

## **An Examination of the Influence of Leading Actuarial Journals**

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## **An Examination of the Influence of Leading Actuarial Journals**

### **ABSTRACT**

The relative significance of research published in eight actuarial journals is evaluated by examining the frequency of citations in sixteen risk, insurance, and actuarial journals during the years 1996 through 2000. First, the frequency with which each sample risk, insurance, and actuarial journal cites itself and the other sample journals is provided so as to communicate the degree to which each journal's published research has had an influence on the other sample journals. Then the sixteen risk, insurance, and actuarial journals are divided into two groups; 1) the actuarial journal group and 2) the risk and insurance journal group. The actuarial journals are then ranked based on their total number of citations including and excluding self-citations. Also, a ranking of journals within the actuarial journal group is provided based on the journal's influence on a per article published basis. Finally, the most frequently cited articles from the actuarial journals are observed and reported.

### **Introduction**

The importance of evaluating journal quality is noted in the finance literature [see Alexander and Mabry (1994), Zivney and Reichenstein (1994), McNulty and Boekeloo (1999), Borokhovich, Bricker, and Simkins (2000), Chung, Cox, and Mitchell (2001), and Arnold, Butler, Crack, and Altintig (2003)]. In the risk, insurance, and actuarial literature, a number of studies have been conducted to provide information on the relative quality of journals and articles in this field including Outreville and Malouin (1985; analysis of the opinions of ARIA members), McNamara and Kolbe (1996; analysis of the opinions of business school deans), Baur, Zivney, and Wells (1996; analysis of journal subscription practices of universities), Hollman and Zeitz (1998;

citation analysis of *Journal of Insurance Issues* articles), and two studies by Colquitt (1997, 2003; citation analyses of the most influential risk, insurance, and actuarial journals).

The purpose of the first and second Colquitt studies was to determine the impact that various risk, insurance, and actuarial journals and articles have had on research in that field by examining citations to these journals found in the leading risk, insurance, actuarial, and finance journals over the periods 1991-1995 and 1996-2000, respectively.<sup>1</sup> According to Colquitt (1997, 2003), reasons for assessing journal quality include its significance to 1) those conducting risk, insurance, and actuarial research; 2) faculty and administrators who are charged with evaluating the work of those conducting this research; 3) the editors and sponsoring organizations of the journals being evaluated, and; 4) the institutions that are making purchasing decisions that involve the journals being evaluated.

The primary purpose for this update of the Colquitt (1997, 2003) studies is to provide the members of the Casualty Actuarial Society and others interested in actuarial research more specific information about the influence of the leading actuarial journals as well as information about how the Casualty Actuarial Society's two publications, the *Casualty Actuarial Society Forum* and the *Proceedings of the Casualty Actuarial Society*, contribute to the overall landscape of actuarial research. For those subscribing or contributing research to the CAS's publications,

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<sup>1</sup> While citation studies are more common in other disciplines and thought to be the most comprehensive method in which to evaluate journal quality [see Alexander and Mabry (1994), Zivney and Reichenstein (1994), Borokhovich, Bricker, and Simkins (2000), Chung, Cox, and Mitchell (2001), and Arnold, Butler, Crack, and Altintig (2003)], presumably the reason why citation analysis had not been used to evaluate journal quality in the insurance and actuarial literature up until Colquitt (1997, 2003) is that very few of the risk, insurance, and actuarial journals are tracked by the Social Sciences Citation Index (SSCI). Currently, only the *Geneva Papers on Risk and Insurance Issues and Practice*, *Geneva Papers on Risk and Insurance Theory*, *Insurance: Mathematics and Economics*, the *Journal of Risk and Insurance*, and the *Journal of Risk and Uncertainty* are included in the journals tracked by the SSCI. Collection of the data needed to conduct a citation analysis without the use of the SSCI is

the study will provide information on the connection that these journals have with other risk, insurance, and actuarial journals and offer other ideas as to other journals in which to subscribe or submit research. For those involved with the publication and dissemination of the two publications, the study will provide an idea as to the sphere of influence that these journals have within the actuarial research community and perhaps shed light on how widely read and known these publications are among those conducting actuarial research.

### **Research Methodology and Data**

The study is based on citations found *in* the sixteen sample risk, insurance, and actuarial journals *only to* articles published in these same sixteen journals (see the Appendix for a list of the sample journals). As a result, this study only assesses the significance of the research published in the sixteen risk, insurance, and actuarial journals. The difference in the journals analyzed in the Colquitt (2003) study and this one is the exclusion in this study of *Benefits Quarterly* and the *Journal of Financial Services Professionals* as well as the finance journals and the inclusion of the *Casualty Actuarial Society Forum* and the *Proceedings of the Casualty Actuarial Society*.<sup>2</sup> The data include the total number of citations in the sixteen sample journals during the years 1996 through 2000.

For the purposes of evaluating the sixteen risk, insurance, and actuarial journals, the journals are separated into two groups; the actuarial journal group and the risk and insurance journal group. The actuarial journal group includes the *ASTIN Bulletin (AB)*, the *British*

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tedious and time consuming.

<sup>2</sup> In the Colquitt (2003) study, *Benefits Quarterly* and the *Journal of Financial Services Professionals* produced no citations to any of the sample actuarial journals. In addition, of the approximately 70,000 citations found in the finance journals evaluated, only twenty-four were to the sample actuarial journals (seventeen of which

*Actuarial Journal (BAJ)*, the *Casualty Actuarial Society Forum (CASF)*, *Insurance: Mathematics and Economics (IME)*, the *Journal of Actuarial Practice (JAP)*, the *North American Actuarial Journal (NAAJ)*, the *Proceedings of the Casualty Actuarial Society (PCAS)*, and the *Scandinavian Actuarial Journal (SAJ)*. The risk and insurance journal group includes the *CPCU Journal (CPCU)*, the *Geneva Papers on Risk and Insurance Issues and Practice (GPIP)*, the *Geneva Papers on Risk and Insurance Theory (GPT)*, the *Journal of Insurance Issues (JII)*, the *Journal of Insurance Regulation (JIR)*, the *Journal of Risk and Insurance (JRI)*, the *Journal of Risk and Uncertainty (JRU)*, and *Risk Management and Insurance Review (RMIR)*. While the Colquitt (1997, 2003) studies focused primarily on the risk and insurance journal group (with a particular focus on the *JRI*), this paper focuses primarily on the findings of the actuarial journal group (with a particular focus on the *CASF* and the *PCAS*).

Given that the Social Sciences Citation Index (SSCI) does not include all of the risk, insurance, and actuarial journals relevant to this study, the citation data are gathered by reviewing the bibliographies of each of the sample journals for references to the risk, insurance, and actuarial journals included in the study. Unless a paper was stated as being forthcoming in one of the sample risk, insurance, or actuarial journals, citations to working papers that were published in one of these journals subsequent to the citation are not recorded. Data gathered include the author, journal edition, and page numbers of the cited article as well as the journal edition and page number of the citing article. Only citations from feature articles, short articles, discussions, and notes and communications regarding research are included in the data. Opinion pieces and regular columns like those found in the *CPCU Journal* are not reviewed for citations.

The citation data collected are used to evaluate the citation patterns of the sample journals and the relative impact that each journal is having on risk, insurance, and actuarial research in total and on a per article published basis. In addition, the data are used to provide information on which of the articles published in the sample actuarial journals have been the most influential in recent years.

### **Discussion of Results**

Table 1 provides the distribution of citations by the year in which the cited article was published for the actuarial journal group, the risk and insurance journal group, and the two journal groups combined. The unavoidable time lag that exists between the time period that is evaluated and the period of data collected that was described in Colquitt (1997, 2003) is again supported by the results found in Table 1. There is a bit of a difference in the distribution of citations found in the actuarial journal group and those found in the risk and insurance journal group. While over 50% of the citations recorded from the risk and insurance journal group were to articles published between the years 1992 and 1997, only 41.53% of the citations from the actuarial journal group were to articles from the same period. A large portion of this difference of roughly nine percent appears to be made up in the difference between the two groups' citations to articles published in the years before 1986. This suggests that many of the articles cited by the actuarial journal group (presumably actuarial articles) have a more lasting influence than do the articles cited by the risk and insurance journal group (presumably the risk and insurance articles).

*Journal Results*

Table 2 provides the citation patterns for all of the sample journals. Table 3 provides the same citation pattern information on a normalized basis (per one thousand citations). Essentially, these tables allow one to view the frequency with which each sample journal cites the other risk, insurance, and actuarial journals. In addition, the total source articles and the number of references to sources other than the sample journals are provided.

The first column on the far left of Table 2 contains the journals that were reviewed for citations. By reading across each row, you can see the journals that were cited by the journal listed in the first column. For example, the first journal listed at the top of the first column is the *AB*. There were 92 articles during the years 1996-2000 from the *AB* that were reviewed for citations. These 92 articles cited the *AB* 177 times, the *BAJ* 21 times, the *CASF* three times, and so on. The *AB* cited sources other than the sample risk, insurance, and actuarial journals 942 times for a total of 1327 citations. The two shaded numbers across each row denote the two most frequently cited journals by the journal reviewed. As can be seen in Table 2, the *AB* (177) and the *IME* (105) were the two journals most frequently cited by the *AB*.

As was observed in the Colquitt (1997, 2003) studies, the journal most frequently cited by the majority of the citing journals is the citing journal itself. This can be seen by observing that most of the cells starting from the top left corner of the grid and proceeding down to the right bottom corner are shaded (indicating that the journal cited was either the first or second most frequently cited journal). The exception to this was the *CASF*, the *GPT*, the *JAP*, the *JII*,

the *NAAJ*, and *RMIR*.<sup>3</sup> Among those, the *GPT*, the *JII*, and *RMIR* all cited the *JRI* with the most frequency. The most frequently cited journal by the *CASF* was the *PCAS*, the most frequently cited journal by the *JAP* was the *BAJ*, and the most frequently cited journal by the *NAAJ* was *IME*. In addition, the actuarial journals and the risk and insurance journals tend to cite the journals within their same group with the most frequency, with the only meaningful overlap being the frequency with which the *JRI* is cited by the *CASF*, *IME*, the *NAAJ*, and the *PCAS*. Tables 2 and 3 also show the influence of *IME*. *IME* was either the first or second most frequently cited journal of six of the eight actuarial journals. The only two actuarial journals where the *IME* was not the first or second most frequently cited journal were the *CASF* and the *PCAS*.

Table 2 also provides each journal=s self-citation rate and each journal=s self-citation index is found in Table 3.<sup>4</sup> The higher the self-citation index, the higher a journal=s frequency of self-citations relative to the frequency with which it is cited by the other sample journals. The lower the self-citation index, the more influential the journal is presumed to be. While a high self-citation index could suggest that a journal is guilty of self-promotion, it also could be that a journal with a high self-citation index publishes research on topics that are of a specialized nature and, as a result, is most frequently referenced by other articles within that same journal [see Colquitt (1997)]. Among the actuarial journals, the *NAAJ* (.40) has the lowest self-citation

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<sup>3</sup> Given that the *NAAJ* and *RMIR* both began publication in 1997, it is not surprising that these two journals cite themselves with relative infrequency.

<sup>4</sup> The calculation of both the self-citation rate and the self-citation index follows that of Borokhovich, Bricker, and Simkins (1994) and Colquitt (1997, 2003). The self-citation rate is the number of self-citations from a journal divided by the total number of citations found in that journal. The self-citation index is the self-citation rate x 100/normalized average citation rate excluding self-citations (per thousand citations).

index, with *IME* (.67), the *AB* (.84), and the *SAJ* (.92) following close behind. The remaining four actuarial journals and their self-citation indices are the *PCAS* (1.39), the *CASF* (1.51), the *BAJ* (1.52) and the *JAP* (5.15).

Table 4 provides a ranking of the sample actuarial journals based on total citations, including and excluding self-citations. When looking at total citations, *IME* is the most frequently cited actuarial journal with 854, followed by the *AB* (658), the *PCAS* (626), the *SAJ* (453), and the *BAJ* (410). The remaining three actuarial journals were the *CASF* (194), the *NAAJ* (148), and the *JAP* (26). One reason for the low citation totals for the *NAAJ* and the *JAP* is likely the relative newness of these journals. In addition, the pedagogical nature of some of the articles in the *JAP* and its relatively low subscription rate are also likely reasons for its low number of citations.<sup>5</sup>

When excluding self-citations, the only changes in the order is a switch in the first and second positions between *IME* (413) and the *AB* (481) and the switch in the sixth and seventh positions between the *CASF* (92) and the *NAAJ* (101). Interestingly, when the *CASF* citations to the *PCAS* are viewed as self-citations to the *PCAS*, then the number of non-self-citations to the *PCAS* falls to 92 and its adjusted rank falls to just below that of the *NAAJ* (seventh position). Also, when the *PCAS* citations to the *CASF* are viewed as self-citations to the *CASF*, then the number of non-self-citations to the *CASF* falls to 33 and its adjusted rank falls to just above the *JAP* (again, seventh position). This is likely due to the fact that these two journals have an actuarial focus that is of primary interest to the members of the Casualty Actuarial Society.

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<sup>5</sup> Baur, Zivney, and Wells (1997) report that (at the time of their study) only 2% (5 out of 265) of all AACSB schools and only 3% (1 out of 30) of schools with a major in actuarial sciences subscribed to the *JAP*.

While the total number of citations for the sample journals provides a measure of the total impact that each journal has on risk, insurance, and actuarial research, the total number of citations is greatly affected by the number of citable articles published by the sample journals. Table 5 provides the Insurance Impact Factor (IIF) for the sample actuarial journals. The IIF follows that of Colquitt (1997, 2003) and captures the relative research impact of a journal on per article basis.<sup>6</sup>

When evaluating the research impact of a journal on a per article basis, the *AB* is ranked first among actuarial journals with an IIF of 2.0175. This essentially means that the *AB* articles published during the period between 1991 and 2000 were cited an average of 2.0175 times per article by the sample risk, insurance, and actuarial journals analyzed. Following the *AB* is the *PCAS* (1.9825), *IME* (1.6336), the *SAJ* (1.5656), the *BAJ* (1.3892), the *NAAJ* (1.1746), the *CASF* (.6078), and the *JAP* (.2766). When looking at the Adjusted Insurance Impact Factor<sup>7</sup> (AIIF) for the actuarial journal group, there is a considerable difference in the rankings. The *AB* (1.4561) has the highest AIIF, followed by the *SAJ* (1.1475), the *PCAS* (1.1404), the *NAAJ* (.8016), *IME* (.7466), the *BAJ* (.4162), the *CASF* (.2778), and the *JAP* (.1170). As was the case when evaluating the IIF, when the *CASF* citations are subtracted when calculating the *PCAS*'s AIIF, the AIIF falls to .2719 and the *PCAS*'s ranking falls to seventh. Also, when the *PCAS* citations

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<sup>6</sup> The IIF equals citations to a journal's articles published in a certain period divided by the number of citable articles during the same period. The period used for all of the journals except the *JAP* and the *NAAJ* is 1991 through 2000. The *JAP* was established in 1993 and the period used for the *JAP* is 1993 through 2000. The *NAAJ* was established in 1997 and the period used for this journal is 1997 through 2000.

<sup>7</sup> The AIIF is the IIF calculated excluding self-citations.

are subtracted when calculating the *CASF*'s AIIF, the AIIF falls to .1046 and the *CASF*'s ranking falls to eighth.

*Article results*

In addition to knowing the relative impact of the actuarial journals, it also is helpful for many to know which of the articles published in the past have been the most influential in recent years. Reasons provided by Colquitt (1997, 2003) include the importance of this knowledge to 1) researchers who can use this information to determine the subjects, methodology, style, etc. that have been a part of the most influential research; 2) editors who use this information to form opinions on the value of future research submitted for publication; and 3) those responsible for developing reading lists for graduate-level seminar courses in actuarial science.

When highlighting the most frequently cited articles published in the sample actuarial journals, it is important to remind the readers of a significant point. There are, perhaps, actuarial articles that have been published in journals not included in the sample journals in this study. As a result, it should be recognized that the articles listed here are the most influential among those published in the sample journals and not necessarily in the entire universe of actuarial literature.

The most frequently cited *CASF* articles published in each year, 1990 through 1999 are found in Table 6.<sup>8</sup> Among the most frequently cited *CASF* articles, authors appearing on more than one article (not including committee participation) include Butsic (1990 and 1999), D'Arcy (1997 and 1998), Feldblum (two articles in 1996), Gorvett (1997 and 1998), Hettinger (1997 and 1998), and Hodes (two articles in 1996). Also, articles that were the most frequently cited for

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<sup>8</sup> No articles published in the *CASF* during the year 2000 or prior to 1990 were cited by the sample journals more than once.

the years 1992, 1993, and 1995 were authored by committees. Finally, only three of the thirteen articles listed in Table 6 are by single authors and six of the thirteen were either written by a committee or by four or more authors.

The most frequently cited *PCAS* articles or discussions published in each year, 1985 through 1999 are found in Table 7.<sup>9</sup> Interestingly, D’Arcy (1989 and 1997), Feldblum (1990 and 1996) and Meyers (1987 and 1991) are the only authors credited with two of the most frequently cited *PCAS* articles for a particular year. Another interesting finding for the top *PCAS* articles is that of the eighteen articles listed in Table 7, all but three are single-authored papers. In addition, the three that were co-authored only have two co-authors. This is distinctly different from what was found in the list of top *CASF* articles.

Table 8 lists the *CASF* and *PCAS* articles that are the most frequently cited by the sample journals regardless of the year in which they were published. Of the sixteen articles on the list, thirteen of them were published in the *PCAS* and three of them were published in the *CASF*. With regard to the age of the articles, there is a fair distribution scattered over the last roughly forty years. Seven of the top *CASF* and *PCAS* articles were published in the 1990s, four were published in the 1980s, three were published in the 1970s, and two were published in the 1960s, with the oldest article being the Longley-Cook article that was published in the *PCAS* in 1962. This is in stark contrast to the distribution of the most frequently cited *JRI* articles found in Colquitt (2003). Of the fifteen top *JRI* articles, ten of them were published between 1992 and

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<sup>9</sup> No articles published in the *PCAS* during the year 2000 were cited by the sample journals more than once.

1996. In addition, only three of the top *JRI* articles were published in the 1980s and the oldest article was from 1986.

Table 9 provides a listing of the most frequently cited articles published in each of the sample actuarial journals. All but two of the most frequently cited articles for each of the journals listed were published during the 1990s. The only exceptions are Panjer's 1981 *AB* article and Heckman and Meyers' 1983 *PCAS* article. As was the case with the most frequently cited *PCAS* articles (Table 7), most (six of eight) of the articles are single-authored and the two articles not single-authored only have two co-authors. Finally, while not shown in Table 9, the author of the most frequently cited *JRI* article ("Solvency Measurement for Property-Liability Risk-Based Capital Applications"; 22 citations) is Butsic, who also co-authored the most frequently cited *CASF* article in 1990 and authored the most frequently cited *CASF* article in 1999.

The most frequently cited articles in any of the actuarial journals are found in Table 10. All actuarial journals except the *CASF*, the *JAP* and the *NAAJ* are represented on this list. The *AB* and *IME* lead the list with five articles each. Close behind the *AB* and *IME* is the *PCAS* with four of the top actuarial articles and the *BAJ* (including the *Journal of the Institute of Actuaries* article from 1992) and *SAJ* have two and one on the list, respectively. All but one of the articles on the list are from the 1980s and 1990s. Interestingly, the only article on the list that was not published in these two decades is Buhlman's *AB* article, "Experience Rating and Credibility," published more than 35 years ago in 1967. It places fourth on the list with nineteen citations. Wilkie's 1995 *BAJ* article, "A More on a Stochastic Asset Model for Actuarial Use" leads all actuarial articles with 33 citations. The authors with multiple articles on the list of the most

frequently cited actuarial articles are Panjer (with two) and Wang and Goovaerts (both with three). Finally, there are two themes that are common among several of the seventeen most influential articles published in the sample actuarial journals in recent years with pricing and financial distress being the subject of over a third of the articles published.

### **Conclusion**

The bibliographies of articles from sixteen risk, insurance, and actuarial journals during the years 1996 through 2000 were reviewed and recorded. After observing the citation patterns of the sample journals, the journals were put into two separate groups; 1) the actuarial journal group and 2) the risk and insurance journal group. The actuarial journals then were ranked based upon their total number of citations and their research impact on a per article basis.

The most frequently cited journal for ten of the sixteen sample journals was the citing journal itself. *IME* was the first or second most frequently cited journal for six of the eight actuarial journals evaluated with the *CASF* and the *PCAS* being the only actuarial journals not having *IME* among their top two. The *PCAS* was the most frequently cited journal and the *CASF* was the second most frequently cited journal by both the *CASF* and the *PCAS*. The *JRI* was the first or second most frequently cited journal by all of the sample risk and insurance journals.

The top actuarial journal based on the total number of citations from the sample journals including self-citations is *IME* with the *AB* and the *PCAS* having the second and third most citations, respectively. These journals remain the top three when excluding self-citations, but the positions of the *IME* and *AB* are reversed. Using the per article impact measure to rank the actuarial journals, the *AB* is the highest ranked journal with the *PCAS* and the *SAJ* ranking second when including and excluding self-citations, respectively.

The most frequently cited articles also are reported. The list of the most frequently cited *CASF* and *PCAS* articles includes thirteen *PCAS* articles and three *CASF* articles with Heckman and Meyers' 1983 *PCAS* article "The Calculation of Aggregate Loss Distributions from Claim Severity and Claim Count Distributions" being the most frequently cited. The list of the most frequently cited articles published in all of the sample actuarial journals include five articles from both the *AB* and *IME*, four from the *PCAS*, two from the *BAJ* (including a *JIA* article from 1992), and one from the *SAJ*.

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## **Appendix**

### **Journals Included in the Study**

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#### ***Actuarial Journals***

*ASTIN Bulletin (AB)*

*British Actuarial Journal (BAJ)*

*Casualty Actuarial Society Forum (CASF)*

*Insurance: Mathematics and Economics (IME)*

*Journal of Actuarial Practice (JAP)*

*North American Actuarial Journal (NAAJ)*

*Proceedings of the Casualty Actuarial Society (PCAS)*

*Scandinavian Actuarial Journal (SAJ)*

#### ***Risk and Insurance Journals***

*CPCU Journal (CPCU)*

*Geneva Papers on Risk and Insurance Issues  
and Practice (GPIP)*

*Geneva Papers on Risk and Insurance Theory (GPT)*

*Journal of Insurance Issues (JII)*

*Journal of Insurance Regulation (JIR)*

*Journal of Risk and Insurance (JRI)*

*Journal of Risk and Uncertainty (JRU)*

*Risk Management and Insurance Review (RMIR)*

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**Table 1**  
**Distribution of Citations by Year of Article Cited**

<i>Year</i>	<i>Actuarial Journals</i>		<i>Risk and Insurance Journals</i>		<i>Total</i>	
	<i>Percentage</i>	<i>Cumulative Percentage</i>	<i>Percentage</i>	<i>Cumulative Percentage</i>	<i>Percentage</i>	<i>Cumulative Percentage</i>
2000	0.83	0.83	0.75	0.75	0.80	0.80
1999	2.68	3.51	2.94	3.68	2.78	3.57
1998	5.78	9.28	3.73	7.41	5.02	8.59
1997	7.40	16.68	8.42	15.83	7.78	16.37
1996	7.63	24.32	7.50	23.32	7.58	23.95
1995	5.85	30.17	10.00	33.32	7.39	31.34
1994	8.82	38.99	8.37	41.69	8.65	39.99
1993	5.67	44.66	7.10	48.79	6.20	46.19
1992	6.16	50.83	8.94	57.74	7.19	53.39
1991	5.11	55.93	6.14	63.88	5.49	58.87
1990	4.85	60.78	5.30	69.18	5.02	63.89
1989	3.51	64.29	3.55	72.73	3.52	67.41
1988	3.95	68.23	3.68	76.41	3.85	71.26
1987	2.97	71.20	3.90	80.32	3.31	74.57
1986	2.35	73.54	2.24	82.55	2.31	76.88
pre - 1986	26.46	100.00	17.45	100.00	23.12	100.00

**Table 2**  
**Journal Citations Patterns**

Citations From (# of source articles)	Citations to the Sample Risk, Insurance, and Actuarial Journals																Total Outside the Sample Journals	Overall Total
	AB	BAJ	CASF	CPCU	GPIP	GPT	IME	JAP	JII	JIR	JRI	JRU	NAAJ	PCAS	RMIR	SAJ		
AB (92)	177	21	3	1	1	1	105	0	0	0	9	0	6	6	0	55	942	1327
BAJ (115)	11	229	5	0	3	0	15	0	0	0	1	1	5	7	0	11	1689	1977
CASF (174)	30	8	102	1	0	2	12	1	0	6	43	1	7	272	0	0	946	1431
CPCU (81)	0	0	0	57	2	0	0	0	0	6	13	1	1	0	4	0	1100	1184
GPIP (186)	2	5	3	1	85	26	5	1	0	3	56	9	1	0	0	2	2917	3116
GPT (51)	7	1	0	0	5	19	10	0	0	2	35	20	0	0	0	12	936	1047
IME (202)	255	53	3	1	1	12	441	0	0	4	58	4	39	15	0	188	2380	3454
JAP (50)	18	44	8	0	0	0	32	15	0	1	17	3	14	24	0	23	685	884
JII (50)	0	1	0	11	7	0	3	0	25	38	192	5	3	4	3	0	756	1048
JIR (123)	0	1	2	13	8	0	1	1	11	99	168	4	3	5	2	0	1536	1854
JRI (141)	18	1	1	11	6	29	25	1	12	37	504	29	15	9	2	9	2965	3674
JRU (140)	0	0	0	0	0	9	1	0	1	3	30	313	0	1	1	2	3728	4089
NAAJ (126)	50	33	8	1	2	5	103	6	0	3	50	4	47	17	0	51	2781	3161
PCAS (114)	20	7	59	3	0	2	7	1	1	15	51	1	4	262	0	4	723	1160
RMIR (59)	0	0	0	18	10	0	1	0	4	17	94	4	0	0	7	0	857	1012
SAJ (63)	70	6	0	0	0	2	93	0	0	0	1	2	3	4	0	96	721	998
TOTAL	658	410	194	118	130	107	854	26	54	234	1322	401	148	626	19	453		
Self-citation rate	.1334	.1158	.0713	.0481	.0273	.0181	.1277	.0170	.0239	.0534	.1372	.0765	.0149	.2259	.0069	.0962		

AB = ASTIN Bulletin; BAJ = British Actuarial Journal; CASF = Casualty Actuarial Society Forum; CPCU = CPCU Journal; GPIP = Geneva Papers on Risk and Insurance Issues and Practice; GPT = Geneva Papers on Risk and Insurance Theory; IME = Insurance: Mathematics and Economics; JAP = Journal of Actuarial Practice; JII = Journal of Insurance Issues; JIR = Journal of Insurance Regulation; JRI = Journal of Risk and Insurance; JRU = Journal of Risk and Uncertainty; NAAJ = North American Actuarial Journal; PCAS = Proceedings of the Casualty Actuarial Society; RMIR = Risk Management and Insurance Review; SAJ = Scandinavian Actuarial Journal; Total Outside the Sample Journals = the number of citations in the journal that are to articles not published in one of the sixteen sample risk, insurance, or actuarial journals; Self-Citation Rate = the percentage of a journal's citations attributable to its own articles. Citations to the Geneva Papers prior to 1990 (the year that the Geneva Papers were split into two journals, the GPIP and the GPT) are attributed to the GPIP and the GPT in the proportion that the GPIP and the GPT received their own citations from that journal during 1990 and beyond.

**Table 3**  
**Normalized Journal Citations**

Citations From (# of source articles)	Citations to the Sample Risk, Insurance, and Actuarial Journals																Total Outside the Sample Journals	Overall Total
	AB	BAJ	CASF	CPCU	GPIP	GPT	IME	JAP	JII	JIR	JRI	JRU	NAAJ	PCAS	RMIR	SAJ		
AB (92)	133	16	2	1	1	1	79	0	0	0	7	0	5	5	0	41	710	1000
BAJ (115)	6	116	3	0	2	0	8	0	0	0	1	1	3	4	0	6	854	1000
CASF (174)	21	6	71	1	0	1	8	1	0	4	30	1	5	190	0	0	661	1000
CPCU (81)	0	0	0	48	2	0	0	0	0	5	11	1	1	0	3	0	929	1000
GPIP (186)	1	2	1	0	27	8	2	0	0	1	18	3	0	0	0	1	936	1000
GPT (51)	7	1	0	0	5	18	10	0	0	2	33	19	0	0	0	11	894	1000
IME (202)	74	15	1	0	0	3	128	0	0	1	17	1	11	4	0	54	689	1000
JAP (50)	20	50	9	0	0	0	36	17	0	1	19	3	16	27	0	26	775	1000
JII (50)	0	1	0	10	7	0	3	0	24	36	183	5	3	4	3	0	725	1000
JIR (123)	0	1	1	7	4	0	1	1	6	53	91	2	2	3	1	0	828	1000
JRI (141)	5	0	0	3	2	8	7	0	3	10	137	8	4	2	1	2	807	1000
JRU (140)	0	0	0	0	0	2	0	0	0	1	7	77	0	0	0	0	912	1000
NAAJ (126)	16	10	3	0	1	2	33	2	0	1	16	1	15	5	0	16	880	1000
PCAS (114)	17	6	51	3	0	2	6	1	1	13	44	1	3	226	0	3	623	1000
RMIR (59)	0	0	0	18	10	0	1	0	4	17	93	4	0	0	7	0	847	1000
SAJ (63)	70	6	0	0	0	2	93	0	0	0	1	2	3	4	0	96	722	1000
Avg over journals	23.13	14.38	8.88	5.69	3.81	2.94	25.94	1.38	2.38	9.06	44.25	8.06	4.44	29.63	0.94	16.00		
Avg with no self-citation	15.80	7.60	4.73	2.87	2.27	1.93	19.13	0.33	0.93	6.13	38.07	3.47	3.73	16.53	0.53	10.67		
Self-citation index	0.84	1.52	1.51	1.68	1.20	0.94	0.67	5.15	2.57	0.87	0.36	2.20	0.40	1.37	1.30	0.90		

AB = ASTIN Bulletin; BAJ = British Actuarial Journal; CASF = Casualty Actuarial Society Forum; CPCU = CPCU Journal; GPIP = Geneva Papers on Risk and Insurance Issues and Practice; GPT = Geneva Papers on Risk and Insurance Theory; IME = Insurance: Mathematics and Economics; JAP = Journal of Actuarial Practice; ; JII = Journal of Insurance Issues; JIR = Journal of Insurance Regulation; JRI = Journal of Risk and Insurance; JRU = Journal of Risk and Uncertainty; NAAJ = North American Actuarial Journal; PCAS = Proceedings of the Casualty Actuarial Society; RMIR = Risk Management and Insurance Review; SAJ = Scandinavian Actuarial Journal; Total Outside the Sample Journals = the number of citations in the journal that are to articles not published in one of the sixteen sample risk, insurance, or actuarial journals; Self-Citation Index = the self-citation rate x 100/normalized average citation rate excluding self-citations (per thousand citations). Totals may not add due to rounding.

**Table 4**  
**Actuarial Journals Ranked by Total Number of Citations**  
**by the Sample Journals During the Years 1996 Through 2000**

Rank	Actuarial Journals	Total Citations	Self-Citations	Non-Self-Citations	Adj Rank*
1	<i>Insurance: Mathematics and Economics</i>	854	441	413	2
2	<i>ASTIN Bulletin</i>	658	177	481	1
3	<i>Proceedings of the Casualty Actuarial Society</i>	626	262**	364	3
4	<i>Scandinavian Actuarial Journal</i>	453	96	357	4
5	<i>British Actuarial Journal</i>	410	229	181	5
6	<i>Casualty Actuarial Society Forum</i>	194	102***	92	7
7	<i>North American Actuarial Journal</i>	148	47	101	6
8	<i>Journal of Actuarial Practice</i>	26	15	11	8

\* Ranking based upon total number of non-self-citations.

\*\* If the CASF citations (272) are included as self-citations to the PCAS, then the number of PCAS non-self-citations falls to 92 and its adjusted rank is just below that of the NAAJ.

\*\*\* If the PCAS citations (59) are included as self-citations to the CASF, then the number of CASF non-self-citations falls to 33 and its adjusted rank is just above that of the JAP.

**Table 5**  
**Relative Impact of Actuarial Journals**  
**(Insurance Impact Factor - Period From 1991 - 2000)**

Actuarial Journals	All Citations		No Self-Citations	
	Insurance Impact Factor*	Rank	Adj Insurance Impact Factor**	Adj Rank
<i>ASTIN Bulletin</i>	2.0175	1	1.4561	1
<i>Proceedings of the Casualty Actuarial Society</i>	1.9825	2	1.1404***	3
<i>Insurance: Mathematics and Economics</i>	1.6336	3	0.7466	5
<i>Scandinavian Actuarial Journal</i>	1.5656	4	1.1475	2
<i>British Actuarial Journal</i>	1.3892	5	0.4162	6
<i>North American Actuarial Journal</i>	1.1746	6	0.8016	4
<i>Casualty Actuarial Society Forum</i>	0.6078	7	0.2778****	7
<i>Journal of Actuarial Practice</i>	0.2766	8	0.1170	8

\*Insurance Impact Factor (IIF) = citations to a journal=s articles published in a certain period divided by the number of citable articles published during the same period. The period used for all of the journals except the *JAP* and the *NAAJ* is 1991 through 2000. The *JAP* was established in 1993 and the period used for this journal is between 1993 through 2000. The *NAAJ* was established in 1997 and the period used for this journal is between 1997 through 2000.

\*\*Adj Insurance Impact Factor (AIIF) = the IIF calculated using only the non-self-citations.

\*\*\* If the *CASF* citations are subtracted when creating the *PCAS*' AIIF, the *PCAS*' AIIF falls to 0.2719 (ranked 7<sup>th</sup>).

\*\*\*\* If the *PCAS* citations are subtracted when creating the *CASF*'s AIIF, the *CASF*'s AIIF falls to 0.1046 (ranked 8<sup>th</sup>).

**Table 6**  
**The CASF Articles or Discussions Published During Each Year, 1990 through 1999,**  
**Which are the Most Frequently Cited by the Sample Journals During the Years 1996 through 2000 \***

Year	Author(s)	Pages	Title	Citations
1999	Butsic	1-70	Capital Allocation for Property-Liability Insurers: A Catastrophe Reinsurance Application	3
1998	D'Arcy, Gorvett, Hettinger, and Walling	53-118	Using the Public Access DFA Model: A Case Study	4
1997	D'Arcy, Gorvett, Herbers, Hettinger, Lehmann, and Miller	1-40	Building a Public Access PC-Based DFA Model	4
1996	Hodes, Feldblum, and Blumsohn	61-150	Workers Compensation Reserve Uncertainty	5
	Hodes, Neghaiwi, Cummings, Philips, and Feldblum	3-88	The Financial Modeling of Property/Casualty Insurance Companies	5
	Lowe and Stanard	89-118	An Integrated Dynamic Financial Analysis and Decision Support System for a Property Catastrophe Reinsurer	5
1995	Subcommittee on Dynamic Financial Models of the CAS Committee on Valuation and Financial Analysis	93-127	Dynamic Financial Models of Property/Casualty Insurers	2
	Pentikainen and Rantala	128-156	A Simulation Procedure for Comparing Different Claims Reserving Methods	2
1994	Philbrick	1-90	Accounting for Risk Margins	12
1993	American Academy of Actuaries Property/Casualty Risk-Based Capital Task Force	105-171	Report on Reserve and Underwriting Risk Factors	6
1992	Actuarial Advisory Committee to the NAIC Property & Casualty Risk-Based Capital Working Group	211-280	Property-Casualty Risk-Based Capital Requirement - A Conceptual Framework	6
1991	Derrig	19-46	The Development of Property-Liability Insurance Pricing Models in the United States	3
1990	Butsic and Lerwick	303-348	An Illustrated Guide to the Use of the Risk-Compensated Discounted Cash Flow Method	4

\* No articles published in the PCAS during the year 2000 or prior to 1990 were cited more than once.

**Table 7**  
**The PCAS Articles or Discussions Published During Each Year, 1985 through 1999,**  
**Which are the Most Frequently Cited by the Sample Journals During the Years 1996 through 2000 \***

Year	Author(s)	Pages	Title	Citations
1999	Mildenhall	393-487	A Systematic Relationship Between Minimum Bias and Generalized Linear Models	4
1998	Wang	848-939	Aggregation of Correlated Risk Portfolios: Models and Algorithms	6
1997	D'Arcy and Dyer	301-390	Ratemaking: A Financial Economics Approach	5
1996	Feldblum	297-435	NAIC Property/Casualty Insurance Company Risk-Based Capital Requirements	8
1995	Bault	78-96	Discussion of "Risk Loads for Insurers"	6
1994	Murphy	154-222	Unbiased Loss Development Factors	6
1993	Bingham	55-109	Surplus-Concepts, Measures of Return, and Determination	7
1992	Gogol	362-366	Discussion of "Reinsurer Risk Loads From Marginal Surplus Requirements"	7
1991	Meyers	163-200	The Competitive Market Equilibrium Risk Load Formula for Increased Limits Ratemaking	10
1990	Feldblum	160-195	Risk Loads for Insurers	13
	Kreps	196-203	Reinsurer Risk Loads from Marginal Surplus Requirements	13
1989	D'Arcy and Doherty	24-44	The Aging Phenomenon and Insurance Prices	4
1988	Almagro and Ghezzi	95-161	Federal Income Taxes Provisions Affecting Property-Casualty Insurers	9
1987	Mahler	119-189	Discussion of "An Analysis of Experience Rating"	3
	Snader	322-353	Reserving Long Term Medical Claims	3
	Taylor	354-383	Regression Models in Claims Analysis I: Theory	3
1986	Clark	69-92	A Formal Approach to Catastrophe Risk Assessment in Management	3
1985	Stanard	124-148	A Simulation Test of Prediction Errors of Loss Reserve Estimation Techniques	16

No article published in the PCAS during the year 2000 was cited more than once.

**Table 8**  
**The PCAS and CASF Articles Most Frequently Cited by the Sample Journals**  
**During the Years 1996 through 2000, Regardless of the Year Published**

Rank	Author(s)	Journal/Year	Pages	Title	Citations
1	Heckman and Meyers	PCAS/1983	22-71	The Calculation of Aggregate Loss Distributions from Claim Severity and Claim Count Distributions	18
2	Stanard	PCAS/1985	124-148	A Simulation Test of Prediction Errors of Loss Reserve Estimation Techniques	16
T3	Feldblum	PCAS/1990	160-195	Risk Loads for Insurers	13
T3	Kreps	PCAS/1990	196-203	Reinsurer Risk Loads from Marginal Surplus Requirements	13
T5	Philbrick	CASF/1994	1-90	Accounting for Risk Margins	12
T5	Miccolis	PCAS/1977	27-59	On the Theory of Increased Limits and Excess of Loss Pricing	12
T5	Berquist and Sherman	PCAS/1977	123-184	Loss Reserve Adequacy Testing: A Comprehensive, Systematic Approach	12
T8	Mack	CASF/1994	101-182	Measuring the Variability of Chain Ladder Reserve Estimates	10
T8	Meyers	PCAS/1991	163-200	The Competitive Market Equilibrium Risk Load Formula for Increased Limits Ratemaking	10
T8	Sherman	PCAS/1984	122-155	Extrapolating, Smoothing, and Interpolating Development Factors	10
T8	Longley-Cook	PCAS/1962	194-221	An Introduction to Credibility Theory	10
T12	Almagro and Ghezzi	PCAS/1988	95-161	Federal Income Taxes Provisions Affecting Property-Casualty Insurers	9
T12	Bornhuetter and Ferguson	PCAS/1972	181-195	The Actuary and the IBNR	9
T12	Mayerson	PCAS/1964	85-104	A Bayesian View of Credibility	9
T15	Feldblum	PCAS/1996	297-435	NAIC Property/Casualty Insurance Company Risk-Based Capital Requirements	8
T15	Zehnwirth	CASF/1994	447-605	Probabilistic Development Factor Models with Applications to Loss Reserve Variability, Prediction Intervals, and Risk Based Capital	8

**Table 9**  
**The Article from Each Actuarial Journal that is the**  
**Most Frequently Cited by the Sample Journals During the Years 1996 through 2000**

Journal	Author(s)	Year/ Pages	Title	Citations
<i>ASTIN Bulletin</i>	Panjer	1981/ 22-26	Recursive Evaluation of a Family of Compound Distributions	33
<i>British Actuarial Journal</i>	Wilkie	1995/ 777-964	More on a Stochastic Asset Model for Actuarial Use	34
<i>Casualty Actuarial Society Forum</i>	Philbrick	1994/ 1-90	Accounting for Risk Margins	12
<i>Insurance: Mathematics and Economics</i>	Wang	1995/ 43-54	Insurance Pricing and Increased Limits Ratemaking by Proportional Hazards Transforms	18
<i>Journal of Actuarial Practice</i>	Knox	1993/ 49-68	A Critique of Defined Contribution Plans Using a Simulation Approach	4
<i>North American Actuarial Journal</i>	Gerber and Shiu	1998/ 48-72	On the Time Value of Ruin	9
<i>Proceedings of the Casualty Actuarial Society</i>	Heckman and Meyers	1983/ 22-71	The Calculation of Aggregate Loss Distributions from Claim Severity and Claim Count Distributions	18
<i>Scandinavian Actuarial Journal</i>	Dufresne	1990/ 39-79	The Distribution of a Perpetuity, with Applications to Risk Theory and Pension Funding	14

**Table 10**  
**The Most Frequently Cited Articles Published in Any of the Actuarial Journals**

Rank	Author(s)	Journal/ Year	Pages	Title	Citations
1	Wilkie	<i>BAJ/95</i>	777-964	More on a Stochastic Asset Model for Actuarial Use	33
2	Panjer	<i>AB/81</i>	22-26	Recursive Evaluation of a Family of Compound Distributions	29
3	Wang	<i>AB/96</i>	71-92	Premium Calculation by Transforming the Layer Premium Density	21
4	Buhlman	<i>AB/67</i>	199-207	Experience Rating and Credibility	19
5	Heckman and Meyers	<i>PCAS/83</i>	22-71	The Calculation of Aggregate Loss Distributions from Claim Severity and Claim Count Distributions	18
6	Dhaene and Goovaerts	<i>AB/96</i>	201-212	Dependency of Risks and Stop-Loss Order	17
7	Stanard	<i>PCAS/85</i>	124-148	A Simulation Test of Prediction Errors of Loss Reserve Estimation Techniques	16
8	Wang, Young and Panjer	<i>IME/97</i>	173-183	Axiomatic Characterization of Insurance Prices	15
T9	Wang	<i>IME/95</i>	43-54	Insurance Pricing and Increased Limits Rate-Making by Proportional Hazards Transformed	14
T9	Dufresne	<i>SAJ/90</i>	39-79	The Distribution of a Perpetuity, with Applications to Risk Theory and Pension Funding	14
T9	DeVylder and Goovaerts	<i>IME/88</i>	1-8	Recursive Calculation of Finite-Time Ruin Probabilities	14
T12	Geoghegan, et al.	<i>JIA/92</i>	173-228	Report on the Wilkie Stochastic Investment Model	13
T12	Dickson	<i>IME/92</i>	191-207	On the Distribution of the Surplus Prior to Ruin	13
T12	Feldblum	<i>PCAS/90</i>	160-195	Risk Loads for Insurers	13
T12	Kreps	<i>PCAS/90</i>	196-203	Reinsurer Risk Loads from Marginal Surplus Requirements	13
T12	Gerber, Goovaerts and Kaas	<i>AB/87</i>	151-163	On the Probability and Severity of Ruin	13
T12	Embrechts and Veraverbeke	<i>IME/82</i>	55-72	Estimates for the Probability of Ruin with Special Emphasis on the Possibility of Large Claims	13

*AB = ASTIN Bulletin; BAJ = British Actuarial Journal; IME = Insurance: Mathematics and Economics; JIA = Journal of the Institute of Actuaries (now the BAJ); PCAS = Proceedings of the Casualty Actuarial Society; SAJ = Scandinavian Actuarial Journal.*

