Acquisitions and Common Stock Returns in the Health Care Industry: 1982-85

Rose Rubin, Finance, North Texas State University
Imre Karafiath, Finance, North Texas State University
Kenneth L. Smith, Economics, North Texas State University

ABSTRACT

Employing a methodology commonly used to determine the movement of stock returns around a specific event, we examined the movement of common stock returns of acquiring firms in the health care industry for three periods, 1982-1983, 1984, and 1985. We find that in the 1982-1983 period, investors could expect negative excess returns from holding stock in acquiring firms in the health care industry. In contrast, for the 1984 and 1985 periods we find no evidence of excess returns for investors. The difference between the two periods, we believe, is due to the more competitive environment which existed in the industry in the latter two periods.

Introduction

The 1983 advent of the Prospective Payment System (PPS) under Medicare marked a turning point in health care financing. Coupled with this major change were increases in the role and numbers of Health Maintenance Organizations (HMOs) and Preferred Provider Organizations (PPOs). Such changes were efforts to increase cost control in the delivery of health care by increasing cost-consciousness in health care payment mechanisms. These significant changes in health care financing have had widespread and far-reaching effects throughout the health care industry. They are perceived to have induced more competitive emphasis at every level of health care production and delivery, including capital markets for the health care industry.

This study presents a test of the concept of increased competitiveness in the health care capital market through application of an event study methodology to the health care industry. In general, if competition has increased, we would expect the returns to stockholders following a merger or acquisition to more closely reflect true market value than if there were less competition in the market. In other words, in a competitive market, there would be no systematic overpricing or underpricing of acquired firms. To approach this broad issue of increased competition, we seek to determine two specific questions: 1) What has been the impact on stock prices of the mergers and acquisitions in the health care industry during the key period from 1982 to 1985? 2) Are acquired firms (i.e., targets) accurately valued by acquiring firms in the health care industry?

In recent years, a flurry of merger and acquisition activity has occurred in the health care industry. Boards of directors, presumably, are charged with operating their firms with the owners' interest their top priority. An acquisition would be expected to take place only if net benefits to the acquiring firm were perceived. These expected net benefits might include increased profits, economies of scale, and managerial synergies (Finkler, February 1985). Finkler (March 1985) suggests that these positive expectations of management may not be shared by stockholders. In this case, we would expect market activity and the market prices of acquiring firms' stocks to reflect stockholders' perceptions of the over-

valuation or undervaluation of target stocks.

If markets are efficient, all available information is immediately impounded in stock prices. Therefore, if targets are accurately priced by the acquiring firm, there should not be any systematic gain or loss from holding equity in the acquiring firm. We test this market hypothesis through an event study of acquisitions in the health care industry from 1982 through 1985. In our earlier period, 1982-1983, we find systematic negative cumulative returns for target firms, but for our later periods, 1984 and 1985, the negative returns vanish. We conclude that in the 1982-1983 period, targets were overvalued by acquiring firms; however, in 1984 and 1985 the targets were more accurately priced. From this analysis, we conclude that stockholder decisions on purchase or sale of stocks in the acquiring firms reflect perceptions of underlying valuations of firms's worth. The over- valuations perceived in the earlier 1982-1983 period reveal evidence of less industry competitiveness than the valuations in 1984 and 1985 following the major health care financing changes noted above.

Methodology

The methodology we use to examine security returns is a standard event study approach. It is described in detail in the *Journal of Financial Economics* in the appendix to Dodd and Warner (1983) and in Hite and Owens (1983). Here, we present a brief description of the event study methodology. A more technical discussion of the test statistics and their construction is provided in the Appendix.

The event in this study is the formal announcement of a takeover bid, or day 0, sometimes referred to as the finance date (Paulsen and Jarrell, 1987). We calculate average returns to the acquiring firm that would be expected given overall market movements for the 200 trading day period ending forty-six days before the announcement.(1) Next, excess returns for each acquisition are obtained by subtracting the expected market returns from the actual returns. These excess returns are aggregated across firms and over time. We then test these aggregated excess returns to see if there is a statistically significant acquisition-related effect.

The aggregation measure of returns used is the cumulative average prediction error (CAPE). The CAPE during the observation window is the average, over all firms, of the individual firm's cumulative prediction errors (CPE). Statistical significance is determined by the application of the test statistic, Z(CPE), constructed so that it is distributed standard normal. Thus, a Z(CPE) value greater than >1.96 indicates statistical significance at the 0.05 level.

As a second step of the study, we make the test more precise by shortening the observation window and looking at four fifteen-day intervals. By observing the CAPE's from the announcement date to day 15 following the announcement, from day 10 to day 25, from day 20 to day 35, and from day 30 to day 45, we are better able to determine the period in which cumulative excess returns occur.

The event study methodology is applied first to a single acquiring firm as a case example and then to the health care industry for the critical period 1982 to 1985 as the major study of this paper.

AMI-Lifemark Merger: A Case Example

Finkler (March 1985) raises the question of whether management expectations in engineering a take-over in the health care industry are shared by stockholders. He cites the case of the 1983 announcement by American Medical International, Inc. (AMI), the third largest hospital management company in the U.S., of its agreement to acquire Lifemark Corporation, the fifth largest hospital management company. Finkler notes that in the two weeks following the announcement of the acquisition, the price of AMI stock fell by 24 percent, while the Dow Jones Industrial Average fell only 1.8 percent.

The positive expectations of management in the AMI-Lifemark acquisition were expressed by chief executives of both companies, as quoted in the *Wall Street Journal* (Oct. 24, 1983). Chairman and CEO of the acquired Lifemark, William Mackey, claimed that "the key to understanding this transaction is the rather dramatic economies of scale that will result. Over $20 million of Lifemark headquarters expense will be eliminated annually. There will be a $10 million savings in data processing costs. Whereas Lifemark, standing alone, would earn about $42

million in 1984 . . . (AMI) could earn as much as $60 million on those assets." Walter Weisman, President of AMI, asserted that the merger has a "possible diluting effect for AMI shareholders, but we feel that is overweighed by the extraordinary expansion of net worth, cash flow, earnings and growth potential, and strengthening of the balance sheet." These financial advantages of the merger were further touted by Royce Denier, Chairman and CEO for AMI. Denier said the merger will "round out our geographic distribution, will give us a much stronger position in key markets and a much sounder basis for a national marketing effort." He said that the merger also will place AMI "in an excellent position to benefit from the new Medicare prospective payment system by increasing the economies of scale for the combined operation" . . . and he predicted that AMI will look for "a very large jump in per-share earnings in fiscal 1985 and for years thereafter."(2)

To test stockholder reaction to the AMI-Lifemark merger, we applied the event study methodology to the period of 10 working days, or two weeks, following the acquisition, as suggested by Finkler (March 1985). Table 1 presents evidence on the AMI takeover of Lifemark from the announcement date through day ten. As is implied by Finkler's analysis, we demonstrate empirically that the excess returns are negative and statistically significant through day eight. Thereafter, the Z(CPE) falls below the -1.96 critical level of statistical significance. These results suggest that in the AMI-Lifemark acquisition case the acquisition announcement caused stock returns of the acquiring firm (AMI) to fall following the announcement. We take this as evidence of stockholder perception that the target firm was overpriced.

The Health Care Industry Study

To determine our health care industry acquisition sample for the study period 1982 to 1985, we searched the *Wall Street Journal*, *Mergers and Acquisitions*, and *Funk and Scott Index* for announcement dates of mergers and acquisitions in the health care industry, as there is not a single exhaustive source for such combinations. From this, we retained only those mergers where both the acquiring and acquired firms were in the health care industry. We then excluded acquiring firms not listed in the Center for Re-

search in Security Prices (CRSP) daily return files. In order to aggregate the excess returns we combined the events in 1982 and 1983, so that our sample size for that period was 26. We found 20 combinations in 1984 and 24 in 1985.

In the analysis, the observation window, the period over which we aggregate excess returns, is defined as the period from 45 days before the announcement of a takeover bid to 45 days following the announcement. Then, in order to be more precise about the interval in which excess returns appear, we test four shortened observation windows. These intervals run from day 0 to day 15, day 10 to day 25, day 20 to day 35, and day 30 to day 45.

Industry Results

Table 2 reports our test statistics, CAPE's and Z(CPE)'s, across health care industry acquisitions for the three periods, 1982-1983, 1984, and 1985. When we aggregate excess returns for the 1982-1983 period shown in columns two and three, we find empirical results consistent with Finkler's (March 1985) analysis. For the 1982-1983 period, each CAPE is negative, although none of the CAPE's is statistically significant prior to the announcement date, day 0. On the announcement date, the average stock price falls by more than 6 percent. Following the announcement date, each CAPE is negative and statistically significant through day +45. This suggests that investors do not view the potential benefits from acquisitions as realizable and that the 1982-1983 targets were perceived by investors as overpriced.

Table 2 also reports our results for 1984 and 1985, which are quite different from the 1982-1983 results. For 1984, all but one of the CAPE's are statistically insignificant, indicating randomness of the CAPE's around zero.(3) In other words, investors did not realize any excess gains or losses from holding equity in any of the acquiring firms in our sample. For 1985, all of the CAPE's are insignificantly different from zero. Thus, as in our 1984 period, investors did not realize excess gains or losses in 1985.

Figures 1 and 2 plot the CAPE's and the Z(CPE)'s for the three periods, clearly showing the contrast between the 1982-1983 period and the two latter periods, 1984 and 1985. While the

CAPE plots in Figure 1 for 1984 and 1985 remain close to zero, the plot of the 1982-1983 CAPE's falls throughout the observation window. Figure 2 plots the Z(CPE)'s, or the level of significance of the cumulative average prediction errors, for the three periods. Horizontal lines are drawn at >1.96, indicating statistical significance of the CAPE's. Movement of the Z(CPE)'s within the >1.96 range indicates nonsystematic fluctuations of the CAPE's. In contrast to the findings for 1984 and 1985, the negative Z(CPE)'s for the period 1982-1983 become statistically significant on day 0 and persist through day 45.

In Table 3 we report results from compressed observation windows. The objective of this compression is to be more precise regarding the period in which the excess returns occur. The results with shortened observation windows support our earlier analysis: we observe statistically significant excess returns only in the 1982-1983 period. During the day 0 to day 15 window, the CAPE's fell by more than 6 percent. Also, during the day 20 to day 35 window the excess returns fell by more than 4 percent. These are the periods in which the negative excess returns are concentrated in the 1982-1983 period.

Summary and Conclusions

Employing a methodology commonly used to determine the movement of stock returns around a specific event, we examined the movement of common stock returns of acquiring firms in the health care industry for the three periods 1982-1983, 1984, and 1985. We find that in the 1982-1983 period, investors could expect negative excess returns from holding stock in acquiring firms in the health care industry. This finding is an indication that target firms were not competitively priced by acquiring firms. This reflects the lack of competitive forces perceived in the health care industry prior to the end of 1983.

In sharp contrast, for the 1984 and 1985 periods we find no evidence of excess returns for investors. During these later periods, the more competitive environment in the health care industry has presumably forced acquiring firms to be more cost-conscious and to price target firms more accurately.

NOTES

1   We estimate the market model for the 200 trading days ending one day prior to the beginning of our observation window. Estimating the market model over the same period as the observation window would produce biased estimates.

2   The acquisition would take place with each of Lifemark's 21.8 million shares of common stock exchanging for 1.7143 shares of AMI common stock. "Currently, American Medical has about 55 million common shares outstanding. After issuing about 40.8 million shares to Lifemark holders, it would have about 95.9 million shares outstanding." Excerpted from "Two Health-Care Companies Slate $1 Billion Merger," the *Wall Street Journal*, October 24, 1983.

3   Within our observation window of ninety-one days only one CAPE, day -11, was statistically significant. Its Z(CPE) value of 2.01 occurred prior to the announcement and we thus consider it an anomaly.

REFERENCES

1.   Dodd, Peter and Jerold B. Warner. "On Corporate Governance: A Study of Proxy Contest," *Journal of Financial Economics*, Vol. 11, (April 1983), pp. 401-438.

2.   Finkler, Steven A. "Merger and Consolidation: The Motives Behind Healthcare Combinations," *Healthcare Financial Management*, Vol. 39, No. 2, (February 1985), pp. 64-74.

3.   ---------------. "Merger and Consolidation: What is the Target Organization Worth?" *Healthcare Financial Management*, Vol. 39, No. 3, (March 1985), pp. 72-82.

4.   ---------------- and Sandra L. Horowitz. "Merger and Consolidation: An Overview of Activity in Healthcare Organizations," *Healthcare Financial Management*, Vol. 39, No. 1, (January 1985), pp. 19-27.

5.   Hite, Gailen L. and James E. Owers. "Security Price Reactions Around Corporate Spin-Off Announcements," *Journal of Financial Economics*, Vol. 12, (December 1983),   pp. 409-436.

6.   Poulsen, Annette B. and Gregg A. Jarrell. "Stock Trading Before the Announcement of Tender Offers: Inside Trading or Market Anticipation?" Unpublished paper, Securities and Exchange Commission, February 24, 1987.

7.   "Two Health-Care Companies Slate $1 Billion Merger," *Wall Street Journal*, October 24, 1983.

Table 1

Significance of Excess Returns Following the AMI Announcement of the Acquisition of Lifemark, October 24, 1983: Day 0 through Day 10

Day	$Z(CPE)^a$
0	-4.82
1	-4.46
2	-3.39
3	-2.69
4	-2.41
5	-2.08
6	-2.45
7	-2.26
8	-1.99
9	-1.77
10	-1.70

[a] $Z(CPE)$ is distributed unit normal. Thus, a value less than 1.96 indicates statisical significance of the cumulative average prediction error at the 5 percent level. See Appendix for technical discussion.

Table 2

Cumulative Average Prediction Errors and $Z(CPE)$'s: 1982-1983, 1984, 1985

Observation Window	1982-1983		1984		1985	
	$CAPE^a$	$Z(CPE)^b$	CAPE	Z(CPE)	CAPE	Z(CPE)
-45	-0.003	-0.53	-0.003	-0.70	-0.003	-1.12
-40	-0.009	-0.75	0.013	0.74	-0.006	-0.62
-35	-0.026	-1.72	0.029	1.41	-0.010	-1.15
-30	-0.020	-1.08	0.035	1.49	-0.007	-0.62
-25	-0.029	-1.41	0.038	1.41	-0.002	-0.21
-20	-0.028	-1.23	0.038	1.32	0.004	0.01
-15	-0.029	-1.15	0.047	1.45	0.009	0.28
-10	-0.042	-1.47	0.064	1.87	0.012	0.44
-9	-0.044	-1.55	0.063	1.78	0.010	0.34
-8	-0.040	-1.36	0.053	1.47	0.003	0.01
-7	-0.051	-1.67	0.059	1.68	0.001	-0.04
-6	-0.043	-1.40	0.057	1.57	-0.004	-0.36
-5	-0.046	-1.44	0.059	1.62	-0.006	-0.40
-4	-0.052	-1.64	0.064	1.75	-0.005	-0.36

-3	-0.052	-1.61	0.063	1.66	-0.002	-0.27
-2	-0.058	-1.78	0.065	1.57	-0.002	-0.11
-1	-0.061	-1.85	0.064	1.47	-0.004	-0.39
0	-0.066	-2.04	0.063	1.48	-0.007	-0.52
1	-0.073	-2.24	0.071	1.67	-0.008	-0.64
2	-0.073	-2.18	0.074	1.74	-0.007	-0.61
3	-0.082	-2.43	0.064	1.45	0.005	-0.13
4	-0.084	-2.48	0.057	1.20	0.009	0.05
5	-0.085	-2.47	0.047	0.94	0.010	0.12
6	-0.094	-2.69	0.052	1.08	0.011	0.17
7	-0.094	-2.67	0.060	1.30	0.011	0.10
8	-0.098	-2.78	0.057	1.18	0.009	0.08
9	-0.104	-2.95	0.068	1.43	0.014	0.31
10	-0.108	-3.06	0.069	1.26	0.015	0.35
15	-0.122	-3.23	0.048	0.67	0.005	0.03
20	-0.133	-3.36	0.044	0.59	-0.006	-0.37
25	-0.144	-3.47	0.045	0.55	-0.009	-0.18
30	-0.171	-3.99	0.056	0.72	-0.015	-0.42
35	-0.178	-4.05	0.070	0.96	-0.024	-0.67
40	-0.174	-3.87	0.078	1.12	-0.020	-0.50
45	-0.188	-3.96	0.084	1.24	-0.006	-0.17

[a] Cumulative average prediction error. See Appendix for technical discussion.

[b] $Z(CPE)$ is distributed unit normal. Thus, a value greater than or less than 1.96 indicates significance at the 5 percent level.

Table 3

Cumulative Average Prediction Errors and Z(CPE)'s,

Compressed Observation Windows:

1982-1983, 1984, 1985

Observation Window	1982-1983		1984		1985	
	CAPE[a]	Z(CPE)[b]	CAPE	Z(CPE)	CAPE	Z(CPE)
0, 15	-.061	-3.20	-.016	-0.85	.012	0.99
10, 25	-.039	-1.92	-.024	-1.16	-.022	-1.73
20, 35	-.044	-2.24	.026	1.03	-.023	-1.86
30, 45	-.015	-0.02	.028	1.27	.009	0.51

[a,b] See notes to Table 2.

FIGURE 1

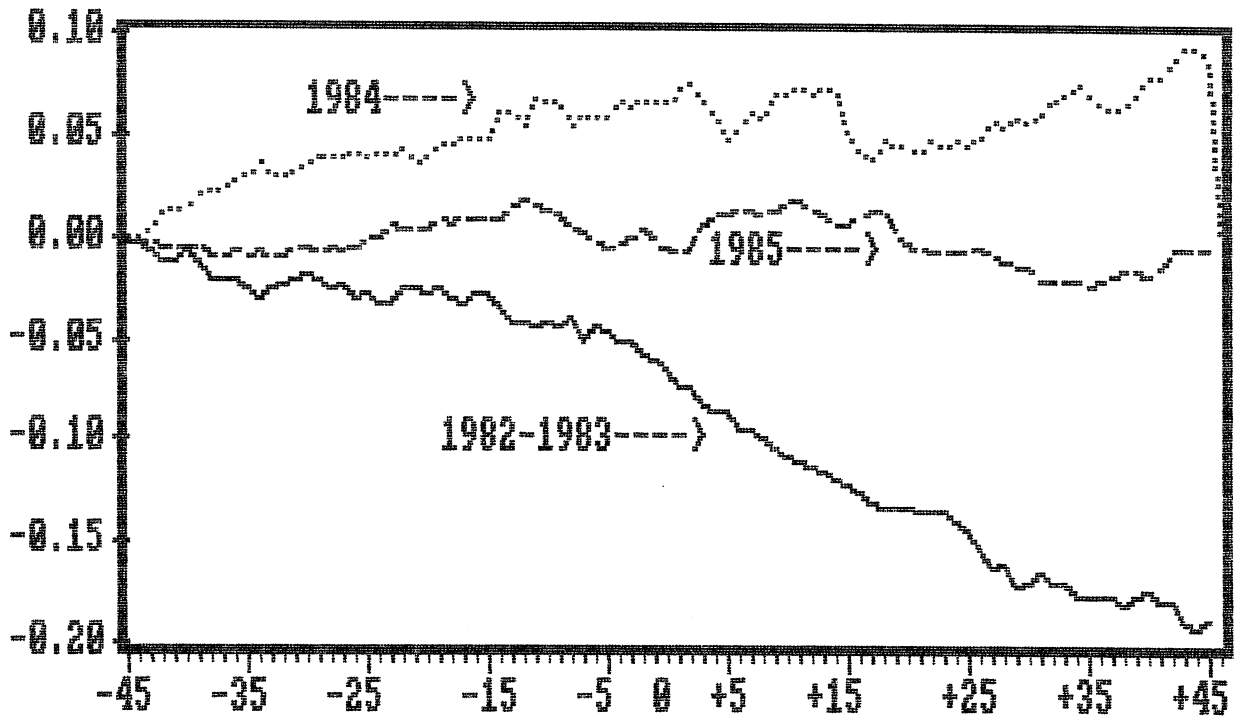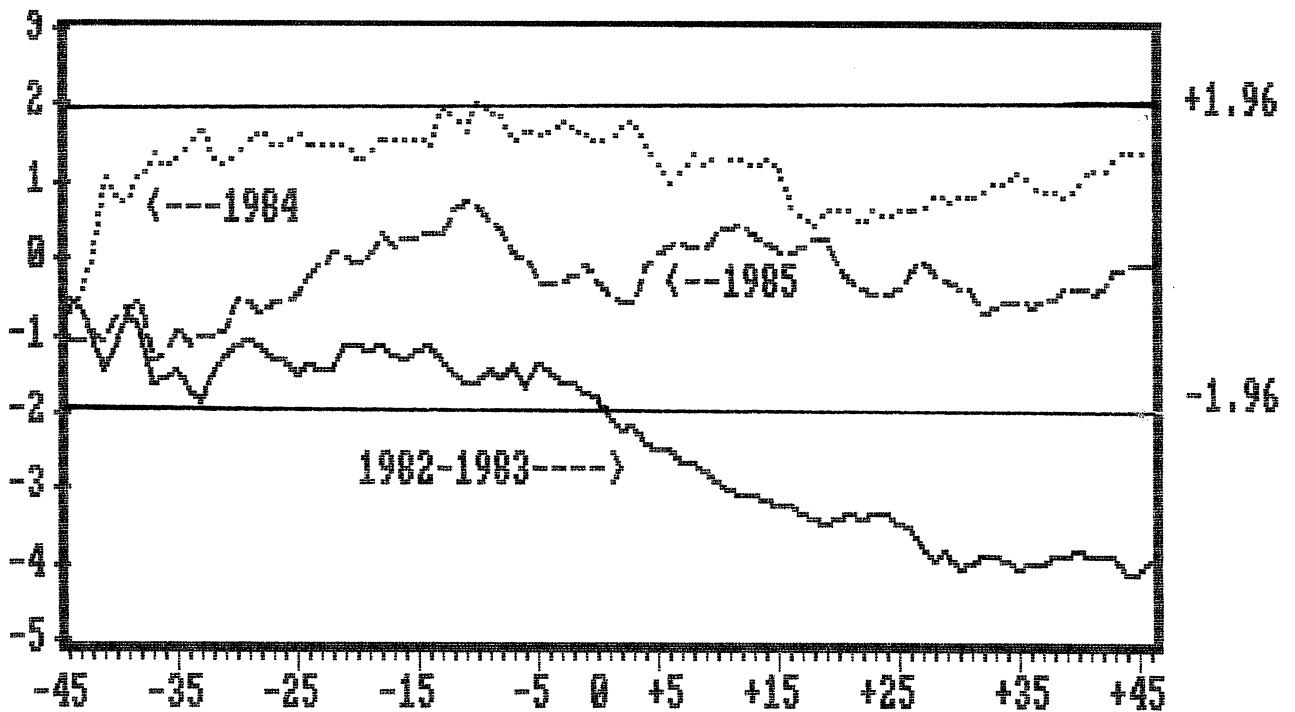### CAPE's 45 Days Before to 45 Days After Announcement, Day 0

FIGURE 2

Z(CPE) 45 Days Before to 45 Days After Announcement, Day 0

APPENDIX

The risk-adjusted market model used to derive results was

$$R_{jt} = \hat{\alpha}_j + \hat{\beta}_j R_{mt} + \varepsilon_{jt}$$

where,

R_{jt} = return on security; at time t,

R_{mt} = return on the market at time t,

ε_{jt} = regression error for the jth firm at time t,

$\hat{\alpha}_j$, $\hat{\beta}_j$ = estimated coefficients for firm j.

The market model is estimated over the 200 trading day period ending one day, -46, prior to the beginning of our observation window. The test statistic CAPE was calculated as

$$CAPE = N^{-1} \sum_{j=1}^{N} \sum_{d_{1j}}^{d_{2j}} \varepsilon_{jt}.$$

The CAPE is the cumulative average prediction error. It is the average error aggregated across the observation window, d_{1j} to d_{2j}.

The Z(CPE) was calculated as:

$$Z(CPE) = N^{-1/2} \sum_{j=1}^{N} [d_{2j} - d_{1j} + 1] \sum_{t=d_{1j}}^{d=j} \varepsilon_{jt} / s_{jt}$$

where,

ε_t = prediction error for firm,

d_{1j} = first day of the observation window,

d_{2j} = last day of the observation window,

N = number of firms in the sample,

s_{jt} = estimated standard deviation of ε_{jt}.

In order to be able to use the standard unit normal distribution the prediction errors, ε_{jt}, are standardized by their estimated standard deviations. These standardized prediction errors, SPE's, are summed for each firm as

$$W_j = \sum_{t=d_{1j}}^{d_{2j}} SPE_{jt} \times 1 / \sqrt{d_{2j} - d_{1j} + 1}$$

With a large sample W_j is distributed unit normal. The test statistic for the average standardized cumulative prediction error is

$$Z(CPE) = \overline{W}_j (N)^{1/2}.$$

$Z(CPE)$ is distributed an unit normal. Thus, a $Z(CPE)$ of 1.96 indicates statistical significance at the .05 level. For a complete technical discussion of these statistics see P. Dodd and J. Warner, "On Corporate Governance: A Study of Proxy Contests," Journal of Financial Economics (April 1983), pp. 401-438.

References

1. Barnes, K., Mendleson, J. & Horn, G. (1987). Examination of structured mentorship for new employees. Working Paper presented to *The Association of Human Resources Management & Organization Behavior*. Regional Conference, San Antonio, April 13.
2. Burke, R. (1984). Mentors in organizations. *Group & Organizational Studies*, 9(3).
3. Carkhuff, R. (1971). *The Development of Human Resources*. New York: Holt, Rinehart & Winston.
4. Carkhuff, R. & Griffin, A. (1970). The selection of human resources specialists. *Journal of Counseling Psychology*, 17.
5. Carkhuff, R. & Berenson, B. (1967). *Beyond Counseling & Therapy*. New York: Holt, Rinehart & Winston.
6. Egan, G. (1970). *Group Processes for Interpersonal Growth*. Monterey, California: Brooks/Cole.
7. Erikson, E. (1963). *Childhood and Society*. New York: Norton Erikson, E. (1968). *Identity, Youth and Crisis*. New York: Norton.
8. Farren, C., Gray, J., & Kaye, B. (1984). Mentoring: A boon to career development. *Personnel*, 61(6).
9. Jung, C. (1933). *Modern Man in Search of a Soul*. New York: Harcourt.
10. Kram, K. (1985). Improving the mentoring process. *Training and Development Journal*, 34(4).
11. Levinson, D.J. et al (1978). *Seasons of a Man's Life*. New York: Knopf.
12. Noe, R.A. (1988). Women and Mentoring: A review and research agenda. *Academy of Management Review*, 13(1).
13. Reich, M. (1985). Executive views from both sides of mentoring. *Personnel*, 62(3).
14. Roche, G. (1979). Much ado about mentors. *Harvard Business Review*, Jan/Feb.