Chen | Mixing and Moment Properties of Various GARCH and Stochastic Volatility Models | 2002 | 82 |
| 16= | W.K. Newey | Kernel Estimation of Partial Means and a General Variance Estimator | 1994 | 82 |
| 16= | A.W. Lo | Maximum-Likelihood Estimation of Generalized Ito Processes with Discretely Sampled Data | 1988 | 82 |
| 20= | B.H. Baltagi, P.X. Wu | Unequally Spaced Panel Data Regressions with AR(1) Disturbances | 1999 | 81 |
| 20= | B.E. Hansen | Convergence to Stochastic Integrals for Dependent Heterogeneous Processes | 1992 | 81 |
| 22 | M. McAleer | Automated Inference snd Learning in Modeling Financial Volatility | 2005 | 74 |
| 23 | T. Jeantheau | Strong Consistency of Estimators for Multivariate ARCH Models | 1998 | 72 |
| 24 | S. Johansen | A Representation of Vector Autoregressive Processes Integrated of Order-2 | 1992 | 71 |
| 25 | B.M. Potscher | Effects of Model Selection on Inference | 1991 | 70 |

**Note:** Data downloaded from ISI on 28 April 2010.

**Table 9**

**25 Most Highly Cited Papers in Journal of Business & Economic Statistics**

| Rank | Author(s) | Title | Year | Citations |
|---|---|---|---|---|
| 1 | E. Zivot, D.W.K. Andrews | Further Evidence on the Great Crash, the Oil-Price Shock, and the Unit-Root Hypothesis | 1992 | 636 |
| 2 | F.X. Diebold, R.S. Mariano | Comparing Predictive Accuracy | 1995 | 634 |
| 3 | G.W. Schwert | Tests for Unit Roots - A Monte-Carlo Investigation | 1989 | 360 |
| 4 | A.Banerjee, R.L. Lumsdaine, J.H. Stock | Recursive and Sequential-Tests of the Unit-Root and Trend-Break Hypotheses - Theory and International Evidence | 1992 | 329 |
| 5 | K.M. Murphy, R.H. Topel | Estimation and Inference in 2-Step Econometric-Models | 1985 | 319 |
| 6 | E. Jacquier, N.G. Polson, P.E. Rossi | Bayesian-Analysis of Stochastic Volatility Models | 1994 | 261 |
| 7 | P. Perron | Testing for a Unit-Root in a Time-Series with a Changing Mean | 1990 | 252 |
| 8 | B.E. Hansen | Tests for Parameter Instability in Regressions with I(1) Processes | 1992 | 241 |
| 9 | R.T. Baillie, T. Bollerslev | The Message In Daily Exchange-Rates - A Conditional-Variance Tale | 1989 | 231 |
| 10 | L.C. Alwan, H.V. Roberts | Time-Series Modeling for Statistical Process-Control | 1988 | 225 |
| 11 | P. Perron, T.J. Vogelsang | Nonstationarity and Level Shifts with An Application to Purchasing Power Parity | 1992 | 217 |
| 12 | J.H. Stock, J.H. Wright, M. Yogo | A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments | 2002 | 214 |

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|---|---|---|---|---|
| 13 | R. Engle | Dynamic Conditional Correlation: A Simple Class of Multivariate Generalized Autoregressive Conditional Heteroskedasticity Models | 2002 | 206 |
| 14 | R.B. Litterman | Forecasting with Bayesian Vector Autoregressions - 5 Years of Experience | 1986 | 200 |
| 15= | B.D. Meyer | Natural and Quasi-Experiments in Economics | 1995 | 199 |
| 15= | D.A. Dickey, S.G. Pantula | Determining the Order of Differencing in Autoregressive Processes | 1987 | 199 |
| 17 | D.E. Runkle | Vector Autoregressions and Reality | 1987 | 191 |
| 18 | J.H. Stock, M.W. Watson | Macroeconomic Forecasting using Diffusion Indexes | 2002 | 177 |
| 19 | W. Enders, C.W.J. Granger | Unit-Root Tests and Asymmetric Adjustment with an Example Using the Term Structure of Interest Rates | 1998 | 176 |
| 20 | L.J. Christiano | Searching for a Break In GNP | 1992 | 170 |
| 21 | A. Hall | Testing for a Unit-Root in Time-Series with Pretest Data-Based Model Selection | 1994 | 168 |
| 22 | S.G. Pantula, G. Gonzalezfarias, W.A. Fuller | A Comparison of Unit-Root Test Criteria | 1994 | 167 |
| 23 | A.C. Harvey | Trends and Cycles in Macroeconomic Time-Series | 1985 | 185 |
| 24 | D.A. Hsieh | Modeling Heteroscedasticity in Daily Foreign-Exchange Rates | 1989 | 157 |
| 25 | C.G. Lamoureux, W.D. Lastrapes | Persistence in Variance, Structural-Change, and the GARCH Model | 1990 | 155 |

**Note:** Data downloaded from ISI on 28 April 2010.

## Table 10

## 25 Most Highly Cited Papers in Journal of Applied Econometrics

| Rank | Author(s) | Title | Year | Citations |
|---|---|---|---|---|
| 1 | D. McFadden, K. Train | Mixed MNL Models for Discrete Response | 2000 | 333 |
| 2 | M.H. Pesaran, Y.C. Shin, R.J. Smith | Bounds Testing Approaches to the Analysis of Level Relationships | 2001 | 287 |
| 3 | J. Bai, P. Perron | Computation and Analysis of Multiple Structural Change Models | 2003 | 223 |
| 4 | S.N. Durlauf, P.A. Johnson | Multiple Regimes and Cross-Country Growth-Behavior | 1995 | 215 |
| 5 | A,C. Harvey, A. Jaeger | Detrending, Stylized Facts and the Business-Cycle | 1993 | 192 |
| 6 | A.B. Bernard, S.N. Durlauf | Convergence In International Output | 1995 | 187 |
| 7 | A. Han, J.A. Hausman | Flexible Parametric-Estimation of Duration and Competing Risk Models | 1990 | 168 |
| 8 | J.G. Mackinnon | Numerical Distribution Functions for Unit Root and Cointegration Tests | 1996 | 161 |
| 9 | W.K. Newey | Semiparametric Efficiency Bounds | 1990 | 149 |
| 10 | F.X. Diebold, M. Nerlove | The Dynamics of Exchange-Rate Volatility - A Multivariate Latent Factor ARCH Model | 1989 | 146 |
| 11 | S.M. Potter | A Nonlinear Approach to US GNP | 1995 | 145 |
| 12 | L.E. Papke, J.M. Wooldridge | Econometric Methods for Fractional Response Variables with an Application to 401(K) Plan Participation Rates | 1996 | 138 |
| 13 | R.T. Baillie, R.J. Myers | Bivariate GARCH Estimation of the Optimal Commodity Futures Hedge | 1991 | 134 |
| 14 | R.T. Baillie, C.F. Chung, | Analysing Inflation by the Fractionally Integrated ARFIMA-GARCH Model | 1996 | 132 |

| | | | | |
|---|---|---|---|---|
| | M.A. Tieslau | | | |
| 15 | J.G. Mackinnon,<br>A.A. Haug,<br>L. Michelis | Numerical Distribution Functions of Likelihood Ratio Tests for Cointegration | 1999 | 123 |
| 16 | K. Lee,<br>M.H. Pesaran,<br>R. Smith | Growth and Convergence in a Multi-Country Empirical Stochastic Solow Model | 1997 | 113 |
| 17 | A. Pagan,<br>F. Vella | Diagnostic-Tests for Models Based on Individual Data - A Survey | 1989 | 107 |
| 18= | F. Vahid,<br>R.F. Engle | Common Trends and Common Cycles | 1993 | 101 |
| 18= | A. Pagan,<br>A. Ullah | The Econometric-Analysis of Models with Risk Terms | 1988 | 101 |
| 20 | P.C.B. Phillips | To Criticize the Critics - An Objective Bayesian-Analysis of Stochastic Trends | 1991 | 97 |
| 21 | T. Terasvirta,<br>H.M. Anderson | Characterizing Nonlinearities In Business Cycles Using Smooth Transition Autoregressive Models | 1992 | 96 |
| 22 | L. Bauwens,<br>S. Laurent,<br>J.V.K. Rombouts | Multivariate GARCH Models: A Survey | 2006 | 85 |
| 23 | A.M. Jones | A Double-Hurdle Model of Cigarette Consumption | 1989 | 84 |
| 24 | C.M. Kuan,<br>T. Liu | Forecasting Exchange-Rates Using Feedforward and Recurrent Neural Networks | 1995 | 79 |
| 25 | B.E. Hansen | The Likelihood Ratio Test under Nonstandard Conditions: Testing The Markov Switching Model of GNP | 1996 | 77 |

**Note:** Data downloaded from ISI on 28 April 2010.

**Table 11**

**10 Most Highly Cited Papers in Annals of Statistics**

| Rank | Author(s) | Title | Year | Citations |
|---|---|---|---|---|
| 1 | G. Schwarz | Estimating Dimension of a Model | 1978 | 6,098 |
| 2 | B. Efron | 1977 Rietz Lecture - Bootstrap Methods - Another Look at the Jackknife | 1979 | 3,248 |
| 3 | J.H. Friedman | Multivariate Adaptive Regression Splines | 1991 | 1,192 |
| 4 | P.K. Andersen, R.D. Gill | Cox Regression-Model for Counting-Processes - A Large Sample Study | 1982 | 1,021 |
| 5 | L. Tierney | Markov-Chains for Exploring Posterior Distributions | 1994 | 1,020 |
| 6 | T.S. Ferguson | Bayesian Analysis of Some Nonparametric Problems | 1973 | 789 |
| 7 | R.J. Gray | A Class of K-Sample Tests for Comparing the Cumulative Incidence of a Competing Risk | 1988 | 784 |
| 8 | C.F.J. Wu | On the Convergence Properties of the EM Algorithm | 1983 | 729 |
| 9 | J. Friedman, T. Hastie, R. Tibshirani | Additive Logistic Regression: A Statistical View of Boosting | 2000 | 694 |
| 10 | Y. Benjamini, D. Yekutieli | The Control of the False Discovery Rate in Multiple Testing under Dependency | 2001 | 689 |

**Note:** Data downloaded from ISI on 19 May 2010.

**Table 12**

**10 Most Highly Cited Papers in Biometrika**

| **Rank** | **Author(s)** | **Title** | **Year** | **Citations** |
|---|---|---|---|---|
| 1 | K.Y. Liang,<br>S.L. Zeger | Longitudinal Data-Analysis using Generalized Linear-Models | 1986 | 5,902 |
| 2 | S.S. Shapiro,<br>M.B. Wilk | An Analysis of Variance Test for Normality (Complete Samples) | 1965 | 3,354 |
| 3 | E.A. Gehan | A Generalized Wilcoxon Test for Comparing Arbitrarily Singly-Censored Samples | 1965 | 2,841 |
| 4 | P.R. Rosenbaum,<br>D.B. Rubin | The Central Role of the Propensity Score in Observational Studies for Causal Effects | 1983 | 2,188 |
| 5 | D.L. Donoho,<br>I.M. Johnstone | Ideal Spatial Adaptation by Wavelet Shrinkage | 1994 | 2,022 |
| 6 | W.K. Hastings | Monte-Carlo Sampling Methods Using Markov Chains and their Applications | 1970 | 1,997 |
| 7 | P.C.B. Phillips,<br>P. Perron | Testing For a Unit-Root in Time-Series Regression | 1988 | 1,711 |
| 8 | H. Scheffe | A Method for Judging all Contrasts in the Analysis of Variance | 1953 | 1,567 |
| 9 | H.D. Patterson,<br>R. Thompson | Recovery of Inter-Block Information when Block Sizes are Unequal | 1971 | 1,524 |
| 10 | D.B. Rubin | Inference and Missing Data | 1976 | 1,482 |

**Note:** Data downloaded from ISI on 19 May 2010.

**Table 13**

**10 Most Highly Cited Papers in JASA**

| Rank | Author(s) | Title | Year | Citations |
|---|---|---|---|---|
| 1 | E.L. Kaplan, P. Meier | Nonparametric-Estimation from Incomplete Observations | 1958 | 34,010 |
| 2 | C.W. Dunnett | A Multiple Comparison Procedure for Comparing Several Treatments with a Control | 1955 | 4,089 |
| 3 | J.H. Ward | Hierarchical Grouping to Optimize an Objective Function | 1963 | 3,299 |
| 4 | D.A. Dickey, W.A. Fuller | Distribution of The Estimators for Autoregressive Time-Series with a Unit Root | 1979 | 2,828 |
| 5 | W.S. Cleveland | Robust Locally Weighted Regression and Smoothing Scatterplots | 1979 | 2,751 |
| 6 | N. Mantel | Chi-Square Tests aith 1 Degree of Freedom - Extensions of Mantel-Haenszel Procedure | 1963 | 2,740 |
| 7 | A.E. Gelfand, A.F.M. Smith | Sampling-Based Approaches to Calculating Marginal Densities | 1990 | 2,121 |
| 8 | R.E. Kass, A.E. Raftery | Bayes Factors | 1995 | 1,960 |
| 9 | A. Zellner | An Efficient Method of Estimating Seemingly Unrelated Regressions and Tests for Aggregation Bias | 1962 | 1,727 |
| 10 | W. Hoeffding | Probability-Inequalities for Sums of Bounded Random-Variables | 1963 | 1,355 |

**Note:** Data downloaded from ISI on 19 May 2010.

**Table 14**

**10 Most Highly Cited Papers in JRSSB**

| Rank | Author(s) | Title | Year | Citations |
|---|---|---|---|---|
| 1 | D.R. Cox | Regression Models and Life-Tables | 1972 | 24,475 |
| 2 | G.E.P. Box,<br>D.R. Cox | An Analysis of Transformations | 1964 | 3,642 |
| 3 | M. Stone | Cross-Validatory Choice and Assessment of Statistical Predictions | 1974 | 1,743 |
| 4 | D.J. Spiegelhalter,<br>N.G. Best,<br>B.R. Carlin,<br>A. van der Linde. | Bayesian Measures of Model Complexity and Fit | 2002 | 1,150 |
| 5 | J.D. Storey | A Direct Approach to False Discovery Rates | 2002 | 841 |
| 6 | D.Y. Lindley,<br>A.F.M. Smith | Bayes Estimates for Linear Model | 1972 | 797 |
| 7 | J.B. Ramsey | Tests for Specification Errors in Classical Linear Least-Squares Regression Analysis | 1969 | 625 |
| 8 | A.P. Dempster,<br>H. Weisberg | A Generalization of Bayesian Inference | 1968 | 491 |
| 9 | D.R. Cox | Further Results on Tests of Separate Families of Hypotheses | 1962 | 455 |
| 10 | H. Scheffe | Experiments with Mixtures | 1958 | 405 |

**Note:** Data downloaded from ISI on 19 May 2010.

## Table 15

### 100 Most Highly Cited Econometrics Papers in Leading Econometrics Journals

| Rank | Author | Year | Journal | Citations |
|---|---|---|---|---|
| 1 | H. White | 1980 | Econometrica | 5416 |
| 2 | R.F. Engle and C.W.J. Granger | 1987 | Econometrica | 4252 |
| 3 | J.J. Heckman | 1979 | Econometrica | 3966 |
| 4 | R.F. Engle | 1982 | Econometrica | 3035 |
| 5 | J.A. Hausman | 1978 | Econometrica | 2495 |
| 6 | T. Bollerslev | 1986 | J. Econometrics | 2370 |
| 7 | W.K. Newey and K.D. West | 1987 | Econometrica | 2295 |
| 8 | L.P. Hansen | 1982 | Econometrica | 2095 |
| 9 | D.A. Dickey and W.A. Fuller | 1981 | Econometrica | 1887 |
| 10 | G.C. Chow | 1960 | Econometrica | 1575 |
| 11 | C.A. Sims | 1980 | Econometrica | 1514 |
| 12 | S. Johansen | 1991 | Econometrica | 1433 |
| 13 | P. Perron | 1989 | Econometrica | 1326 |
| 14 | J. Lintner | 1965 | REStat | 1319 |
| 15 | H. White | 1982 | Econometrica | 1304 |
| 16 | R.M. Solow | 1957 | REStat | 1298 |
| 17 | D. Kwiatkowski, P.C.B. Phillips, P. Schimdt and Y. Shin | 1992 | J. Econometrics | 1211 |
| 18 | J.D. Hamilton | 1989 | Econometrica | 1139 |
| 19 | J. Tobin | 1958 | Econometrica | 1121 |
| 20 | R. Koenker and G. Bassett | 1978 | Econometrica | 1022 |
| 21 | D.B. Nelson | 1991 | Econometrica | 973 |
| 22 | P.C.B. Phillips | 1987 | Econometrica | 876 |
| 23 | T. Bollerslev, R.Y. Chou and K.F. Kroner | 1992 | J. Econometrics | 859 |
| 24 | D.W.K. Andrews | 1991 | Econometrica | 793 |
| 25 | Z. Griliches | 1957 | Econometrica | 727 |

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|---|---|---|---|---|
| 26 | D. Staiger and J.H. Stock | 1997 | Econometrica | 725 |
| 27 | J. Heckman and B. Singer | 1984 | Econometrica | 722 |
| 28 | J. Hausman, B.H. Hall and Z. Griliches | 1984 | Econometrica | 721 |
| 29 | R. Davidson and J.G. Mackinnon | 1981 | Econometrica | 667 |
| 30 | R. Blundell and S. Bond | 1998 | J. Econometrics | 666 |
| 31 | L.R. Chistenson, D.W. Jorgenson and L.J. Lau | 1973 | REStat | 654 |
| 32 | L.P. Hansen and K.J. Singleton | 1982 | Econometrica | 650 |
| 33 | T.S. Breusch and A.R. Pagan | 1979 | Econometrica | 642 |
| 34 | R.F. Engle and B.S. Yoo | 1987 | J. Econometrics | 641 |
| 35 | E. Zivot and D.W.K. Andrews | 1992 | JBES | 636 |
| 36 | F.X. Diebold and R.S. Mariano | 1995 | JBES | 634 |
| 37 | G. Elliott, T.J. Rothenberg and J.H. Stock | 1996 | Econometrica | 630 |
| 38 | K.J. Arrow, H.B. Chenery, B.S. Minhas and R.M. Solow | 1961 | REStat | 589 |
| 39 | D.W.K. Andrews | 1993 | Econometrica | 579 |
| 40 | J. Durbin | 1970 | Econometrica | 552 |
| 41 | Q.H. Vuong | 1989 | Econometrica | 548 |
| 42 | K.S. Im, M.H. Pesaran and Y. Shin | 2003 | J. Econometrics | 528 |
| 43 | J. Jondrow, C.A.K. Lovell, I.S. Materov and P. Schmidt | 1982 | J. Econometrics | 519 |
| 44 | M. Arellano and O. Bover | 1995 | J. Econometrics | 514 |
| 45 | R.F. Engle, D.F. Hendry and J.F. Richard | 1983 | Econometrica | 512 |
| 46 | J. Heckman | 1974 | Econometrica | 505 |
| 47 | F. Hayashi | 1982 | Econometrica | 500 |
| 48 | W.L. Goffe, G.D. Ferrier and J. Rogers | 1994 | J. Econometrics | 499 |
| 49 | J.J. Heckman | 1982 | Econometrica | 496 |
| 50 | J.H. Stock and M.W. Watson | 1993 | Econometrica | 495 |
| 51 | P.K. Clark | 1973 | Econometrica | 494 |
| 52 | S. Nickell | 1981 | Econometrica | 492 |
| 53 | J.A. Hausman and W.E. Taylor | 1981 | Econometrica | 475 |
| 54 | D. Heath, R. Jarrow and A. Morton | 1992 | Econometrica | 468 |
| 55 | J. Neyman and E.L. Scott | 1948 | Econometrica | 467 |
| 56 | H.B. Mann | 1945 | Econometrica | 459 |

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|---|---|---|---|---|
| 57 | Y. Mundlak | 1978 | Econometrica | 447 |
| 58 | P.M. Robinson | 1988 | Econometrica | 445 |
| 59 | E.R. Berndt and D.O. Wood | 1975 | REStat | 438 |
| 60 | R.F. Engle, D.M. Lilien and R.P. Robins | 1987 | Econometrica | 435 |
| 61 | J.S. Bai and P. Perron | 1998 | Econometrica | 426 |
| 62= | J.S. Stock | 1987 | Econometrica | 425 |
| 62= | J. Tobin | 1965 | Econometrica | 425 |
| 64 | S. Hylleberg, R.F. Engle, C.W.J. Granger and B.S. Yoo | 1990 | J. Econometrics | 424 |
| 65 | T. Bollerslev | 1987 | REStat | 413 |
| 66= | P.C.B. Phillips and S. Ouliarris | 1990 | Econometrica | 411 |
| 66= | J.F. McDonald and R.A. Moffitt | 1980 | REStat | 411 |
| 68 | C.A. Sims, J.H. Stock and M.W. Watson | 1990 | Econometrica | 404 |
| 69 | S. Almon | 1965 | Econometrica | 401 |
| 70 | J. Hausman and D. McFadden | 1984 | Econometrica | 392 |
| 71 | A. Levin, C.F. Lin and C.S.J. Chu | 2002 | J. Econometrics | 387 |
| 72 | C.W.J. Granger | 1981 | J. Econometrics | 386 |
| 73 | Z. Griliches | 1967 | Econometrica | 378 |
| 74 | J. Geweke | 1989 | Econometrica | 375 |
| 75 | B.R. Moulton | 1990 | REStat | 373 |
| 76 | P.C.B. Phillips | 1986 | J. Econometrics | 372 |
| 77 | J. Tobin | 1956 | REStat | 370 |
| 78 | L.-F. Lee | 1983 | Econometrica | 363 |
| 79 | T. Lancaster | 1979 | Econometrica | 362 |
| 80 | G.W. Schwert | 1989 | JBES | 360 |
| 81= | S. Johansen and K. Juselius | 1992 | J. Econometrics | 358 |
| 81= | C.W.J. Granger | 1988 | J. Econometrics | 358 |
| 83 | T. Bollerslev | 1990 | REStat | 357 |
| 84 | A.W. Lo, AW | 1983 | Econometrica | 354 |
| 85 | R.F. Engle and K.F. Kroner | 1995 | ET | 351 |
| 86 | L.M. Seiford and R.M. Thrall | 1990 | J. Econometrics | 348 |
| 87 | D.W.K. Andrews and W. Ploberger | 1994 | Econometrica | 347 |

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|---|---|---|---|---|
| 88 | G.W. Imbens and J.D. Angrist | 1994 | Econometrica | 334 |
| 89= | D. McFadden and K. Train | 2000 | J. Applied Econometrics | 333 |
| 89= | J.G. Cragg | 1971 | Econometrica | 333 |
| 91 | W.E. Diewert and T.J. Wales | 1987 | Econometrica | 330 |
| 92 | A.Banerjee, R.L. Lumsdaine and J.H. Stock | 1992 | JBES | 329 |
| 93= | D. McFadden | 1989 | Econometrica | 326 |
| 93= | B.R. Moulton | 1986 | J. Econometrics | 326 |
| 95= | S. Ng, S, and P. Perron | 2001 | Econometrica | 320 |
| 95= | P.C.B. Phillips | 1991 | Econometrica | 320 |
| 95= | T. Amemiya | 1973 | Econometrica | 320 |
| 98 | K.M. Murphy and R.H. Topel | 1985 | JBES | 319 |
| 99= | I. Krinsky and A.L. Robb | 1986 | REStat | 313 |
| 99= | D.E. Farrar and R.R. Glauber | 1967 | REStat | 313 |

**Notes**: Data downloaded from ISI on 28 April 2010. There are 7 Nobel Laureates in the 100 Most Highly Cited Papers in major econometrics journals. [K.J. Arrow (NL) has one citation (CES production function), though his significant contributions to economics would not generally be regarded as econometric in nature.]

(1) Econometrica: 64 (9/10, 16/20, 24/30, 29/40, 35/50, 44/60, 51/70, 55/80, 59/90)
(2) Journal of Econometrics (J. Econometrics): 17
(3) Review of Economics and Statistics (REStat): 12
(4) Journal of Business and Economic Statistics (JBES): 5
(5) Econometric Theory (ET): 1
(6) Journal of Applied Econometrics (J. Applied Econometrics): 1

**Table 16**

**Authors with Two or More in 100 Most Highly Cited Econometrics Papers**

| | Author | Nobel Laureate | Number of papers | Sole authored |
|---|---|---|---|---|
| 1 | R.F. Engle | * | 7 | 1 |
| 2 | J.H. Stock | | 6 | 1 |
| 3 | P.C.B. Phillips | | 5 | 2 |
| 4 | C.W.J. Granger | * | 4 | 1 |
| 5 | J.J. Heckman | * | 4 | 3 |
| 6 | J.A. Hausman | | 4 | 1 |
| 7 | D.W.K. Andrews | | 4 | 2 |
| 8 | T. Bollerslev | | 4 | 3 |
| 9 | J. Tobin | * | 3 | 3 |
| 10 | D. McFadden | * | 3 | - |
| 11 | Z. Griliches | | 3 | 2 |
| 12 | P. Perron | | 3 | 1 |
| 13 | R.M. Solow | * | 2 | 1 |
| 14 | H. White | | 2 | 2 |
| 15 | S. Johansen | | 2 | 1 |
| 16 | C. Sims | | 2 | 1 |
| 17 | L.P. Hansen | | 2 | 1 |
| 18 | P. Schmidt | | 2 | - |
| 19 | M.W. Watson | | 2 | - |
| 20 | Y. Shin | | 2 | 1 |
| 21 | B.S. Yoo | | 2 | - |

**Notes:** Data downloaded from ISI on 28 April 2010. There are 7 Nobel Laureates in the 100 Most Highly Cited Papers in Econometrics, who contributed 9 distinct papers, and 24 papers in total.

## Table 17

### Highly Cited Econometrics Papers in Other Leading Journals in Economics and Statistics

| | Year | Citations |
|---|---|---|
| **Review of Economic Studies** | | |
| M. Arellano and S. Bond | 1991 | 1,495 |
| T.S. Breusch and A.R. Pagan | 1980 | 583 |
| P.C.B. Phillips and B.E. Hansen | 1990 | 536 |
| **Oxford Bulletin of Economics and Statistics** | | |
| S. Johansen and K. Juselius | 1990 | 1,692 |
| K. Osterwald-Lenum | 1992 | 671 |
| C.W.J. Granger | 1986 | 549 |
| **International Economic Review** | | |
| A.R. Pagan | 1984 | 575 |
| L.-F. Lee | 1978 | 441 |

**Note:** Data downloaded from ISI on 19 May 2010.