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## **THE DEVELOPMENT OF AGENCY THOUGHT: A CITATION ANALYSIS OF THE LITERATURE**

*Abstract:* With the advent of new bibliographic data sources and new analytical techniques, accounting historians may now trace the development of accounting thought with the aid of bibliometric analysis. The objective of this paper is to discuss a social science view of history, discuss essential bibliometric concepts, and provide an example of citation analysis applied to the literature of agency theory — to demonstrate its use in historical research.

### **INTRODUCTION**

In this paper we look at the historical development of a modern accounting research topic, agency theory. Instead of doing this in the traditional intellectual history manner, by a personal exploration of the relevant literature, we employ a much more mechanical and impersonal method and look at the development of agency theory using citation and co-citation analysis. More specifically, we are concerned with employing citation and co-citation analysis to determine: (1) the growth attributes of the agency literature with respect to citations and papers, (2) the influential researchers involved in the development of the agency literature, (3) the relationship between the most influential papers, (4) how the structure of the agency literature has changed over the 1972-84 time period, and (5) the body of knowledge that has had the greatest impact on the development of the agency literature, as perceived by accounting researchers. We classify our style of history as social science history in contrast to traditional history. The first part of the paper presents the social science approach to historical analysis. Part two presents our historical study of agency theory.

## SOCIAL SCIENCE HISTORY

A prevailing tendency of historians this century has been to maintain the independence of history from science by treating history as an end in itself. Christopher Dawson [1956], a noted historian of comparative culture, traced this tendency back to ancient Greece.

To the Greeks history was a form of rhetoric and had nothing in common with science, which finds its true pattern in mathematics and geometry. Science is concerned with the universal; history with the particular. Science belongs to the world of absolute and eternal reality; history to the world of time and change. Science is truth, history is opinion [p. 17].

This conception of history as being concerned only with the particular and not with general laws and patterns is held rather tenaciously by most present-day historians. Elton [1983], for instance, maintains that historical evidence is so marked by confusion and lack of certainty that it is "suitable only for the analysis of given events and problems, without the chance of discovering 'synthesizing principles' capable of ordering all social life and its history in a meaningful way" [p. 75].

The opposing position rejects the notion that there cannot be a history involved with regularities and general patterns. It rejects the attempt at prescribing a method of history that deals only with the particular in history. The social science approach wants to broaden historical methods, it does not reject the particularist method, rather, it advocates a diversity of methods [Clubb, 1981, p. 596]. The social science approach finds it difficult to accept that history can have no other end than simply the collection of essentially isolated facts for their own sake. If this were all that history aspired to it would be a type of intellectual pastime — mere antiquarianism. The social science approach looks for meaning and direction from the study of the past. And as for the opposition of science and history as posited by the Greeks: it has been shown to be invalid. Modern science does not aim "at the contemplation of unchanging truth. It is essentially inductive and experimental, and surveys the whole world of nature as it lives and moves" [Dawson, 1956, p. 19]. The non-particularist view, Dawson says, seeks to understand the past rather as "an organic process than as a mosaic of isolated facts" [p. 19].

Dawson's view is echoed by Bailyn in his 1981 presidential address to the American Historical Association. Bailyn calls for a synthesizing movement in modern history. He maintains that historical studies have proliferated at such an overwhelming rate

that only a "besotted Faust would attempt to keep up with even a large part of this proliferating literature in any detail" [1982, p. 2]. One of the principal defining characteristics of social science history is that it deals primarily with aggregated data. The focus is on central tendencies of populations; there is no other way of dealing with groups as groups. No longer is history simply the history of monarchs and politicians, but also the history of the common man. Another important aspect of social science history is its use of social and economic forces as explanatory devices.

### *Empirical Laws*

The traditional historian who takes as his subject matter a particular historical individual or event rejects the concept of forces as identifiable agents affecting historical events. He feels that such an approach must necessarily artificially abstract from an infinite variety of forces and that the patterns they formulate can never accommodate all the particulars, "and only rarely assists in the discovery and understanding of additional particular events" [Elton, p. 77]. Furthermore, social events are rather unique making them unrepeatable in detail, thereby greatly hampering the isolation of social causes. But, as Fairthorne [1969] says, this causal insensitivity while hampering explanation correspondingly helps prediction.

Provided that the unknown causes are not augmented or replaced by different ones, the general pattern of events is likely to be repeated. Given enough carefully collected and presented data, both the pattern and its persistence can be estimated carefully in numerical terms. This can be very useful, pending explanation [p. 320].

Whether unknown causes remain stable over time is a question that would probably divide historians again along the traditionalist, pattern seeker lines. Eventually only successful prediction will decide the issue. A good example of some social data that fits in well with Fairthorne's view is bibliographic data: properties of recorded discourse and behavior appertaining to it. He labels the quantitative treatment of such data — bibliometrics. The data underlying our historical example in Part II of this study, citations and co-citations, fall squarely under the bibliographic description. Before we turn to a discussion of citation data and bibliometrics we will briefly comment on what is considered by many to be the most successful of the social science approaches to history — cliometrics.

### *Cliometrics*

A most successful social science approach to history has been cliometrics: the metrics of the muse of history — Clio. Cliometrics is the wedding of neoclassical economic theory to nineteenth-century economic life. A proponent of cliometrics, Donald McCloskey [1978], suggests that its two major achievements are, first, the rethinking of bad economics and reshuffling of misused numbers [p. 15], and second “the extension to history of modern economic counting” [p. 17]. Douglass North [1978, p. 78], another cliometrician, considers the systematic use of price theory as a major achievement and defining characteristic. In their well known work, Robert Fogel and Stanley Engerman show how cliometric studies have been successful in changing long standing beliefs about the past concerning the ante bellum South’s economic viability and of the economics of its slave system [1974].

Despite these successes cliometrics has its critics. North (a cliometrician) [1978] has been among its most vocal critics. He contends that the cliometric approach to economic history avoids what he considers to be an essential task of economic history: that of showing how economic constraints have evolved through time [p. 77]. North does not reject cliometrics, rather he attempts to bolster the old style economic history so that it is not overwhelmed by cliometrics. He feels that the interests of pure economic theory require a strong old style economic history. North looks for the reasons why constraints change over time, rather than how the changes affect economic outcomes [1978, p. 78]. And cliometrics, in his opinion, at best can focus on the how rather than the why of change.

### *Citations and Co-citations*

With the advent of commercial citation indices in the physical sciences since the early 1960’s and in the social sciences since 1975 the use and analysis of citations has increased. It also demonstrates an additional opportunity — as we shall argue — for bibliometric application. Beside being used as a unique library referencing tool, citation counts and citation analysis have proved quite useful for evaluation purposes. A number of studies [Clark, 1954; Bayer and Folger, 1966; Orr and Kassab, 1965; Robinson and Adler, 1981] have shown that citation counts have correlated better with experts’ rankings of researchers than did the actual number of papers published, level of income, and number and quality of their students. In the accounting literature

[McRae, 1974] used citations to analyze the information flow network between accounting journals and other business and economic journals. Dyckman and Zeff [1984], used citations in their analysis and evaluation of the contribution to accounting research that the *Journal of Accounting Research* made during its first 20 years of publication. Brown and Gardner [1985a, 1985b] used citations to assess the overall impact of major research journals on contemporary accounting research, and to evaluate the research contributions of accounting faculty and doctoral programs. Finally Gamble and O'Doherty [1985a, 1985b] used citations to rank accounting departments and to analyze the development of the smoothing of accounting income literature.

Co-citation analysis is a summarizing technique that is particularly useful for visually displaying the links between research papers. Co-citation analysis is concerned with the number of papers that have cited a selected pair of documents [Small, 1973]. An allied technique is called bibliographic coupling which uses the number of references a selected pair of papers have in common to measure the similarity of their subject matters [Kessler, 1963]. But bibliographic coupling is rather static in nature and mainly suited to comparing papers published in a given year. It does offer a good index of similarity but it does not readily measure how a discipline is changing over time. Co-citation analysis, on the other hand, accumulates co-citations over time and shows how older papers are linked with newer ones (through the mechanism of being jointly cited). This method provides a systematic empirical alternative to the 'review' article written by a recognized authority in a field. Such articles are seldom written because of the high cost in time and effort [Herring (1968); Garfield (1977)]. Co-citation analysis, although essentially in an introductory stage, warrants our consideration as an effective on-going approach to increasing the availability of 'review' articles.

## DATA COLLECTION

The objective of our data collection efforts is to compile citations by accounting articles in the agency area from 1972-1984.<sup>1</sup> Before the above objective can be achieved, a source index

<sup>1</sup>The 1972-84 time period was selected because it represents the period of time when: (1) the agency theory literature began to develop into two distinct areas of research, (2) the agency literature experienced its maximum growth (this can be verified by observing Table 1) and (3) the accounting agency theory literature was truly multidisciplinary, i.e., it was influenced by writings outside of accounting (see pg. 12).

and a citation index must be compiled.<sup>2</sup> Our initial step in compiling our source index was to follow the suggestion by Jensen [1983] and separate the agency theory literature into two groups — positive theory and principal-agent. The article employed to initiate the search for source articles in positive theory was Watts and Zimmerman [1978]. A survey article by Baiman [1982] was employed to initiate the search for source articles in the principal-agent area.

The Watts and Zimmerman article was selected because, in two different studies, it was selected as one of the most influential positive theory papers in accounting.<sup>3</sup> Thus, a vast number of source articles can be obtained simply by collecting citations to the Watts and Zimmerman paper. The survey article, by Baiman, was selected because it provided us with a number of articles devoted to the principal-agent area.

The second step, in compiling our source index, was to collect citations to the Watts and Zimmerman and Baiman papers. This was accomplished with the aid of the Social Science Citation Index (SSCI).<sup>4</sup> It should be noted that, in terms of compiling our source index, we only selected citations to the above papers by other agency papers. Our judgement was used to determine whether a document was an agency theory related document or not. Generally, the title or abstract was enough to classify a document. Where this did not suffice, the reference list or footnotes were checked to see if other agency theory documents were referenced; if they were, the text of the referencing document was studied to determine the classification. A paper was not classified as related to the agency literature if it dealt with agency theory in an incidental fashion.

The third step involved in compiling the data base was to again search the SSCI for citations using, this time: (1) The citations selected from step two and (2) selected references contained in the Watts and Zimmerman and Baiman papers. The fourth step involved cycling through the SSCI (by hand and

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<sup>2</sup>A source index is no more than a listing of papers that are relevant to the particular area of interest. A citation index is an index which contains the citations of the source papers.

<sup>3</sup>See Brown and Gardner [1980a] and Dyckman and Zeff [1984].

<sup>4</sup>The SSCI is a quarterly index (with annual and five year accumulations) compiled from the references and bibliographies found in the articles in more than 1,400 source journals (plus some books, mainly annuals). The breath of coverage is extremely wide: the source journals include virtually all major research oriented journals. Further, the SSCI does not contain all accounting journals (See Gamble and O'Doherty [1985a] footnote 3). Thus, this is a *limitation* of citation analysis as the SSCI is not a complete source, at this time.

three and selected references from those citing documents. This process was continued until all of the citations by accounting articles in the agency area from 1972-1984 were collected.

### DATA ANALYSIS

Table 1 displays the number of articles, citations and the average number of citations per paper for the journals in which the cited articles appeared.<sup>5</sup> Journal of Financial Economics (JFE) has the highest average citation rate, followed by Journal of Political Economy (JPE), American Economic Review (AER) and Journal of Accounting & Economics (JA&E). Further, Accounting Review (AR), Journal of Accounting Research (JAR) and JA&E account for 55% of the total citations and 56% of total papers. The high average citation rate enjoyed by JFE was greatly influenced by Jensen and Meckling's [1976] 49 citations.

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<sup>5</sup>The other accounting category includes journals such as, *Accounting Organizations & Society*, *Abacus*, *Journal of Accounting & Public Policy* and the *Australian Journal of Management*. The other economic category includes journals such as, *Econometrica*, *Economica*, *Journal of Public Economics*, *Journal of Economic Theory*, *Journal of Law and Economics*, and *Review of Economic Studies*.



**TABLE 1**  
Title of Journal Publishing Cited Article

Year Published	AR	JAR	JA & E	JFE	JPE	AER	BJE	MS	Other Acctg.	Other Econ.
1937	-	-	-	-	-	-	-	-	-	1:7-7
1964	-	1:3-3	-	-	-	-	-	1:9-9	-	1:1-1
1967	-	2:3-150	-	-	-	-	-	-	-	-
1968	2:12-6*	-	-	-	-	1:1-1	-	-	-	1:13-13
1969	-	1:15-15	-	-	-	-	-	-	-	-
1970	-	-	-	-	-	-	-	-	-	-
1971	-	-	-	-	-	1:5-5	-	-	-	-
1972	-	1:15-15	-	-	-	1:13-13	-	-	-	-
1973	-	-	-	-	-	1:15-15	-	-	-	3:7-2.33
1974	1:1-1	1:8-8	-	-	-	-	-	-	-	2:8-4
1975	1:1-1	3:14-4.66	-	-	-	1:1-1	-	-	-	1:1-1
1976	2:17-8.50	1:10-10	-	1:3-3	1:5-5	1:7-7	1:9-9	-	-	1:2-2
1977	3:7-2.33	1:5-5	-	1:49-49	-	-	1:1-1	-	1:9-9	-
1978	2:48-21.50	-	-	-	-	2:12-6	1:1-1	1:1-1	-	-
1979	3:8-2.66	4:3-75	1:14-14	1:12-12	-	1:1-1	2:14-7	1:14-14	-	5:20-4
1980	3:12-6	7:33-4.7	1:12-12	-	1:13-13	-	3:11-3.67	1:2-2	-	3:10-3.33
1981	3:12-4	6:18-3	6:54-9	-	-	-	-	-	-	2:10-5
1982	3:7-2.3	4:21-5.25	4:16-4	-	-	-	-	1:2-2	6:17-2.8	1:1-1
1983	6:16-2.67	4:8-2	6:14-2.3	-	-	-	-	-	5:3-60	2:5-2.50
1937-83	28;136-4.85	37;156-4.21	18;110-6.11	3;64-21.33	2;18-9	9;55-6.11	7;35-5	5;28-5.60	12;29-2.41	23;35-3.69

AR: Accounting Review

JAR: Journal of Accounting Research

JA & E: Journal of Accounting & Economics

JFE: Journal of Financial Economics

JPE: Journal of Political Economy

AER: American Economic Review

BJE: The Bell Journal of Economics

MS: Management Science

\*Number of Articles; Citation(s)-Average number of citations per paper

Table 2 displays the classification of papers, along with their citations, by the journals in which they appeared. In terms of principal-agent papers, 47% were found in AR and JAR; of the 47%, both journals accounted for roughly the same percent. The citation percentage for the above two journals was 46%; of that 46%, AR accounted for 22% and JAR 24%. Economics journals accounted for approximately 45% of principal-agent papers and 44% of citations.

**TABLE 2**

Classification of Papers and Citations by Journal

	Positive Theory		Principal-Agent	
	Papers	Citations	Papers	Citations
AR	12	63	16	73
JAR	20	77	17	79
JA & E	18	110	0	0
JFE	3	64	0	0
JPE	2	18	0	0
AER	2	12	7	43
BJE	0	0	4	24
MS	0	0	5	28
Other Acctg.	10	24	2	5
Other Econ.	3	7	18	78

With respect to positive theory papers, 72% were located in AR, JAR and JA&E; of that 72%, AR accounted for 14%, JAR 30% and JA&E 28%. In terms of citations, however, AR accounted for 17%, JAR 20% and JA&E an impressive 30%. Economics journals only accounted for 13% of total positive theory papers with an impressive 29% of total citations.

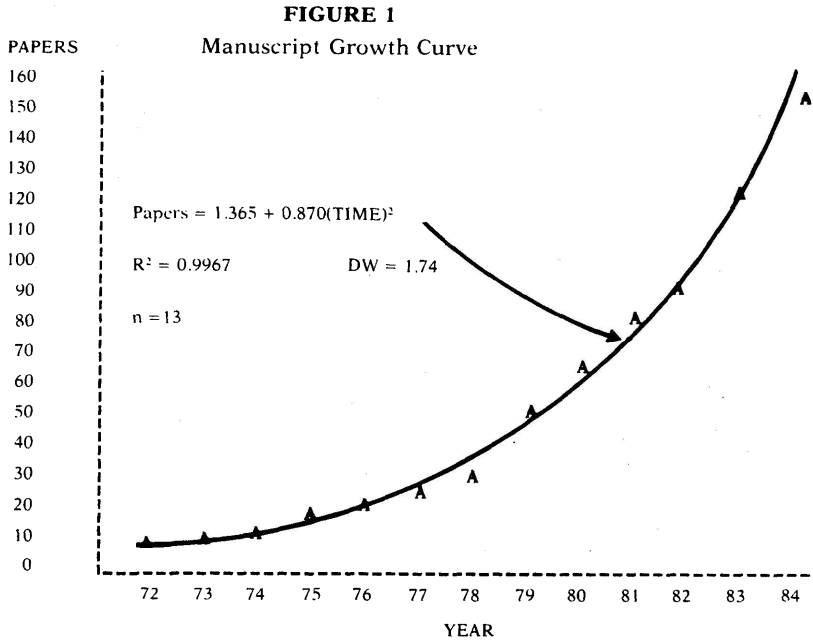
Table 3 reveals that over 80% of all citations are to articles published from two to ten years prior to the citing article. This suggests a tendency for earlier published papers to be cited less frequently.

**TABLE 3**  
 Age Distribution of Citations

Years of age at time cited*	Number of Citations	Percent of citations
0 - 1	60	8%
2 - 5	488	68%
6 - 10	132	19%
11 - 15	22	3%
16 - 20	7	1%
20 - over	7	1%

\*Citations were placed in categories by computing the difference between the year cited and the year that the cited item was published.

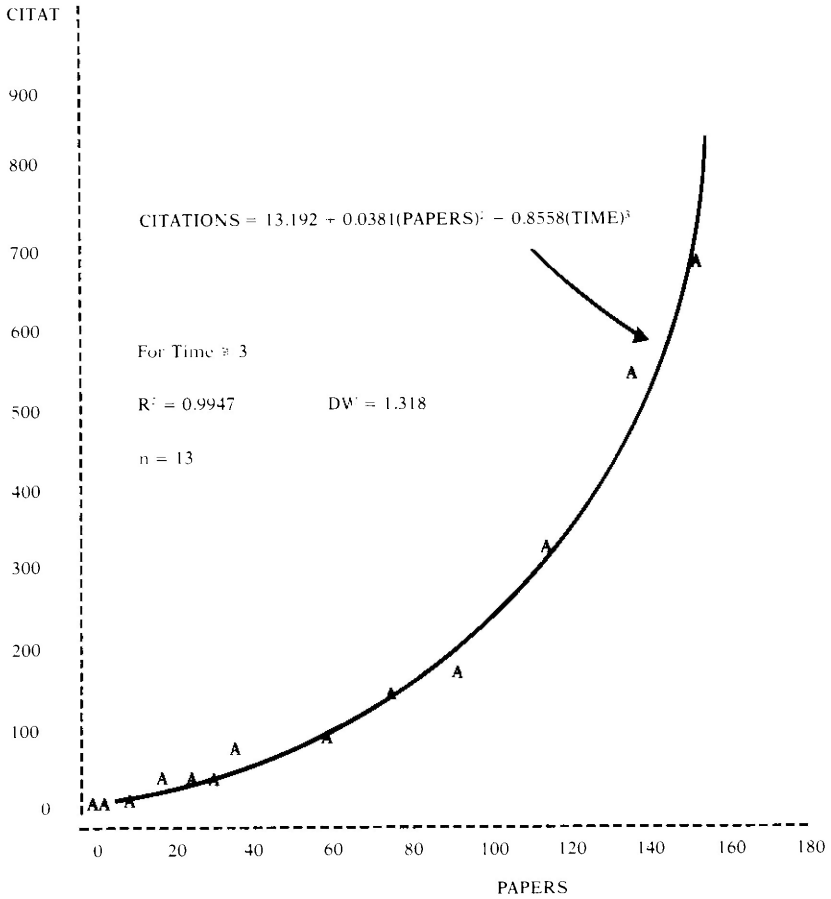
Figures 1 and 2 provide information regarding the growth attributes of the agency literature. Figure 1 shows the cumulative number of papers for the 1972-1984 time period and Figure 2 shows the cumulative number of citations relative to the cumulative number of papers for the same period of time.<sup>6</sup>



<sup>6</sup>Papers published prior to 1972 were excluded from the number of papers because, for purposes of this analysis, they are considered as outliers.

**FIGURE 2**

Citations vs Number of Papers



Curves were fitted to both relationships using a wide range of polynomials and exponential growth formulations. The best fitting models, however, proved to be simple quadratics. The citation growth did not result in a single equation which fits the curve well, over the entire range of data, due to the very flat portion in the first several years. The best fitting curve is reported in Figure 2 and tracks the data quite closely from the third year forward. The negative coefficient on the time variable suggests that as the topic begins to mature, early references begin to disappear from the citations. The time variable takes on the values 1, 2, 3, . . . starting with the first year in the sequence (1972) and thus measures the years of maturity of the agency theory literature.

It should be noted that this particular study has only thirteen years of data and thus is a small sample size for testing for the assumptions of a regression model (especially normality). The Durbin-Watson statistics is not significant at the 5% level for the time growth of papers and is in the grey area at the 5% level for the citation growth curve and is not significant at the 1% level. However, potential departures from normality are not deemed critical here since the regression coefficients are unbiased estimators and hypothesis testing is not a principal concern in this paper.

### *Co-citation Analysis*

Co-citation analysis is concerned with the number of papers that have cited a given pair of papers. The co-citation methodology commences with the determination of the most cited papers in a specialty. The next step in performing co-citation analysis is the determination of co-citation strength between pairs of papers. The strength of co-citation between two papers is determined from a source index. Each of the two papers is used to scan the references of each source item, from the source index, to determine the number of identical citing items. An identical citing item is simply an article which has cited both papers, therefore co-citation strength is a measure of the number of times a pair of papers is jointly cited by a source item. Thus in measuring co-citation strength, we measure the degree of relationship or association between papers as perceived by the population of citing authors. Co-citation analysis is a valuable tool because it holds the potential to provide new insights into processes of growth and response to scientific discovery by relating coincident uses of cited material [Griffith, 1976].

A citation diagram (map) is a visual display of the co-citation

relationship between papers. Citation diagrams have been used for diverse purposes. For example, Garfield [1979] investigated the history of the Genetic Code, demonstrating the significance of nodal papers in a network; Griffith [1973] diagramed the natural sciences literature.

Our co-citation analysis begins by selecting those papers with seven or more citations (see Table 4). The seven citation criterion yielded twenty-nine papers; of those 29 papers selected, 44% are from non-accounting journals. Further, JA&E accounts for approximately 46% of the accounting papers followed by JAR (33%) and AR (21%).

**TABLE 4**  
 Twenty-Nine Most Highly Cited Documents

Rank	Citations	Author(s)	Title, Journal, Date, Vol.
25 (tie)	7	R. H. Coase	"The Nature of the Firm," <i>Economica, New Series</i> , 1937, Vol. 4.
22 (tie)	9	K. S. Arrow	"Control in Large Organizations," <i>Management Science</i> , 1964, Vol. 10.
9 (tie)	13	R. B. Wilson	"The Theory of Syndicates," <i>Economica</i> , 1968, Vol. 36.
24	8	R. S. Kaplan	"Optimal Investigation Strategies with Imperfect Information," <i>Journal of Accounting Research</i> , 1969, Vol. 7.
12 (tie)	12	A. A. Alchian, and H. Demsetz	"Production, Information Costs, and Economic Organization," <i>American Economic Review</i> , 1972, Vol. 62.
6 (tie)	15	J. S. Demski	"Optimal Performance Measure- ment," <i>Journal of Accounting Research</i> , 1972, Vol. 10.
6 (tie)	15	S. A. Ross	"The Economic Theory of Agency: The Principal's Problem," <i>American Economic Review</i> , 1973, Vol. 63.
18 (tie)	10	J. S. Demski	"Uncertainty and Evaluations Based on Controllable Performance," <i>Journal of Accounting Research</i> , 1976, Vol. 14.
25 (tie)	7	S. J. Grossman, and J. Stiglitz	"Information and Competitive Price Systems," <i>American Economic Review</i> , 1976, Vol. 66.
1	49	M. C. Jensen, and W. H. Meckling	"Agency Costs and the Theory of the Firm," <i>Journal of Financial Economics</i> , 1976, Vol. 3.

22 (tie)	9	J. A. Mirrless	"Optimal Structure of Incentives and Authority within an Organization," <i>The Bell Journal of Economics</i> , 1976, Vol. 7.
16 (tie)	11	E. Daniel Smith	"The Effect of the Separation of Ownership From Control on Accounting Policy Decisions," <i>The Accounting Review</i> , 1976, Vol. 51.
4	19	J. S. Demski and Gerald A. Feltham	"Economic Incentives In Budgetary Control Systems," <i>The Accounting Review</i> , 1978, Vol. 53.
18 (tie)	10	M. Harris and A. Raviv	"Some Results on Incentive Contracts with Application to Education and Employment, Health Insurance, and Law Enforcement," <i>The American Economic Review</i> , 1978, Vol. 68.
2	24	R. L. Watts, and J. L. Zimmerman	"Towards a Positive Theory of the Determination of Accounting Standards," <i>The Accounting Review</i> , 1978, Vol. 53.
16 (tie)	11	B. Homstrom	"Moral Hazard and Observability," <i>The Bell Journal of Economics</i> , 1979, Vol. 10.
5	16	R. L. Hagggerman and M. E. Zmijewski	"Some Economic Determinants of Accounting Policy Choice," <i>Journal of Accounting and Economics</i> , 1979, Vol. 1.
12 (tie)	12	C. W. Smith, Jr. and J. B. Warner	"On Financial Contracting: An Analysis of Bond Covenants," <i>Journal of Financial Economics</i> , 1979, Vol. 3.
9 (tie)	13	S. Baiman and J. S. Demski	"Economically Optimal Performance Evaluation and Control Systems," <i>Journal of Accounting Research</i> , Supp., 1980, Vol. 18.
25 (tie)	7	D. S. Dhaliwal	"The Effect of the Firm's Capital Structure on the Choice of Accounting Methods," <i>The Accounting Review</i> , 1980, Vol. 55.
12 (tie)	12	G. Foster	"Accounting Policy Decisions and Capital Market Research," <i>Journal of Accounting and Economics</i> , 1980, Vol. 2.
3	20	E. F. Fama	"Agency Problems and the Theory of the Firm," <i>Journal of Political Economy</i> , 1980, Vol. 88.
25 (tie)	7	M. Harris and R. M. Townsend	"Resource Allocation Under Asymmetric Information," <i>Econometrica</i> , 1981, Vol. 49.

18 (tie)	10	R. Bowen and E. W. Noreen	"Determinants of the Corporate Decision to Capitalize Interest," <i>Journal of Accounting and Economics</i> , 1981, Vol. 3.
9 (tie)	13	D. W. Collins, M. Rozeff and D. Dhaliwal	"The Economics Determinants of the Market Reaction to Proposed Mandatory Accounting Changes in the Oil and Gas Industry," <i>Journal of Accounting and Economics</i> , 1981, Vol. 3.
25 (tie)	7	F. Gjesdal	"Accounting For Stewardship," <i>Journal of Accounting Research</i> , 1981, Vol. 19.
12 (tie)	12	R. W. Holthausen	"Evidence on the Effect of Bond Covenants and Management Choice of Accounting Techniques: The Case of the Depreciation Switch-Back," <i>Journal of Accounting and Economics</i> , 1981, Vol. 3.
6 (tie)	15	R. Leftwich	"Evidence of the Impact of Mandatory Changes in Accounting Principles on Corporate Loan Agree- ments," <i>Journal of Accounting and Economics</i> , 1981, Vol. 3.
18 (tie)	10	M. Zmijewski and R. Hagerman	"An Income Strategy Approach to the Positive Theory of Accounting Setting/Choice," <i>Journal of Accounting and Economics</i> , 1981, Vol. 3.

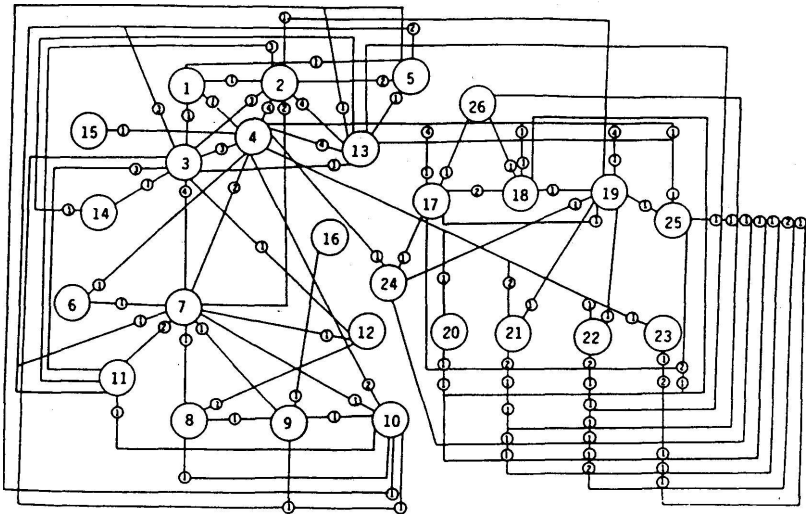
Each of the twenty-nine papers in Table 4 was paired with every other paper to generate twenty-eight pairs for each paper. Each pair of papers was used to scan the references of each source item to determine the number of identical citing papers.<sup>7</sup> Figure 3 was developed based upon the number of identical citing items for each pair of papers. The scale contained at the bottom of the Figure was used to select those relationships between papers that would be included in the network and to provide a way to display the co-citation strength between the papers.

<sup>7</sup>Kaplan [1969], Grossman and Stiglitz [1976], and Holmstron [1979] are excluded because they have less than 6 co-citations with the other papers.



**FIGURE 3**

**Co-citation Network for Frequently cited Agency Theory Papers**



**LEGEND**

- |                               |                                 |
|-------------------------------|---------------------------------|
| 1 Coase [1937]                | 14 Harris and Townsend [1981]   |
| 2 Alchian and Demesetz [1972] | 15 Smith [1976]                 |
| 3 Ross [1973]                 | 16 Zimmerman [1979]             |
| 4 Jensen and Meckling [1976]  | 17 Watts & Zimmerman [1978]     |
| 5 Harris and Raviv [1978]     | 18 Haggerman & Zmijewski [1979] |
| 6 Arrow [1964]                | 19 Smith and Warner [1979]      |
| 7 Wilson [1968]               | 20 Zmijewski & Haggerman [1981] |
| 8 Demski [1972]               | 21 Leftwich [1981]              |
| 9 Demski [1976]               | 22 Holthausen [1981]            |
| 10 Demski and Feltham [1978]  | 23 Bowen and Noreen [1981]      |
| 11 Mirrless [1976]            | 24 Foster [1980]                |
| 12 Baiman and Demski [1980]   | 25 Collins, et. al. [1981]      |
| 13 Fama [1980]                | 26 Dhaliwal [1980]              |

**NUMBER OF Co-CITATIONS**

Not shown	1-5
1	6-10
2	11-14
3	15-26
4	26 or more

Figure 3 provides insights regarding the agency theory literature. First, the agency theory literature can be analyzed in terms of two phases. The first phase, represented by papers 1-16, is the original research front.<sup>8</sup> In terms of the research front, it

<sup>8</sup>Price [1965], made the following comments regarding a research front  
 "... Since only a small part of the earlier literature is knitted together by the new year's crop of papers, we may look upon this small part as a sort of growing lip or epidermal layer, an active research front" [p. 512].

appears that Wilson [1968], Alchian and Demsetz [1972], Ross [1973], Jensen and Meckling [1976] and Fama [1980] are principal papers, i.e., the papers that have the highest co-citation relationship with the other papers. This suggest that economics literature was very instrumental in agency theory development. Further, it appears that all of the accounting principal-agent papers are related either directly or indirectly through the influence of Demski. Finally, it should be noted that the research front is dominated by principal-agent papers.

The second phase, represented by papers 17-26, is representative of the dominant form of present day agency theory — positive theory. Notice that the only links between the research front and present day agency research are provided by Jensen and Meckling [1976] and Fama [1980]. Further, present day agency theory, in accounting, appears to be dominated by JA&E papers. The impact of JA&E on the agency theory literature is probably due to the fact that it mainly publishes agency related papers. It should also be noted that, based upon the co-citation relationship between the papers, JA&E papers heavily cite each other. Finally, phase two suggest a structural shift in the agency literature from principle-agent to positive theory.

As was stated above, the first phase of the agency literature, which is composed of a number of different papers published in a variety of journals, is regarded as the research front. Within the research front, co-citation strength varies from one to four. Thus, the following question emerges: What caused certain papers to have a stronger co-citation link than others? The paragraphs below will provide an answer to that question for those papers with 16 or more citations.<sup>9</sup>

Alchian and Demsetz [1972] and Coase [1937], Alchian and Demsetz [1972] and Ross [1983], Alchian and Demsetz [1972] and Jensen and Meckling [1976], Alchian and Demsetz [1972] and Mirrless [1976], Alchian and Demsetz [1972] and Fama [1980], are perceived by the citing authors to have a strong relationship because of the following reasons:

- (1) Alchian and Demsetz [1972] extended Coase's [1937] theory of the firm.

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<sup>9</sup>Even though Coase [1937] does not have a high co-citation strength with the other papers, it will be used to gain insight regarding its relationship with those papers that are highly cited. That is, who extended Coase's pioneering work. Further, we are defining structure as the composition of papers that make-up a field of study.

- (2) Alchian and Demsetz [1972] and Ross [1973] are both, in substance, concerned with the principal's problem in an agency setting. Alchian and Demsetz [1972] approach the subject matter from a qualitative perspective and Ross [1973] quantitatively in terms of conditions of uncertainty.
- (3) Jensen and Meckling [1976] extended Alchian and Demsetz's [1972] definition of a firm.
- (4) Alchian and Demsetz [1972] and Mirrless [1976] are both concerned with contracts, Alchian and Demsetz [1972] from a qualitative perspective and Mirrless [1976] quantitatively in terms of optimality.
- (5) Fama [1980] extended Alchian and Demsetz's [1972] definition of a firm.

Ross [1973] and Jensen and Meckling [1976], Ross [1973] and Wilson [1968], Ross [1973] and Mirrless [1976], Jensen and Meckling [1976] and Fama [1980] are perceived by the citing authors to have a strong relationship because of the following reasons:

- (1) Ross [1973] and Jensen and Meckling [1976] are related because they both are concerned with agency relationships.
- (2) Ross [1973] and Wilson [1968] are related because they both are concerned with the determination of an optimal fee schedule.
- (3) Ross [1973] and Mirrless [1976] are related because they both are concerned with optimal incentives.
- (4) Jensen and Meckling [1976] and Fama [1980] are related because they both are concerned with the extension of Alchian and Demsetz's [1972] definition of a firm.

### SUMMARY AND CONCLUSION

The impact of total accounting and economics papers on the development of principal-agent research has been approximately the same for the 1972-84 time period. However, in the positive theory area, accounting researchers have had the greater impact. This impact is due to JA&E (a journal devoted to further development of positive theory) and its self-citation practices.

On an aggregate basis, agency theory papers (from 1972-84) grew at a rate of 1.73% with respect time and citations grew .0762 with respect to papers and -1.7116 with respect to time. The negative time coefficient for citations is consistent with the findings in Table 3, i.e., older papers are cited less often than current ones. The findings in Table 3 can also be related to Price's

[1970] immediacy index which is the percent of total references that cite literature in the last five years. The immediacy index calculated for the agency theory literature is approximately 76%. It should be noted that this high immediacy index is due to the fact that the agency theory literature is relatively young and, again, the influence of the JA&E (which was started in 1979).

In terms of papers with 7 or more citations, economics has had a greater impact than accounting, on principal-agent research. However, accounting researchers have had a greater impact on positive theory research. The co-citation map revealed that the initial research front is dominated by principal-agent papers. However, a structural shift occurred around 1979, from principal-agent to positive theory. This structural shift was caused by JA&E. The map also confirms Jensen's [1983] observation that the principal-agent and positive theory literatures "reference each other less than one might expect given the closeness of their topics" [p. 334]. Finally, the co-citation map enabled us to determine which highly cited papers were perceived by researchers to have a strong relationship and why.

In this paper, we have demonstrated the use of citation analysis and suggest that it can be profitably used by historians to study the development of accounting thought in general. Because of the type of data, and the attendant technique used to present and analyze them, our paper falls under the general heading of bibliometrics.

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