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AN EXAMINATION OF THE INFLUENCE OF LEADING ACTUARIAL JOURNALS

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Abstract

The relative significance of research published in eight actuarial journals is evaluated by examining the frequency of citations in 16 risk, insurance, and actuarial journals during the years 1996 through 2000. First, the frequency with which each sample journal cites itself and the other 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 16 journals are divided into 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 journals' influence on a per article published basis. Finally, the most frequently cited articles from the actuarial journals are observed and reported.

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1. INTRODUCTION

The importance of evaluating journal quality is noted in the finance literature (see Alexander and Mabry [1], Zivney and Reichenstein [12], McNulty and Boekeloo [10], Borokhovich, Bricker, and Simkins [4], Chung, Cox, and Mitchell [5], and Arnold, Butler, Crack, and Altintig [2]). In the risk, insurance, and actuarial literature, a number of studies have been conducted to provide information on the relative quality of the journals and articles in this field, including Outreville and Malouin [11], McNamara and Kolbe [9], Baur, Zivney, and Wells [3], Hollman and Zeitz [8], and two studies by Colquitt [6], [7].

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 found in the leading risk, insurance, actuarial, and finance journals over the periods 1991–1995 and 1996–2000, respectively.[1] According to Colquitt [6], [7], reasons for assessing

[1]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 [1], Zivney and Reichenstein [12], Borokhovich, Bricker, and Simkins [4], Chung, Cox, and Mitchell [5], and Arnold, Butler, Crack, and Altintig [2]], presumably the reason why citation analysis had not been used to evaluate journal quality in the insurance and actuarial literature up until Colquitt [6], [7] 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*

journal quality include its significance to 1) those conducting 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.

The primary purpose for this update of the Colquitt 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* (*CASF*) and the *Proceedings of the Casualty Actuarial Society* (*PCAS*), contribute to the overall landscape of actuarial research. For those subscribing or contributing research to the Casualty Actuarial Society's publications, the study will provide information on the connection that these journals have with other risk, insurance, and actuarial journals and offer 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 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.

2. RESEARCH METHODOLOGY AND DATA

The study is based on citations found *in* the 16 sample risk, insurance, and actuarial journals *only to* articles published in these same 16 journals (see the following chart for a list of the sample journals). As a result, this study only assesses the significance of the research published in these 16 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*

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 tedious and time consuming.

as well as the finance journals and the inclusion of the *Casualty Actuarial Society Forum* and the *Proceedings of the Casualty Actuarial Society*.[2] The data include the total number of citations in the 16 sample journals during the years 1996 through 2000.

For the purposes of evaluating the 16 risk, insurance, and actuarial journals, the journals are separated into two groups; the actuarial journal group and the risk and insurance journal group.

Sample 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)

While the Colquitt 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*).

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[2]In the Colquitt study [7], *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 24 were to the sample actuarial journals (17 of which were to the *British Actuarial Journal*).

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 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.

3. DISCUSSION OF RESULTS

Table 1 provides the distribution of citations by the year in which the cited article was published for each journal group, and for the two journal groups combined. The unavoidable lag that exists between the time period evaluated and data collection that was described in the Colquitt studies is again supported by the results found in Table 1. There is 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

TABLE 1

DISTRIBUTION OF CITATIONS BY YEAR OF CITED ARTICLE

	Actuarial Journals		Risk and Insurance Journals		Total	
Year	Percentage	Cumulative Percentage	Percentage	Cumulative Percentage	Percentage	Cumulative Percentage
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

articles from the same period.[3] A large portion of this difference comes from 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).

[3]Three to four years appears to be the time lag between when an article is published and when it is read, incorporated into future research, and referenced in a published article. This would explain the apparent significance of the articles published between 1992 and 1997 when reviewing articles published from 1996 to 2000.

3.1. 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 1,327 citations. The two shaded numbers across each row denote the two most frequently cited journals by the journal reviewed. As can been 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 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*.[4] 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

[4]Given that the *NAAJ* and *RMIR* both began publication in 1997, it is not surprising that these two journals cite themselves with relative infrequency.

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*	*IME*	*JAP*	*NAAJ*	*PCAS*	*SAJ*	*CPCU*	*GPIP*	*GPT*	*JII*	*JIR*	*JRI*	*JRU*	*RMIR*		
AB (92)	**177****	21	3	**105**	0	6	6	55	1	1	1	0	0	9	0	0	942	1327
BAJ (115)	11	**229**	5	**15**	0	5	7	11	0	3	0	0	0	1	1	0	1689	1977
CASF (174)	30	8	**102**	12	1	7	**272**	0	1	0	2	0	6	43	1	0	946	1431
IME (202)	**255**	53	3	**441**	0	39	15	188	1	1	12	0	4	58	4	0	2380	3454
JAP (50)	18	**44**	8	**32**	15	14	24	23	0	0	0	0	1	17	3	0	685	884
NAAJ (126)	50	33	8	**103**	6	47	17	**51**	1	2	5	0	3	50	4	0	2781	3161
PCAS (114)	20	7	**59**	7	1	4	**262**	4	3	0	2	1	15	51	1	0	723	116
SAJ (63)	70	6	0	**93**	0	3	4	**96**	0	0	2	0	0	1	2	0	721	998
CPCU (81)	0	0	0	0	0	1	0	0	**57**	2	0	0	6	**13**	1	4	1100	1184
GPIP (186)	2	5	3	5	1	1	0	2	1	**85**	26	0	3	**56**	9	0	2917	3116

GPT (51)	7	1	0	10	0	0	0	12	0	5	19	0	2	**35**	**20**	0	936	1047
JII (50)	0	1	0	3	0	3	4	0	11	7	0	25	**38**	**192**	5	3	756	1048
JIR (123)	0	1	2	1	1	3	5	0	13	8	0	11	**99**	**168**	4	2	1536	1854
JRI (141)	18	1	1	25	1	15	9	9	11	6	29	12	**37**	**504**	29	2	2965	3674
JRU (140)	0	0	0	1	0	0	1	2	0	0	9	1	3	**30**	**313**	1	3728	4089
RMIR (59)	0	0	0	1	0	0	0	0	**18**	10	0	4	17	**94**	4	7	857	1012
TOTAL	658	410	194	854	26	148	626	453	118	130	107	54	234	1322	401	19		
Self-citation rate	.1334	.1158	.0713	.1277	.0170	.0149	.2259	.0962	.0481	.0273	.0181	.0239	.0534	.1372	.0765	.0069		

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 16 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.

*The source articles reviewed for citations were from 1996–2000.

**The two shaded numbers across each row denote the two most frequently cited journals by the jornal reviewed.

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*	*IME*	*JAP*	*NAAJ*	*PCAS*	*SAJ*	*CPCU*	*GPIP*	*GPT*	*JII*	*JIR*	*JRI*	*JRU*	*RMIR*		
AB (92)	133	16	2	79	0	5	5	41	1	1	1	0	0	70	0	0	710	1000
BAJ (115)	6	116	3	8	0	3	4	6	0	2	0	0	0	10	1	0	854	1000
CASF (174)	21	6	71	8	1	5	190	0	1	0	1	0	4	300	1	0	661	1000
IME (202)	74	15	1	128	0	11	4	54	0	0	3	0	1	170	1	0	689	1000
JAP (50)	20	50	9	36	17	16	27	26	0	0	0	0	1	190	3	0	775	1000
NAAJ (126)	16	10	3	33	2	15	5	16	0	1	2	0	1	160	1	0	880	1000
PCAS (114)	17	6	51	6	1	3	226	3	3	0	2	1	13	440	1	0	623	1000
SAJ (63)	70	6	0	93	0	3	4	96	0	0	2	0	0	10	2	0	722	1000
CPCU (81)	0	0	0	0	0	1	0	0	48	2	0	0	5	110	1	3	929	1000
GPIP (186)	1	2	1	2	0	0	0	1	0	27	8	0	1	180	3	0	936	1000

GPT (51)	7	1	0	10	0	0	0	11	0	5	18	0	2	330	19	0	894	1000
JII (50)	0	1	0	3	0	3	4	0	10	7	0	24	36	1830	5	3	725	1000
JIR (123)	0	1	1	1	1	2	3	0	7	4	0	6	53	910	2	1	828	1000
JRI (141)	5	0	0	7	0	4	2	2	3	2	8	3	10	1370	8	1	807	1000
JRU (140)	0	0	0	0	0	0	0	0	0	0	2	0	1	70	77	0	912	1000
RMIR (59)	0	0	0	1	0	0	0	0	18	10	0	4	17	930	4	7	847	1000
Avg over journals	23.13	14.38	8.88	25.94	1.38	4.44	29.63	16.00	5.69	3.81	2.94	2.38	9.06	44.25	8.06	0.94		
Avg with no self-citation	15.80	7.60	4.73	19.13	0.33	3.73	16.53	10.67	2.87	2.27	1.93	0.93	6.13	38.07	3.47	0.53		
Self-citation index	0.84	1.52	1.51	0.67	5.15	0.40	1.37	0.90	1.68	1.20	0.94	2.57	0.87	0.36	2.20	1.30		

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 16 sample risk, insurance, or actuarial journals; Self-Citation Index = the self-citation rate × 100/normalized average citation rate excluding self-citations (per thousand citations). Totals may not add due to rounding.

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.[5] 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 [6]). Among the actuarial journals, the *NAAJ* (0.40) has the lowest self-citation index, with *IME* (0.67), the *AB* (0.84), and the *SAJ* (0.92) 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

[5]The calculation of both the self-citation rate and the self-citation index follows that of Borokhovich, Bricker, and Simkins [4] and Colquitt [6], [7]. 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 $\times 100$/normalized average citation rate excluding self-citations (per thousand citations).

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]
1	*Insurance: Mathematics and Economics*	854	441	413	2
2	*ASTIN Bulletin*	658	177	481	1
3	*Proceedings of the Casualty Actuarial Society*	626	262[2]	364	3
4	*Scandinavian Actuarial Journal*	453	96	357	4
5	*British Actuarial Journal*	410	229	181	5
6	*Casualty Actuarial Society Forum*	194	102[3]	92	7
7	*North American Actuarial Journal*	148	47	101	6
8	*Journal of Actuarial Practice*	26	15	11	8

[1]Ranking based upon total number of non-self-citations.
[2]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*.
[3]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*.

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 the relatively low number of *JAP* subscribers are also likely reasons for its low number of citations.[6]

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 considered to be 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

[6]Baur, Zivney, and Wells [3] 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*.

of the *NAAJ* (seventh position). Also, when the *PCAS* citations to the *CASF* are considered to be 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.

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 Colquitt and captures the relative research impact of a journal on a per article basis.[7]

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* (0.6078), and the *JAP* (0.2766). When looking at the adjusted insurance impact factor[8] (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* (0.8016), *IME* (0.7466), the *BAJ* (0.4162), the *CASF* (0.2778), and the *JAP* (0.1170). As was the case when evaluating the IIF, when the *CASF* citations are subtracted when calculating the *PCAS*'s AIIF, the AIIF falls to 0.2719 and the *PCAS*'s ranking falls to seventh.

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[7]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.

[8]The AIIF is the IIF calculated excluding self-citations.

TABLE 5

RELATIVE IMPACT OF ACTUARIAL JOURNALS
(INSURANCE IMPACT FACTOR—PERIOD FROM 1991–2000)

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

[1]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.
[2]Adj Insurance Impact Factor (AIIF) = the IIF calculated using only the non-self-citations.
[3]If the *CASF* citations are subtracted when creating the *PCAS*' AIIF, the *PCAS*' AIIF falls to 0.2719 (ranked 7th).
[4]If the *PCAS* citations are subtracted when creating the *CASF*'s AIIF, the *CASF*'s AIIF falls to 0.1046 (ranked 8th).

Also, when the *PCAS* citations are subtracted when calculating the *CASF*'s AIIF, the AIIF falls to 0.1046 and the *CASF*'s ranking falls to eighth.

3.2. Article Results

In addition to knowing the relative impact of the actuarial journals, it also is helpful to know which of the articles published in the past have been the most influential in recent years. Reasons provided by Colquitt include the importance of this knowledge to 1) researchers who can use this information to determine the subjects, methodology, style, and the like 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. In addition, it is important for actuarial societies that administer professional examinations to have knowledge of the most influential actuarial articles so that syllabus committees can consider the incorporation of these articles in the examination process.

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, influential 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.

Similar to loss reserve development, it takes time for published articles to be fully recognized by other researchers and incorporated into future research. As a result, it is appropriate to make comparisons between articles that were published during the same year. The most frequently cited *CASF* articles published in each year, 1990 through 1999 are found in Table 6.[9] 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 the years 1992, 1993, and 1995 were authored by committees. Finally, only three of the 13 articles listed in Table 6 are by single authors and six of the 13 were either written by a committee or by four or more authors.

[9]No articles published in the *CASF* during the year 2000 or prior to 1990 were cited by the sample journals more than once.

The most frequently cited *PCAS* articles or discussions published in each year, 1985 through 1999 are found in Table 7.[10] Interestingly, D'Arcy (1989 and 1997) and Feldblum (1990 and 1996) 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 18 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 16 articles on the list, 13 of them were published in the *PCAS* and three in the *CASF*. With regard to the age of the articles, there is a fair distribution scattered over the last 40 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 [7]. Of the 15 top *JRI* articles, ten of them were published between 1992 and 1996. In addition, only three of the top *JRI* articles were published in the 1980s and the oldest article was from 1986. The difference in the distribution of the most frequently cited *PCAS* and *CASF* articles and the most frequently cited *JRI* articles is evidence of the more lasting influence that actuarial articles have on future research as compared to risk and insurance articles.

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

[10]No articles published in the *PCAS* during the year 2000 were cited by the sample journals more than once.

TABLE 6

THE CASF ARTICLES OR DISCUSSIONS PUBLISHED DURING EACH YEAR, 1990 THROUGH 1999, THAT ARE THE MOST FREQUENTLY CITED BY THE SAMPLE JOURNALS DURING THE YEARS 1996 THROUGH 2000*

Year of Publication	Title	Pages	Author(s)	Citations
1999	Capital Allocation for Property-Liability Insurers: A Catastrophe Reinsurance Application	1–70	Butsic	3
1998	Using the Public Access DFA Model: A Case Study	53–118	D'Arcy, Gorvett, Hettinger, and Walling	4
1997	Building a Public Access PC-Based DFA Model	1–40	D'Arcy, Gorvett, Herbers, Hettinger, Lehmann, and Miller	4
1996	Workers Compensation Reserve Uncertainty	61–150	Hodes, Feldblum, and Blumsohn	5
	The Financial Modeling of Property/Casualty Insurance Companies	3–88	Hodes, Neghaiwi, Cummings, Philips, and Feldblum	5
	An Integrated Dynamic Financial Analysis and Decision Support System for a Property Catastrophe Reinsurer	89–118	Lowe and Stanard	5

1995	Dynamic Financial Models of Property/Casualty Insurers	93–127	Subcommittee on Dynamic Financial Models of the CAS Committee on Valuation and Financial Analysis	2
	A Simulation Procedure for Comparing Different Claims Reserving Methods	128–156	Pentikainen and Rantala	2
1994	Accounting for Risk Margins	1–90	Philbrick	12
1993	Report on Reserve and Underwriting Risk Factors	105–171	American Academy of Actuaries Property/Casualty Risk-Based Capital Task Force	6
1992	Property-Casualty Risk-Based Capital Requirement—A Conceptual Framework	211–280	Actuarial Advisory Committee to the NAIC Property & Casualty Risk-Based Capital Working Group	6
1991	The Development of Property-Liability Insurance Pricing Models in the United States	19–46	Derrig	3
1990	An Illustrated Guide to the Use of the Risk-Compensated Discounted Cash Flow Method	303–348	Butsic and Lerwick	4

TABLE 7

PCAS Articles or Discussions Published During Each Year, 1985 Through 1999, That are the Most Frequently Cited by the Sample Journals During the Years 1996 Through 2000*

Year of Publication	Title	Pages	Author(s)	Citations
1999	A Systematic Relationship Between Minimum Bias and Generalized Linear Models	393–487	Mildenhall	4
1998	Aggregation of Correlated Risk Portfolios: Models and Algorithms	848–939	Wang	6
1997	Ratemaking: A Financial Economics Approach	301–390	D'Arcy and Dyer	5
1996	NAIC Property/Casualty Insurance Company Risk-Based Capital Requirements	297–435	Feldblum	8
1995	Discussion of "Risk Loads for Insurers"	78–96	Bault	6
1994	Unbiased Loss Development Factors	154–222	Murphy	6
1993	Surplus-Concepts, Measures of Return, and Determination	55–109	Bingham	7

1992	Discussion of "Reinsurer Risk Loads From Marginal Surplus Requirements"	362–366	Gogol	7
1991	The Competitive Market Equilibrium Risk Load Formula for Increased Limits Ratemaking	163–200	Meyers	10
1990	Risk Loads for Insurers	160–195	Feldblum	13
	Reinsurer Risk Loads from Marginal Surplus Requirements	196–203	Kreps	13
1989	The Aging Phenomenon and Insurance Prices	24–44	D'Arcy and Doherty	4
1988	Federal Income Taxes Provisions Affecting Property-Casualty Insurers	95–161	Almagro and Ghezzi	9
1987	Discussion of "An Analysis of Experience Rating"	119–189	Mahler	3
	Reserving Long Term Medical Claims	322–353	Snader	3
	Regression Models in Claims Analysis I: Theory	354–383	Taylor	3
1986	A Formal Approach to Catastrophe Risk Assessment in Management	69–92	Clark	3
1985	A Simulation Test of Prediction Errors of Loss Reserve Estimation Techniques	124–148	Stanard	16

TABLE 8

PCAS AND CASF ARTICLES MOST FREQUENTLY CITED BY THE SAMPLE JOURNALS DURING THE YEARS 1996 THROUGH 2000, REGARDLESS OF THE YEAR PUBLISHED

Rank	Title	Journal/Year	Pages	Author(s)	Citations
1	The Calculation of Aggregate Loss Distributions from Claim Severity and Claim Count Distributions	*PCAS*/1983	22–71	Heckman and Meyers	18
2	A Simulation Test of Prediction Errors of Loss Reserve Estimation Techniques	*PCAS*/1985	124–148	Stanard	16
T3	Risk Loads for Insurers	PCAS/1990	160–195	Feldblum	13
T3	Reinsurer Risk Loads from Marginal Surplus Requirements	*PCAS*/1990	196–203	Kreps	13
T5	Accounting for Risk Margins	*CASF*/1994	1–90	Philbrick	12
T5	On the Theory of Increased Limits and Excess of Loss Pricing	*PCAS*/1977	27–59	Miccolis	12
T5	Loss Reserve Adequacy Testing: A Comprehensive, Systematic Approach	*PCAS*/1977	123–184	Berquist and Sherman	12

T8	Measuring the Variability of Chain Ladder Reserve Estimates	*CASF*/1994	101–182	Mack	10
T8	The Competitive Market Equilibrium Risk Load Formula for Increased Limits Ratemaking	*PCAS*/1991	163–200	Meyers	10
T8	Extrapolating, Smoothing, and Interpolating Development Factors	*PCAS*/1984	122–155	Sherman	10
T8	An Introduction to Credibility Theory	*PCAS*/1962	194–221	Longley-Cook	10
T12	Federal Income Taxes Provisions Affecting Property-Casualty Insurers	*PCAS*/1988	95–161	Almagro and Ghezzi	9
T12	The Actuary and the IBNR	*PCAS*/1972	181–195	Bornhuetter and Ferguson	9
T12	A Bayesian View of Credibility	*PCAS*/1964	85–104	Mayerson	9
T15	NAIC Property/Casualty Insurance Company Risk-Based Capital Requirements	*PCAS*/1996	297–435	Feldblum	8
T15	Probabilistic Development Factor Models with Applications to Loss Reserve Variability, Prediction Intervals, and Risk Based Capital	*CASF*/1994	447–605	Zehnwirth	8

TABLE 9

THE ARTICLE FROM EACH ACTUARIAL JOURNAL MOST FREQUENTLY CITED BY THE SAMPLE JOURNALS DURING THE YEARS 1996 THROUGH 2000

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

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 coauthored 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 Bühlman's *AB* article, "Experience Rating and Credibility," published more than 35 years ago in 1967. It places fourth on the list with 19 citations. Wilkie's 1995 *BAJ* article, "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 17 most influential articles published in the sample actuarial journals in recent years: pricing and financial distress are the subjects of over a third of the articles.

4. CONCLUSION

The bibliographies of articles from 16 risk, insurance, and actuarial journals during the years 1996 through 2000 were

TABLE 10

MOST FREQUENTLY CITED ARTICLES PUBLISHED IN ANY OF THE ACTUARIAL JOURNALS

Rank	Title	Journal/Year	Pages	Author(s)	Citations
1	More on a Stochastic Asset Model for Actuarial Use	*BAJ*/95	777–964	Wilkie	33
2	Recursive Evaluation of a Family of Compound Distributions	*AB*/81	22–26	Panjer	29
3	Premium Calculation by Transforming the Layer Premium Density	*AB*/96	71–92	Wang	21
4	Experience Rating and Credibility	*AB*/67	199–207	Buhlman	19
5	The Calculation of Aggregate Loss Distributions from Claim Severity and Claim Count Distributions	*PCAS*/83	22–71	Heckman and Meyers	18
6	Dependency of Risks and Stop-Loss Order	*AB*/96	201–212	Dhaene and Goovaerts	17
7	A Simulation Test of Prediction Errors of Loss Reserve Estimation Techniques	*PCAS*/85	124–148	Stanard	16
8	Axiomatic Characterization of Insurance Prices	*IME*/97	173–183	Wang, Young and Panjer	15

T9	Insurance Pricing and Increased Limits Rate-Making by Proportional Hazards Transformed	*IME*/95	43–54	Wang	14
T9	The Distribution of a Perpetuity, with Applications to Risk Theory and Pension Funding	*SAJ*/90	39–79	Dufresne	14
T9	Recursive Calculation of Finite-Time Ruin Probabilities	*IME*/88	1–8	DeVylder and Goovaerts	14
T12	Report on the Wilkie Stochastic Investment Model	*JIA*/92	173–228	Geoghegan, et al.	13
T12	On the Distribution of the Surplus Prior to Ruin	*IME*/92	191–207	Dickson	13
T12	Risk Loads for Insurers	*PCAS*/90	160–195	Feldblum	13
T12	Reinsurer Risk Loads from Marginal Surplus Requirements	*PCAS*/90	196–203	Kreps	13
T12	On the Probability and Severity of Ruin	*AB*/87	151–163	Gerber, Goovaerts and Kaas	13
T12	Estimates for the Probability of Ruin with Special Emphasis on the Possibility of Large Claims	*IME*/82	55–72	Embrechts and Veraverbeke	13

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. Then the actuarial journals were ranked based on the total number of citations and their research impact on a per article basis.

The most frequently cited journal for ten of the 16 sample journals was the citing journal itself. For the actuarial journals, *IME* was the first or second most frequently cited journal for six of the eight 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*. For the sample risk and insurance journals, the *JRI* was the first or second most frequently cited journal by all 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 are also reported. The list of the most frequently cited *CASF* and *PCAS* articles includes 13 *PCAS* articles and three *CASF* articles. Heckman and Meyers' 1983 *PCAS* article "The Calculation of Aggregate Loss Distributions from Claim Severity and Claim Count Distributions" is the most frequently cited. The list of the most frequently cited articles published in all of the sample actuarial journals includes 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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