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The effects of quarterly earnings announcements on the returns of stocks

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CAPSTONE PROJECT:

The Effects of Quarterly Earnings Announcements on the Returns of Stocks

by

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Finance 499H
Dr. Komarynsky

To My parents

who have always been there
when I needed them

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I. Introduction

The dramatic rise in the Dow Jones Industrial Average in the last year has fueled new interest in the stock market. People are always trying to get the edge, using whatever information they can use. But does any of this information really help investors to achieve abnormal returns. Does knowledge of a stock split or an earnings announcement help the average investor to get the jump on the competition? I hope that my paper will shed some light on this subject.

The purpose of my paper is to test the semi-strong form of the efficient market hypothesis. My study will try to prove that the stock market is efficient in reacting to new information as it is released to the public. I will study the effects of the announcement of quarterly earnings on the price of securities and attempt to determine whether the stock market is efficient in reacting to the announcement. The paper is divided into four major parts. First, I will define the efficient market hypothesis and its various forms, concentrating on the semi-strong form. Next, I will present evidence from published sources both supporting and contradictory to the efficient market hypothesis. Then, I will report on the processes and results of my quarterly earnings experiment and its conclusion. Finally, I will offer a summary and conclusion as to the validity of the semi-strong form of the efficient market hypothesis.

II. The Efficient Market Hypothesis

When market efficiency is talked about, we are not discussing how it is organized or how administratively efficient it is. Instead, we are talking about whether the market sets prices that reflect the true worth of the securities. As Dale Morse states, "In an efficient securities market, market prices should react to any information that may be relevant to the valuation of the securities."[1] There are two aspects to the market's reaction. These are the direction and magnitude of the adjustments. An efficient market would react quickly and correctly to any relevant information introduced into the system.

There are three levels of efficiency in the efficient market hypothesis. These are the weak form, the semi-strong form, and the strong form. The weak form of the efficient market hypothesis states that "current stock prices fully reflect all stock market information including the historical sequence of prices, price changes, volume information, and any other information generated by the market itself such as odd-lot sales and specialist activity."[2] Under this form of efficiency, investors would be unable to acheive abnormal returns by trading on past market information.

The second level of market efficiency is the semi-strong form of the efficient market hypothesis. In describing this level of efficiency, Leuthold and Hartmann said, "If prices reflect all publicly available information as it is released, the market is said to be semi-strong efficient."[3] Therefore, investors would not profit by trading on published data.

The third and highest level of market efficiency is the strong form of the efficient market hypothesis. The market is efficient in the strong sense if "share prices fully reflect not only published information but all relevant information including data not yet publicly available."[4]. With this level of efficiency, even an insider would not be able to profit on his private information.

As stated earlier, this paper deals with the semi-strong form of the efficient market hypothesis. The market achieves this level of efficiency when "Prices fully reflect all available relevant information."[5]. It would not depend on how the investors interpret this information, the market would represent the best interpretation of the information. This level of efficiency has a strong impact on the average investor. If the market is semi-strong efficient, he/she would not be able to profit from published information. Therefore, the investor hopes that the market is inefficient and he/she can use the information to achieve abnormal profits. A fundemental analyst, who studies available information, would profit by being able to find undervalued securities.

There have been many studies on the semi-strong form of the efficient market hypothesis. Different types of information that is publicly available has been tested. In the next section, I will discuss some of the more important and more recent studies done on the semi-strong market hypothesis.

III. Evidence on Semi-Strong Market Efficiency

A. Evidence Supporting Market Efficiency

There is evidence both supporting and contrary to the semi-strong form of the efficient market hypothesis. Most of the evidence, though, is supportive of semi-strong market efficiency. One of the first tests of this level of market efficiency was conducted by Fama, Fisher, Jensen, and Roll. In their study, they studied the effects of stock splits on abnormal returns of securities. Fama et al. found that there were abnormal returns occuring prior to the split announcement. But, after the announcement of the stock split, "The average cumulative abnormal return, which was increasing prior to the announcement, ceased to increase (or decrease) significantly in the period following the split announcement."[6]. This is exactly in line with what the efficient market hypothesis would predict.

In a more recent study done by Reilly and Drzycimski on stock splits, they also found the market to be semi-strong efficient. In their study, the most notable price change came from day t_{-2} to day t_{-1}. The reason for this change might be pre-publication information. This is because the announcement appears in The Wall Street Journal the day after the actual announcement.[7]. On their experiment, Reilly and Drzycimski concluded, ". . .the results consistently supported the semi-strong efficient market hypothesis, because they indicate that stock prices either adjusted prior to or very shortly after the public announcement of stock splits."[8].

Another famous study which supported semi-strong efficiency

was the study by Ball and Brown on the effects of annual earnings announcements on stock prices. In this study, the two men investigated the impact of annual earnings announcements on the market for 261 firms during rhe period 1957-1965. They charted excess returns from twelve months prior to the announcement to six months after the announcement. The results as reported by Simon Keane in Stock Market Efficiency: Theory, Evidence, Implications are:

> 1) throughout the preceeding twelve months, the prices of the shares moved progressively in the same direction as that of the subsequent change in earnings;
>
> 2) as much as 80%-90% of the price movement was completed by the announcement date . . .[9].

Another study on annual earnings announcements by Beaver showed that trading volume significantly increases around the time of the announcement.

A study done by Davies and Canes considered the effects of publicly announced buy and sell recommendations on stock prices. In this study, Davies and Canes took buy and sell recommendations from The Wall Street Journal's "Heard on the Street" column and measured the abnormal return for the securities for a period before and after the publication. They concluded that ". . . information readily available . . . appears to be very quickly incorporated into stock prices . . ."[10]. They also concluded that the evidence "does not point to an unexploited opportunity for profit, which is perhaps a fundemental test of market efficiency."[11].

There have been many other studies that support the semi-

strong efficient market hypothesis. Studies on new issues, new exchange listings, reactions to world events, and potential takeovers have all shown positive evidence of semi-strong market efficiency.

B. Evidence Contrary to Market Efficiency

Although most of the evidence gathered supports semi-strong efficiency there have been studies that question this level of market efficiency. A study by Basu examined the relationship between price-earnings ratio and the returns on stocks. In this study, Basu found a definite relationship between the historical price-earnings ratio of the stock and its subsequent market performance. The results showed that low price-earnings ratio stocks had superior returns while stocks with high price-earnings ratios had inferior returns. This is contrary to semi-strong form efficiency because the investor could garnish abnormal returns using available public information.[12].

In studies by Banz and Reinganum, a size effect on the return of stocks occurred. In these studies, it was discovered that "smaller firms consistently experienced significantly larger risk-adjusted returns than the large firms."[13]. Since abnormal returns were generated, then it follows that the market is not efficient in the semi-strong sense.

Some of the most interesting results have come from studies on the effects of quarterly earnings announcements on stock prices. These studies have given us the strongest evidence against semi-strong market efficiency. In one study, Watts analyzed quarterly earnings reports over the period 1962-1968. He found that

abnormal returns could be earned in the period 1962-1965, but that the amount of return was still too small to cover transaction costs. Watts concluded that ". . . those observed abnormal returns imply that the market is inefficient."[14] In another study, Jay, Litzenberger, and McEnally also studied the effects of quarterly earnings. They also concluded that abnormal returns could be attained by acting on the announcement of quarterly earnings.

In a more recent study, Morse studied many types of public announcements, including the announcement of quarterly earnings. Morse used the date of the announcement's listing in The Wall Street Journal as the announcement date. He used fifty stocks in the four-year period from 1973 to 1976. In this study, Morse noted, "The market began to react the day prior to the WSJ announcement and continued to react significantly for three days after the announcement."[15] Morse then concluded, "The quarterly earnings reports, however, appears to have the most significant and sustained effect on the valuation of securities."[16] All three of these studies have shown a flaw in the semi-strong form of the efficient market hypothesis. Now, I will report on the processes and results from my own study on the effect of quarterly earnings announcements on stock prices.

IV. Quarterly Earnings Announcements and Stock Prices

A. Data

This experiment is designed to test the semi-strong form of the efficient market hypothesis. In this experiment, I am testing the effect on stock returns of quarterly earnings reports.

It is my goal to determine whether or not abnormal returns can be achieved by acting on the basis of quarterly earnings announcements. If the market is efficient in the semi-strong sense, then abnormal returns will not be attained by trading in the securities after the earnings reports are published. In describing the market efficiency, Watts said, "If the market is efficient with respect to public announcements (of quarterly earnings), stock price changes associated with that information would be contemporaneous with the public announcement of the earnings."[17].

For my study, I chose twenty companies actively traded on the New York Stock Exchange. Below is a list of the twenty companies that were used in the experiment:

American Express	Merck & Co.
Citicorp	Philip - Morris
Commonwealth Edison	PPG Industries
Dow Chemical	RJ Reynolds
Exxon	Square D Company
General Electric	Toledo Edison
General Motors	TRW Company
Int'l Business Machines	United States Steel
Johnson & Johnson	Upjohn
Manufacturers Hanover	Xerox.

Data was gathered for twenty quarters from 1980-1984 for a total of four hundred observations. The announcement date is the date that the quarterly earnings report was published in The Wall Street Journal. Price information was gathered for the period from one day prior to the announcement to two days after the announcement. The return for the Standard & Poor's 500 Index was used as the market return. The price information on the individual securities and the Standard & Poor's 500 Index was the closing

price for the day.

B. Processes

All of the quarterly earnings reports were sorted into two groups, those with an increase in quarterly earnings from the prior year, and those with a decrease in earnings from the prior year. If there was no change in earnings from the prior year, the observation was included in the increase group. Breaking down the sample this way, there were 277 positive observations and 123 negative observations. The sample was then stratified into quarters (1st, 2nd, etc.). Each quarter was then seperated into positive and negative observations. This stratification resulted in four groups with approximately 70 positive observations and 30 negative observations in each group.

To calculate the rate of return for each security and the Standard & Poor's 500 Index, day t_{-1} was used as a base. The equation

$$R_t = (P_n - P_{t_{-1}})/P_{t_{-1}}$$

where R_t = return for period t
where P_n = price at day n
where $P_{t_{-1}}$ = price at day -1

was used to arrive at the rate of return for each security and the market. The abnormal return for each security was calculated by the equation

$$AR_{it} = R_{it} - R_{mt}$$

where AR_{it} = abnormal return for stock i for period t
where R_{it} = return for security i for period t
where R_{mt} = return for the market for period t.

The change in earnings per share was calculated by the equation

$$DEPS = (EPS_t - EPS_{t-1})/EPS_{t-1}$$

where DEPS = % change in earnings per share
where EPS_t = earnings per share for current period
where EPS_{t-1} = earnings per share for prior period.

Means analysis was then performed on the abnormal returns. Mean abnormal returns were calculated for day 0, day +1, and day +2. The means were calculated for the positive and for the negative observations in the main set and in the four subsets. The results of the means analysis are contained in Appendix A.

In addition to the means analysis, regression analysis was performed on the data. In the regression analysis, the change in earnings per share was the dependant variable. The independant variables in the model are the abnormal returns at day 0, day +1, and day +2. Simple regression was run for each of the abnormal returns. Stepwise regression was also performed and the results included the best one, two, and three variable models. The regression analysis was run for all the companies in the sample and then broken down by each individual company. The results of both regression analysis can be found in Appendix B.

C. Results

I will first discuss the results of the regression analysis. Next, Iwill discuss the results of the means analysis that was performed. Finally, some possible flaws in the experimental design will be discussed.

I will start with the simple regression analysis. The dependant variable, the change in earnings per share, was regressed

against the abnormal returns at day 0, day +1, and day +2. The R-squared for all companies sampled was .0015 for day 0, .005 for day +1, and .0058 for day +2. This shows that the abnormal returns had a very low correlation with the changes in earings per share. Only in a few instances, did the R-squared rise above .2. This was in the case of PPG Industries, Toledo Edison, TRW Company, and Upjohn. Intests of significance using t-tests, the significance declined from day 0 to day +1 to day +2. This is consistent with semi-strong market efficiency in that abnormal returns will tend to zero in days following the announcement of the public announcement. When examining the individual companies, though, you find the significance highest on any of the three days. Although each stock behaves differently, as a whole, the significance declines.

The stepwise regression yielded some differing results. In these regressions, F-tests were used instead of t-tests. The R-squared still remained very low and the same companies as earlier registered an R-squared of greater than .2. The best one variable model for all the companies samples used day +2 as the independent variable. When two variables were used, day +1 was added, then finally day 0 was used. This differs with the earlier results were day 0 was the most significant and day +2 was the least significant. The individual companies were split pretty evenly on the best one and two variable models. In all, the levels of significance were not very high throughout the stepwise regression analysis. When three variable models were examined, PPG Industries was the only company with an F-value

of greater than 2.00. Inthe two variable model, seven companies registered an F-value over 2.00. The one variable model yielded only six companies with F-values greater than 2.00.

The other type of analysis that was done was a means analysis. Mean abnormal returns were calculated for those observations with a positive change and for those observations with a negative change. A table of the means and graphs depicting those numbers in shown in Appendix A. In the first graph that encompasses all the four hundred observations, you can see a significant increase in abnormal returns from day -1 to day 0 for the observations with a positive change. After day 0, the return inch up slightly. For observations with a negative change, the abnormal return was slightly positive for day 0 and increased dramatically after that. These observations would be consistent with market efficiency in the semi-strong sense. An abnormal profit could not be achieved after buying on the news of positive earnings or selling short on the news of negative earnings.

Examining the quarterly graphs, the same realization occurs for the first three quarters. After a negative earnings announcement, abnormal returns increase slowly at first but then pick up speed. Positive earnings announcements show a significant increase from day -1 to day 0 and then a small increase afterward. The fourth quarter, though, is something of an anomoly. Here, positive earnings cause an increase in abnormal returns and negative earnings cause a decrease in abnormal returns. The market is still efficient in that the biggest gain or loss occurs from day -1 to day 0. The graph looks very similar to

the results of the Ball and Brown study. A reason for this could be that along with the publishing of fourth quarter earnings comes the publication of annual earnings numbers. The market's reaction could be to the annual numbers and not to the announcement of quarterly earnings.

This study of the effects of quarterly earnings on stock prices was a very limited study. The study could have been more complete if more companies were used or if the time frame surrounding the announcement date was widened. This would have made the study more effective but this could not be done due to limited resources and limited time. Another possible flaw was that I did not take into consideration the sensitivity of the security to the market (company beta) when calculating abnormal returns. This might have changed the results slightly but I do not believe this ommission caused any significant errors.

D. Conclusion

In examining the results of this study, it appears that the market reacts fairly efficiently to the infusion of new information, specifically quarterly earnings. Earlier in this paper, I indicated that the market is efficient in two aspects, magnitude and direction. This study appears to show that the market is efficient in one aspect, magnitude of change but inefficient in the other aspect, the direction of change. A positive return coupled with negative earnings announcement shows inefficiency in the direction of change in the stock market. The regression analysis showed little correlation between the change in earnings and stock prices. This seems to indicate that although the

market is fairly efficient in reacting to quarterly earnings announcements, investors do not see the quarterly earnings reports as very important information.

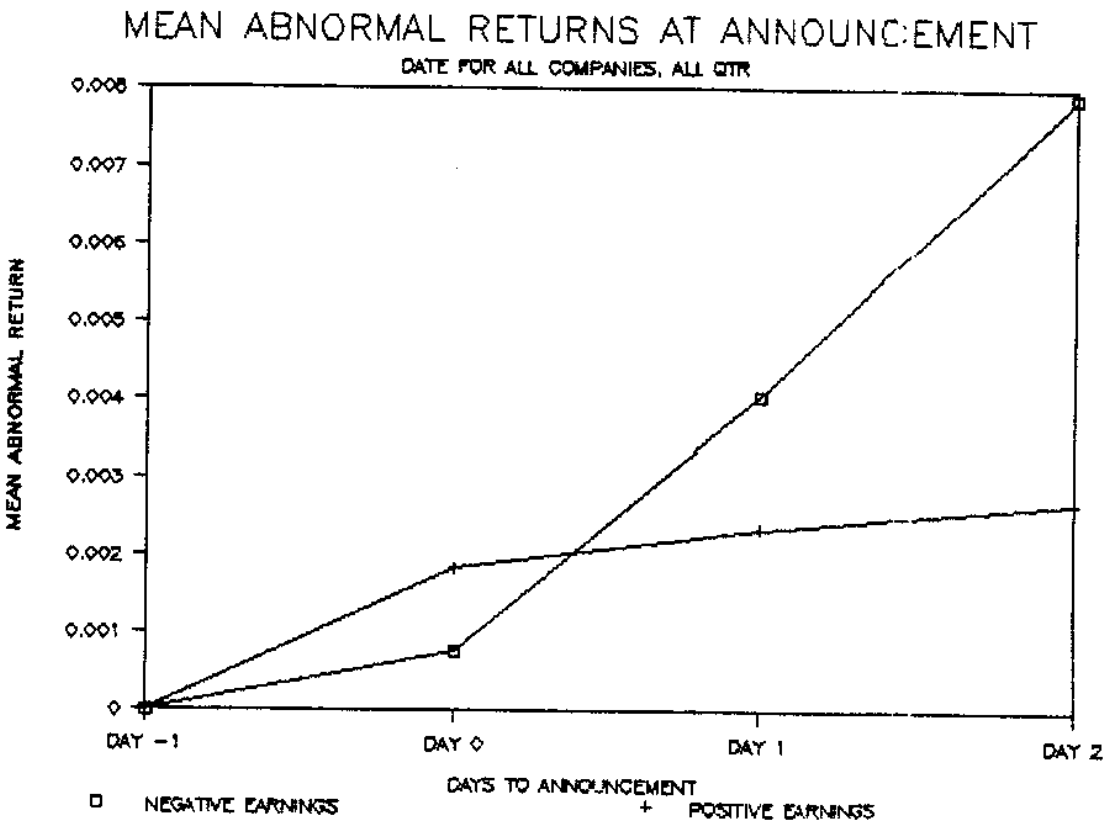
V. Summary

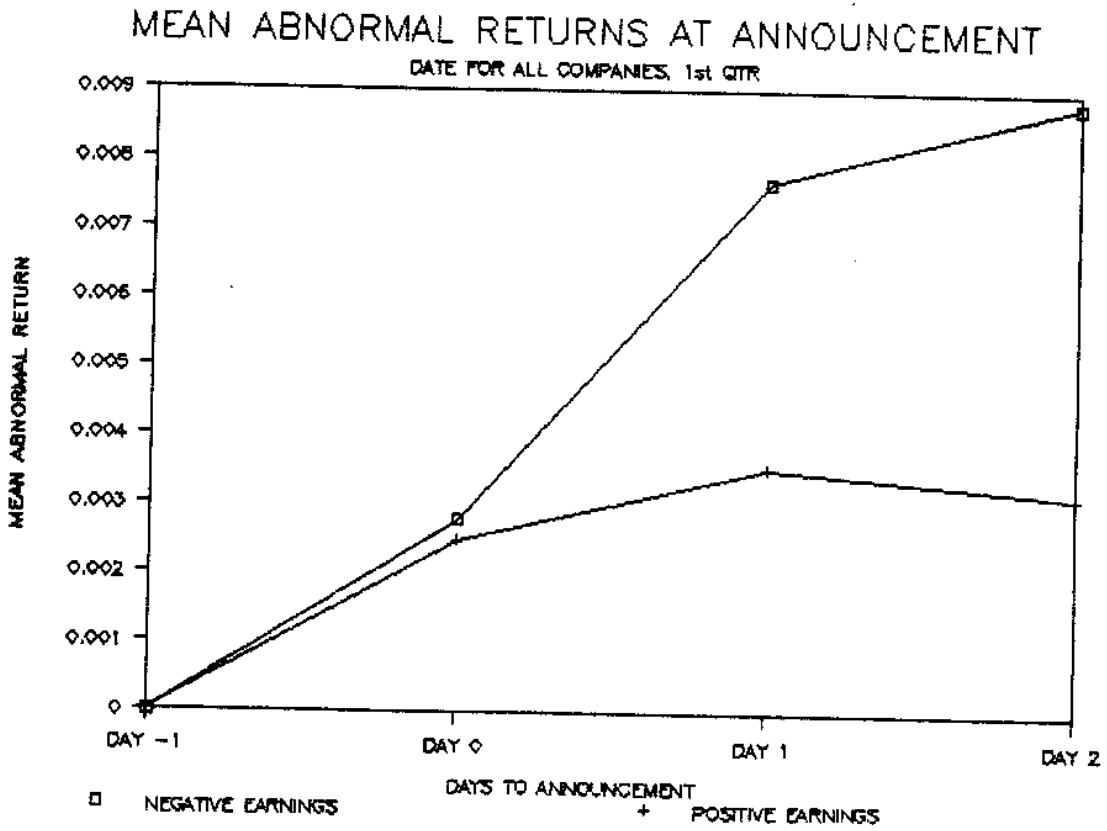
After examining the evidence of other people's research and the results of my own experiment, it appears to me that the stock market is efficient in the semi-strong sense. My research shows that although investors do not see quarterly earnings announcements as very important information, the market still reacts very quickly to the infusion of this information. Examining the results of studies by Ball and Brown, Reilly and Drzycimski, Fama et al. shows that the market is efficient in relation to the announcement of new information such as stock splits or annual earnings announcements. The implication to investors is that the only way to "beat" the market is with inside information. Also, this level of efficiency would hold that even if your portfolio is professionally managed, you will not generate abnormal returns. Davies and Canes sum it up very well by saying, "Investigations of price movements accompanying economic events . . . likewise have offered little hope that trading based on these announcements will be profitable."[18].

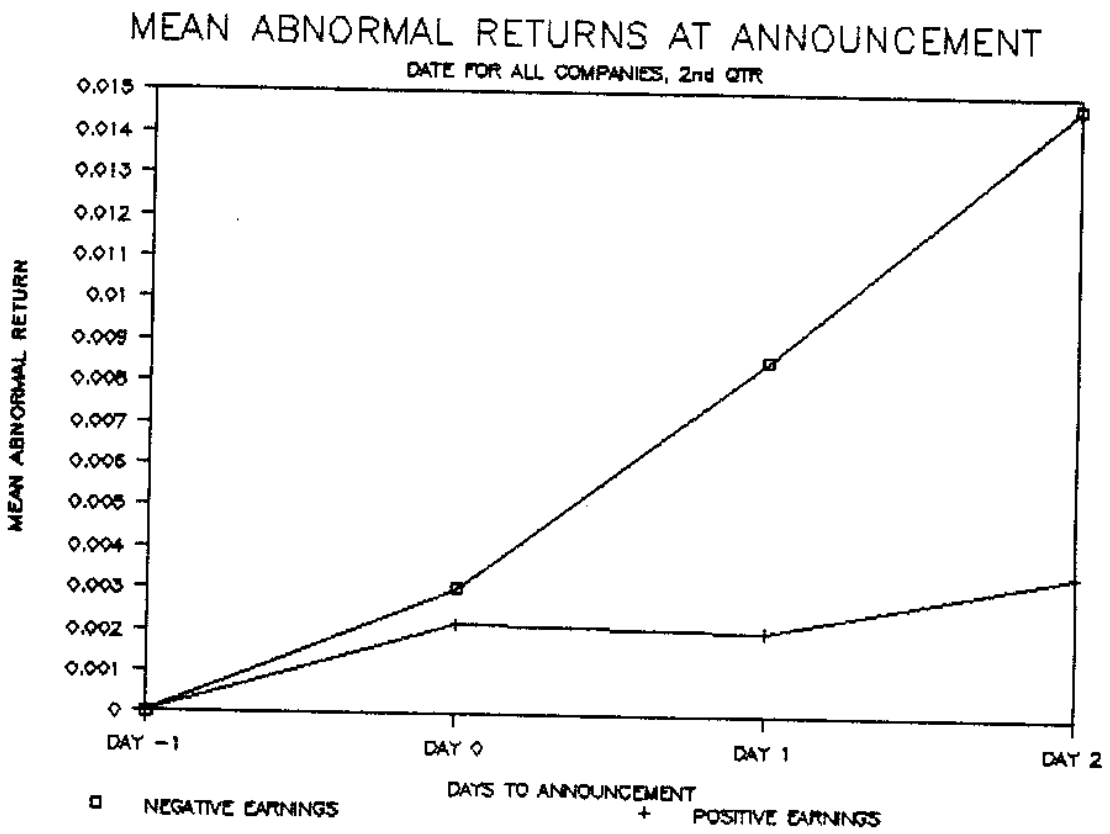
APPENDIX A:
Means Analysis Results

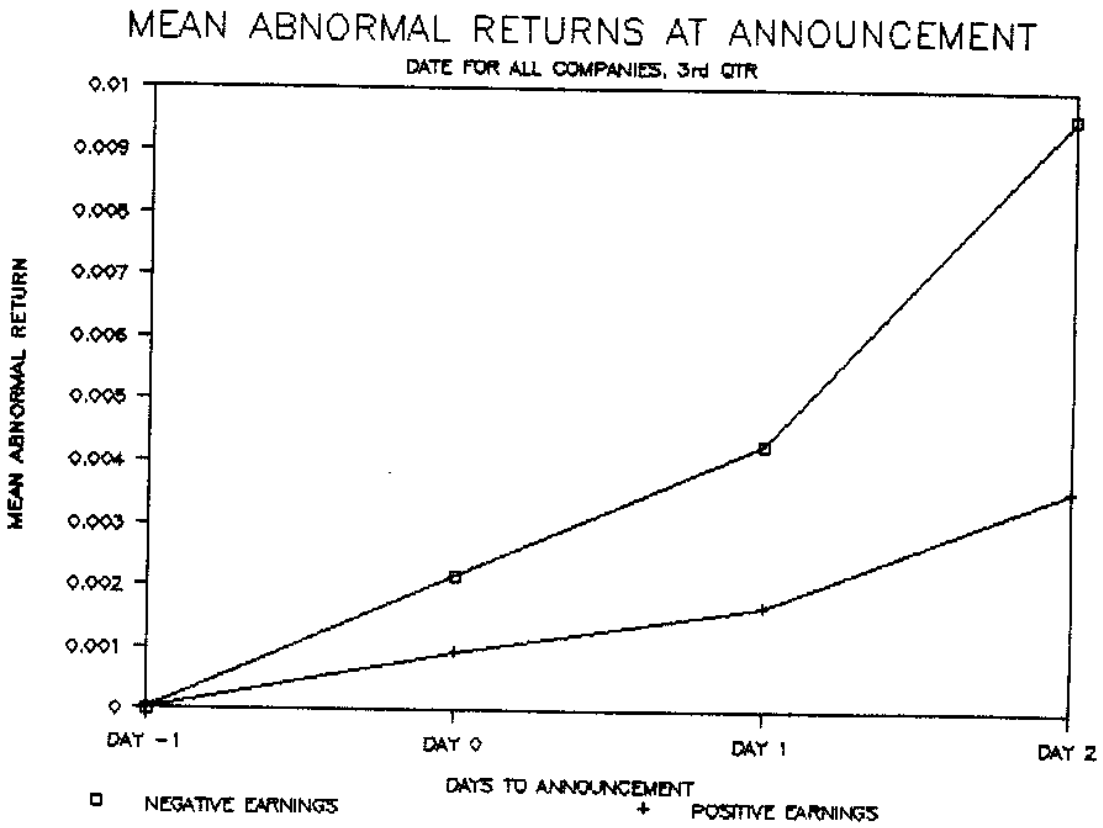
TABLE OF MEAN ABNORMAL RETURNS
FOR ALL QUARTERS AND BY EACH QUARTER

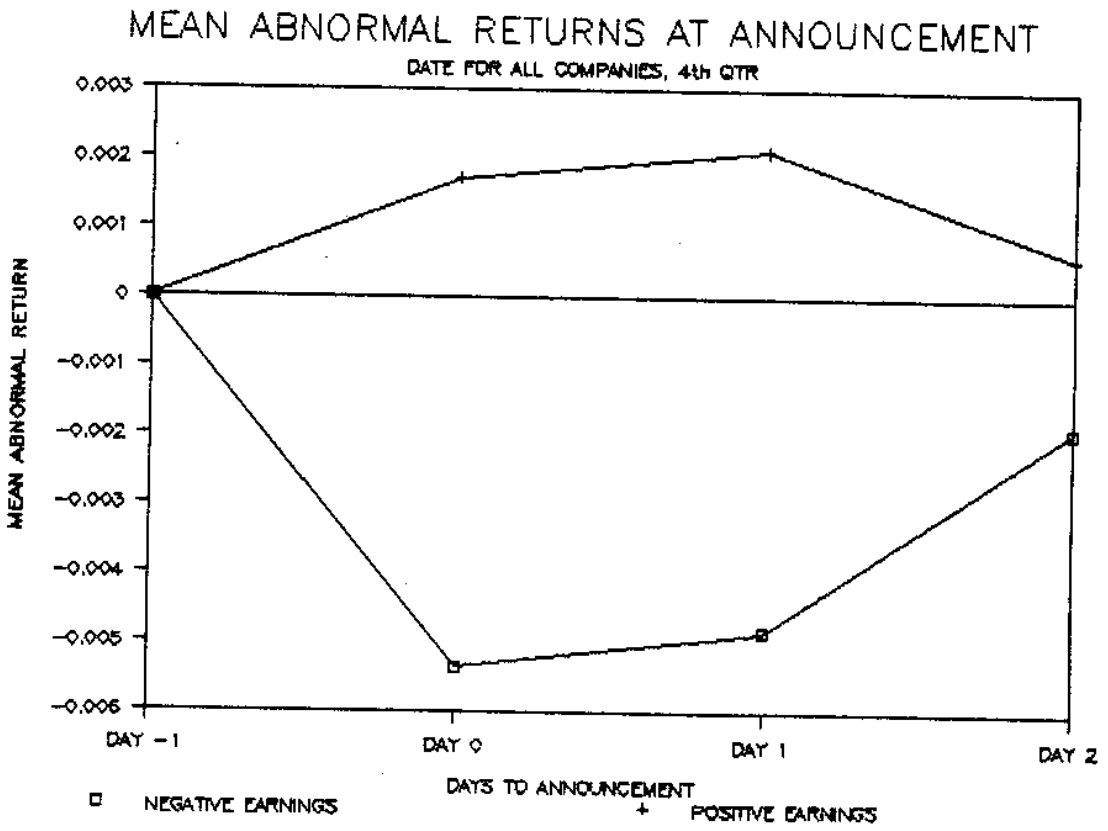
	DAY -1	DAY 0	DAY +1	DAY +2
ALL QUARTERS				
Positive Earnings	0.00000000	0.00192878	0.00234109	0.00268744
Negative Earnings	0.00000000	0.00076620	0.00416820	0.00788914
1st QUARTER				
Positive Earnings	0.00000000	0.00248816	0.00354884	0.00317097
Negative Earnings	0.00000000	0.00278285	0.00768618	0.00883293
2nd QUARTER				
Positive Earnings	0.00000000	0.00215923	0.00202963	0.00347161
Negative Earnings	0.00000000	0.00383643	0.00857268	0.01474998
3rd QUARTER				
Positive Earnings	0.00000000	0.00094077	0.00169586	0.00357691
Negative Earnings	0.00000000	0.00216961	0.00429336	0.00957447
4th QUARTER				
Positive Earnings	0.00000000	0.00172659	0.00213157	0.00059589
Negative Earnings	0.00000000	0.00534651	-0.00483561	-0.00190526


MEAN ABNORMAL RETURNS AT ANNOUNCEMENT
DATE FOR ALL COMPANIES, ALL QTR
MEAN ABNORMAL RETURN
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
DAY -1
DAY 0
DAY 1
DAY 2
DAYS TO ANNOUNCEMENT
NEGATIVE EARNINGS
POSITIVE EARNINGS


MEAN ABNORMAL RETURNS AT ANNOUNCEMENT
DATE FOR ALL COMPANIES, 1st QTR
MEAN ABNORMAL RETURN
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
DAY -1
DAY 0
DAY 1
DAY 2
DAYS TO ANNOUNCEMENT
NEGATIVE EARNINGS
POSITIVE EARNINGS


MEAN ABNORMAL RETURNS AT ANNOUNCEMENT
DATE FOR ALL COMPANIES, 2nd QTR
MEAN ABNORMAL RETURN
0.015
0.014
0.013
0.012
0.011
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
DAY −1
DAY 0
DAY 1
DAY 2
DAYS TO ANNOUNCEMENT
NEGATIVE EARNINGS
POSITIVE EARNINGS


MEAN ABNORMAL RETURNS AT ANNOUNCEMENT
DATE FOR ALL COMPANIES, 3rd QTR
MEAN ABNORMAL RETURN
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
DAY -1
DAY 0
DAY 1
DAY 2
DAYS TO ANNOUNCEMENT
NEGATIVE EARNINGS
POSITIVE EARNINGS


MEAN ABNORMAL RETURNS AT ANNOUNCEMENT
DATE FOR ALL COMPANIES, 4th QTR
MEAN ABNORMAL RETURN
0.003
0.002
0.001
0
-0.001
-0.002
-0.003
-0.004
-0.005
-0.006
DAY -1
DAY 0
DAY 1
DAY 2
DAYS TO ANNOUNCEMENT
NEGATIVE EARNINGS
POSITIVE EARNINGS

APPENDIX B:
Regression Statistics

TABLE OF REGRESSION STATISTICS
DEPENDENT VARIABLE: DEPS INDEPENDENT VARIABLE: ABRR
FOR ALL SAMPLE COMPANIES AND BY INDIVIDUAL COMPANY

COMPANY	COEFFICIENT INTERCEPT	COEFFICIENT DAY 0	R-SQUARED	T-SCORE INTERCEPT	T-SCORE DAY 0	PROB > T INTERCEPT	PROB > T DAY 0	DURBIN-WATSON
ALL COMPANIES	-0.045249	-5.097886	0.0015	-0.565	-0.785	0.5722	0.433	1.955
AMERICAN EXPRESS	-0.476289	-14.31695	0.0544	-1.175	-1.017	0.2555	0.3225	0.844
CITICORP	0.121905	3.588479	0.0387	1.199	0.755	0.2462	0.4599	2.512
COMMONWEALTH EDISON	0.098638	-0.138797	0.0003	3.391	-0.075	0.804	0.9408	2.363
DOW CHEMICAL	0.163004	7.837484	0.017	0.636	0.559	0.5202	0.5833	2.381
EXXON	0.119397	5.085495	0.0278	1.445	0.718	0.1656	0.4822	2.047
GENERAL ELECTRIC	0.103663	-0.726742	0.0346	12.149	-0.804	0.0001	0.432	2.125
GENERAL MOTORS	-1.086895	-9.187877	0.0092	-0.53	-0.058	0.6828	0.9543	2.044
INTL BUSINESS MACHINES	0.168044	-2.226775	0.0585	4.759	-0.978	0.0042	0.3489	2.602
JOHNSON & JOHNSON	0.095179	-1.358085	0.0118	2.024	-0.465	0.0581	0.6497	1.903
MANUFACTURERS HANOVER	0.021112	-3.765968	0.1893	0.497	-2.85	0.495	0.0552	2.531
MERCK & CO.	0.066195	0.925713	0.0193	2.949	0.595	0.0086	0.5591	2.307
PHILIP - MORRIS	0.121877	1.886229	0.045	3.582	0.921	0.0025	0.369	1.364
PPG INDUSTRIES	0.11039	-5.598699	0.0242	1.084	-0.668	0.2927	0.5127	2.834
RJ REYNOLDS	0.093631	1.732062	0.0122	1.909	0.471	0.0724	0.6434	2.386
SQUARE D COMPANY	0.109285	-1.564545	0.0101	1.102	-0.428	0.285	0.6738	2.303
TOLEDO EDISON	0.100115	-6.604657	0.2334	2.489	-2.341	0.0228	0.0309	3.245
TRW COMPANY	0.053624	6.872982	0.0803	0.757	1.254	0.4593	0.2259	2.089
UNITED STATES STEEL	-1.414504	-68.71166	0.84	-1.817	-8.0866	0.3227	0.3981	2.016
UPJOHN	0.058853	-5.462321	0.1734	0.919	-1.943	0.3782	0.0687	2.695
XEROX	-0.102536	2.48883	0.0878	-2.442	1.316	0.0252	0.2046	2.686

TABLE OF REGRESSION STATISTICS
DEPENDENT VARIABLE: DEPS INDEPENDENT VARIABLE: ABRI
FOR ALL SAMPLE COMPANIES AND BY INDIVIDUAL COMPANY

COMPANY	COEFFICIENT INTERCEPT	COEFFICIENT DAY 1	R-SQUARED	T-SCORE INTERCEPT	T-SCORE DAY 1	PROB) T INTERCEPT	PROB) T DAY 1	DURBIN-WATSON
ALL COMPANIES	-0.05313	-6.89085	0.005	-0.459	-1.419	0.6462	0.1568	1.942
AMERICAN EXPRESS	-0.386846	-9.30962	0.024	-0.948	-0.666	0.3556	0.5139	0.714
CITICORP	0.132648	2.009362	0.0169	1.324	0.557	0.2021	0.5847	2.605
COMMONWEALTH EDISON	0.098452	-0.06578	0.0001	3.31	-0.045	0.0039	0.9647	2.373
DOW CHEMICAL	0.207947	0.786999	0.0003	0.829	0.078	0.418	0.9389	2.355
EXXON	0.120511	1.269652	0.0048	1.428	0.294	0.1705	0.7718	2.065
GENERAL ELECTRIC	0.104917	-0.51954	0.0653	12.302	-1.122	0.0001	0.2786	2.294
GENERAL MOTORS	-0.872215	-31.4449	0.0076	-0.463	-0.371	0.6489	0.715	1.957
INTL BUSINESS MACHINES	0.156822	-0.00899	0	4.581	0.005	0.0002	0.9963	2.687
JOHNSON & JOHNSON	0.087181	1.008715	0.0134	1.849	0.495	0.0809	0.6269	1.708
MANUFACTURERS HANOVER	0.010626	-3.26776	0.1555	0.343	-1.821	0.7355	0.0853	2.281
MERCK & CO.	0.044289	0.185348	0.0016	2.042	0.169	0.0108	0.8679	2.292
PHILIP - MORRIS	0.112815	1.030282	0.0185	3.026	0.583	0.0073	0.5673	1.38
PPG INDUSTRIES	0.136898	-15.0656	0.2586	1.575	-2.506	0.1326	0.0223	2.816
RJ REYNOLDS	0.094975	1.068188	0.0151	1.926	0.526	0.0701	0.6055	2.356
SQUARE D COMPANY	0.183594	-2.51858	0.0247	1.851	-0.675	0.3071	0.5082	2.218
TOLEDO EDISON	0.05935	-3.12492	0.1195	1.43	-1.563	0.1699	0.1354	2.983
TRW COMPANY	0.016841	7.865762	0.1714	0.234	1.929	0.8178	0.0696	1.979
UNITED STATES STEEL	-1.266646	-30.6714	0.0316	-0.879	-0.766	0.391	0.4536	1.937
UPJOHN	0.077689	-3.93471	0.222	1.253	-2.267	0.2263	0.036	2.695
XEROX	-0.106169	5.158413	0.0243	-2.447	0.67	0.0249	0.5114	2.694

TABLE OF REGRESSION STATISTICS
DEPENDENT VARIABLE: DEPS INDEPENDENT VARIABLE: ABR2
FOR ALL SAMPLE COMPANIES AND BY INDIVIDUAL COMPANY

COMPANY	COEFFICIENT		R-	T-SCORE		PROB > T		DURBIN-
	INTERCEPT	DAY 2	SQUARED	INTERCEPT	DAY 2	INTERCEPT	DAY 2	WATSON
ALL COMPANIES	-0.04788	-6.02394	0.0058	-0.486	-1.523	0.6851	0.1285	1.939
AMERICAN EXPRESS	-0.31573	-8.149545	0.0314	-0.746	-0.764	0.4653	0.4546	0.754
CITICORP	0.15189	-0.961539	0.0124	1.557	-0.475	0.1369	0.6485	2.353
COMMONWEALTH EDISON	0.188401	-1.505668	0.0587	3.459	-1.059	0.0026	0.3034	2.598
DOW CHEMICAL	0.195863	2.389132	0.004	0.806	0.268	0.4305	0.7919	2.366
EXXON	0.129289	-0.650235	0.0021	1.467	-0.193	0.1542	0.8489	2.094
GENERAL ELECTRIC	0.103112	-0.224881	0.0155	11.818	-0.533	0.0001	0.6888	2.197
GENERAL MOTORS	-0.90737	-20.37848	0.0076	-0.487	-0.372	0.6322	0.7144	1.935
INTL BUSINESS MACHINES	0.152315	1.194589	0.0238	4.477	0.663	0.0003	0.5157	2.783
JOHNSON & JOHNSON	0.092349	1.599758	0.0476	2.829	0.948	0.0575	0.3557	1.589
MANUFACTURERS HANOVER	0.021516	-2.258445	0.1843	0.707	-2.811	0.4887	0.0596	2.228
MERCK & CO.	0.063573	0.0078368	0	2.86	0.008	0.0104	0.9937	2.27
PHILIP - MORRIS	0.111052	3.105387	0.024	2.956	0.665	0.0085	0.5145	1.362
PPG INDUSTRIES	0.129942	-7.355596	0.241	1.488	-2.391	0.1541	0.0279	2.35
RJ REYNOLDS	0.096065	1.234106	0.0266	1.97	0.702	0.0645	0.4917	2.341
SQUARE D COMPANY	0.120223	-2.720476	0.0162	1.188	-0.544	0.2584	0.5932	2.335
TOLEDO EDISON	0.062083	-2.587361	0.1302	1.513	-1.641	0.1476	0.1181	2.768
TRW COMPANY	0.010694	9.343178	0.2229	0.154	2.272	0.8791	0.0356	1.971
UNITED STATES STEEL	-1.162672	-30.72832	0.0298	-0.78	-0.744	0.4457	0.4667	2.002
UPJOHN	0.080096	-3.125671	0.2483	1.312	-2.438	0.2059	0.0253	2.55
XEROX	-0.111344	2.186441	0.0719	-2.614	1.181	0.0176	0.2531	2.697

TABLE OF STEPWISE REGRESSION STATISTICS
STEP 1 AND STEP 2
FOR ALL SAMPLE COMPANIES AND BY INDIVIDUAL COMPANY

	STEP 1				STEP 2				
COMPANY	VARIABLE USED	R-SQUARED	F-VALUE	PROB > F	VARIABLE USED	VARIABLE USED	R-SQUARED	F-VALUE	PROB > F
ALL SAMPLE COMPANIES	ABR2	0.005579579	2.32	0.1283	ABR1	ABR2	0.00596259	1.19	0.3051
AMERICAN EXPRESS	ABR0	0.05436541	1.03	0.3225	ABR0	ABR2	0.85957581	0.54	0.5933
CITICORP	ABR0	0.03071441	0.57	0.4599	ABR1	ABR2	0.14366929	1.43	0.2676
COMMONWEALTH EDISON	ABR2	0.05869224	1.12	0.3034	ABR1	ABR2	0.24735732	2.79	0.0893
DOW CHEMICAL	ABR0	0.0170371	0.31	0.5833	ABR0	ABR1	0.03302213	0.29	0.7517
EXXON	ABR0	0.0270888	0.51	0.4822	ABR0	ABR2	0.06551957	0.6	0.5621
GENERAL ELECTRIC	ABR1	0.06531569	1.26	0.2768	ABR1	ABR2	0.12781595	1.25	0.3127
GENERAL MOTORS	ABR2	0.00762103	0.14	0.7144	ABR0	ABR1	0.01520370	0.13	0.8773
INTL BUSINESS MACHINES	ABR0	0.05049316	0.96	0.3409	ABR0	ABR2	0.2120892	2.3	0.1307
JOHNSON & JOHNSON	ABR2	0.04755116	0.9	0.3557	ABR0	ABR2	0.16270883	1.65	0.2209
MANUFACTURERS HANOVER	ABR0	0.18931586	4.2	0.0552	ABR0	ABR2	0.25928491	2.98	0.079
MERCK & CO.	ABR0	0.01930608	0.35	0.5591	ABR0	ABR2	0.04331927	0.38	0.6863
PHILIP - MORRIS	ABR0	0.04503848	0.85	0.369	ABR0	ABR1	0.04554627	0.41	0.6728
PPG INDUSTRIES	ABR1	0.2586211	6.28	0.022	ABR0	ABR1	0.39368898	5.52	0.0142
RJ REYNOLDS	ABR2	0.02663853	0.49	0.4917	ABR1	ABR2	0.02979452	0.26	0.7733
SQUARE D COMPANY	ABR1	0.02469499	0.46	0.5082	ABR0	ABR1	0.02639535	0.23	0.7966
TOLEDO EDISON	ABR0	0.23344916	5.48	0.0309	ABR0	ABR2	0.24998667	2.83	0.0867
TRW COMPANY	ABR2	0.22285259	5.16	0.0356	ABR0	ABR2	0.22897951	2.52	0.1097
UNITED STATES STEEL	ABR0	0.03995469	0.75	0.3981	ABR0	ABR1	0.04061393	0.36	0.703
UPJOHN	ABR2	0.24829249	5.95	0.0253	ABR1	ABR2	0.24877476	2.81	0.0879
XEROX	ABR1	0.08798109	1.73	0.2046	ABR0	ABR1	0.10504638	1	0.3893

TABLE OF STEPWISE REGRESSION STATISTICS
STEP 3
FOR ALL SAMPLE COMPANIES AND BY INDIVIDUAL COMPANY

	STEP 3					
COMPANY	VARIABLE USED	VARIABLE USED	VARIABLE USED	R-SQUARED	F-VALUE	PROB > F
ALL SAMPLE COMPANIES	ABR0	ABR1	ABR2	0.09621028	0.82	0.4834
AMERICAN EXPRESS	ABR0	ABR1	ABR2	0.06374268	0.36	0.7885
CITICORP	ABR0	ABR1	ABR2	0.17577195	1.14	0.3639
COMMONWEALTH EDISON	ABR0	ABR1	ABR2	0.24863439	1.76	0.1934
DOW CHEMICAL	ABR0	ABR1	ABR2	0.0500388	0.28	0.8384
EXXON	ABR0	ABR1	ABR2	0.06720288	0.38	0.7658
GENERAL ELECTRIC	ABR0	ABR1	ABR2	0.12817857	0.78	0.5201
GENERAL MOTORS	ABR0	ABR1	ABR2	0.01581648	0.09	0.9669
INTL BUSINESS MACHINES	ABR0	ABR1	ABR2	0.248509	1.76	0.1946
JOHNSON & JOHNSON	ABR0	ABR1	ABR2	0.166246	1.06	0.3922
MANUFACTURERS HANOVER	ABR0	ABR1	ABR2	0.28692433	2.15	0.1345
MERCK & CO.	ABR0	ABR1	ABR2	0.04335892	0.24	0.8659
PHILIP - MORRIS	ABR0	ABR1	ABR2	0.04705765	0.26	0.8508
PPG INDUSTRIES	ABR0	ABR1	ABR2	0.42814217	3.99	0.0267
RJ REYNOLDS	ABR0	ABR1	ABR2	0.0314067	0.17	0.9131
SQUARE D COMPANY	ABR0	ABR1	ABR2	0.02640316	0.14	0.9316
TOLEDO EDISON	ABR0	ABR1	ABR2	0.26581434	1.93	0.1653
TRW COMPANY	ABR0	ABR1	ABR2	0.23018757	1.59	0.2298
UNITED STATES STEEL	ABR0	ABR1	ABR2	0.04463651	0.23	0.877
UPJOHN	ABR0	ABR1	ABR2	0.24947235	1.77	0.1928
XEROX	ABR0	ABR1	ABR2	0.13709879	1.35	0.2855

ENDNOTES

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