

Federal Funds Rate Changes: A Test of Market Efficiency

Frank W. Bacon
Longwood University
E-mail: baconfw@longwood.edu

Charles E. McMillan
Longwood University
E-mail: cemcmill@longwood.edu

ABSTRACT

This study tested the effect of two federal funds rate increase and two federal funds rate decrease announcements on stock price performance. Using standard risk adjusted event study methodology with the market model, the study analyzed 22,444 recent observations for the four event study periods from the thirty DOW firms with total market capitalization of three and one-half trillion dollars and the S&P 500 Index to examine the impact of the federal funds rate change announcements on stock price. Results show a significant negative market reaction prior to the announcements of both increases and decreases in the change in the federal funds rate. This suggests the market associates possible economic instability with any Federal Reserve intervention and views this discretionary monetary policy action as a negative signal. This is consistent with Milton Friedman's monetarist theory stating that Keynesian discretionary monetary policy creates rather than corrects economic instability. Findings support efficient market theory at the semi-strong form level as documented by Fama (1970). Similar too many other event study findings in the finance literature (stock splits, repurchases, dividend

announcements and etc.), effects of trading activity on the basis of the anticipated announcement surfaced prior to it being made public.

INTRODUCTION

How fast does the stock market react to new publicly announced information? According to Fama (1970), market efficiency can take on three forms: weak form efficiency, semi-strong form efficiency, and strong form efficiency. In a market that is weak form efficient, stock prices should react so quickly to all past information that investors are unable to earn an above normal return based on their knowledge of this information. Semi-strong form efficiency hypothesizes that stock price is a reflection of all publicly available information. Stock price should react efficiently enough to all public information that investors are unable to earn abnormal returns. Strong form efficiency hypothesizes that stock price is based upon both private and public information. In this case, the market reacts to an event based on information that is held within the confines of the firm prior to its public announcement, suggesting that investors were able to act on inside information illegally.

To test the market's efficiency with respect to information embedded in the public announcement of federal funds rate changes, this study uses standard event study methodology (Copeland, 2005). The study examines the effects of two increases and two decreases in the federal funds rate to test market efficiency and to see the impact of the Federal Reserve's discretionary monetary policy action on the stock market.

BACKGROUND AND PURPOSE

The Federal Reserve System plays a substantial role in the fluctuations of both the economy and the financial markets. The Federal Reserve controls monetary policy in the United States. One monetary policy gauge of the Federal Reserve System is the federal funds rate, which is considered one of the “primary indicators of the stance of monetary policy” (Mishkin 393). The federal funds rate is the interest rate at which overnight loans of reserves are made from one bank to another. The federal funds rate is set as a target rate by the Federal Open Market Committee (FOMC) and has a direct impact on interest rates throughout the economy. The market often reacts quickly to changes in the Federal Reserve’s policy due to its significant impact on the money supply and the economy. Increases or decreases in the federal funds rate are immediately reflected in the stock market.

According to the efficient market hypothesis, the stock market should immediately respond to public announcements of federal funds rate changes making it impossible for an investor to “beat the market” or to make an above normal return on their investment by acting on such information. This study investigates whether an investor can, in fact, achieve an above normal return by capitalizing on public announcements of changes in the federal funds rate target. The study tests the efficient market hypothesis by assessing the investor’s ability to earn an above normal return in the short run by acting on federal funds rate change announcements.

The purpose of this event study is to determine the impact of federal funds rate changes on the stock market in the short run. Moreover, this research tests how efficiently financial markets react to federal funds rate changes. This study tests the efficient market hypothesis by determining if equity markets react efficiently (quickly) in the

short-term to changes made by the Federal Reserve. Likewise, the study determines if the stock market reacts to announcements of federal funds rate changes at the weak-form, semi-strong form, or strong form level of market efficiency.

LITERATURE REVIEW

Fama (1970, 1976) defined market efficiency in three forms: weak-form, semi-strong-form and strong-form. Weak-form efficiency deals with the notion that no investor can earn an above economic return by developing trading rules based on past price or return information. Numerous studies (Fama, 1965; Alexander, 1961; Fama and Blume, 1966; Granger and Morgenstern, 1970) support the random walk theory, which assumes stock prices move at random and that it is impossible outperform the market without taking on additional risk.

If the market is weak form efficient, then stock prices will react so quickly to all past information that no investor can earn an above normal return (higher than the market return or the return on the S&P 500 index) by acting on this type of information. Annual accounting reports are an example of past information. These summarize the “past operations” of the firm and when mailed out are past information. If an investor receives the report and buys the firm’s stock after discovering the firm had high earnings for the period and then stock price does not rise, the market is said to be efficient with respect to past information and is weak form efficient.

Semi strong-form market efficiency states that no investor can earn an above economic return based on any publicly available information. Tests of semistrong form efficiency (Fama, Fisher, Jensen, and Roll, 1969; Ball and Brown, 1968; Aharony and Swary, 1980, 1981; Joy, Litzenberger, and McEnally, 1977; Watts, 1978; Patell and Wolfson 1984; Scholes, 1972; Kraus and Stoll, 1972; Mikkelsen and Partch,

1985; Dann, Mayers, and Raab, 1977) document the claim that no investor can earn an above normal return on publicly available information such as accounting statements, stock splits, dividend announcements, sale of stock announcements, repurchase of stock announcements, block trades, and earnings announcements.

If the market is semi-strong form efficient, then stock price reacts so quickly to all public information that no investor can earn an above normal return (higher than the market or the return on the S&P 500 index) by acting on this type of information. Public announcements of stock splits, repurchases, dividend increases are an example of public information. If one buys the stock on the announcement date and still does not earn an above normal return, the market is semi-strong form efficient.

Strong-form efficiency theory suggests that no investor can earn an above normal return from using any information, public or private. Studies on the validity of strong form efficiency offer mixed results (Jaffe, 1974; Finnerty, 1976; Givoly and Palmon, 1985; Friend, Blume, and Crockett, 1970; Jensen, 1968). A large body of literature cites numerous anomalies that question all forms of the market efficiency theory.

If the market is strong form efficient, then stock price reacts so quickly to all information (public and private) that no investor can earn an above normal return (higher than the market or the return on the S&P 500 index) by acting on this type of information. In this case, the market reacts to an event within the confines of the firm (or secret information) when it occurs even before it is publicly announced. For this to occur, investors must act on inside information, which is illegal. If one buys the stock on the event and still does not make an above normal return, the market is strong form efficient.

“Because information is reflected in prices immediately, investors should only expect to obtain a normal rate of return” (Ross 342). However, does market efficiency hold for public announcements of federal funds rate changes? Weak form efficiency states that a company’s stock price is based on past prices and information, while strong form efficiency argues that the price is a reflection of all information, public and private. While both of these theories have merit, this study asserts that federal funds rate changes are reflected in the price of a company’s stock according to the semi-strong form of efficiency, indicating that all public information available determines the price of the stock.

METHODOLOGY

The study sample includes the 30 large firms comprising the DOW Jones Industrial Index (DOW). Table 1 provides a description of the study sample. The study tests how quickly the 30 DOW firms react to four public announcements of a federal funds rate change. Analysis of the rate change announcement includes 22,444 observations of the 30 DOW firms and the Standard & Poor’s 500 Index (S&P 500) during the calendar years 2000, 2001, 2003, and 2004.

TABLE 1. DESCRIPTION OF THE STUDY SAMPLE

Firm (Ticker)	Market Cap (billions)	Sales (Thousands)	Total Assets (Thousands)
Alcoa (AA)	20.37	23,478,000	32,609,000
American International Group (AIG)	163.28	97,987,000	798,660,000
American Express (AXP)	58.51	29,115,000	192,638,000
Boeing (BA)	54.18	52,457,000	53,963,000
Citicorp (C)	229.09	108,276,000	1,484,101,000
Caterpillar (CAT)	33.11	30,251,000	43,091,000
Dupont (DD)	38.44	27,995,000	35,632,000
Walt Disney (DIS)	46.19	30,752,000	53,902,000
General Electric (GE)	357.57	91,107,000	750,507,000
General Motors (GM)	15.98	185,524,000	448,507,000
Home Depot (HD)	84.86	73,094,000	38,097,000
Honeywell (HON)	28.4	25,601,000	31,062,000
Hewlett Packard (HPQ)	78.99	79,905,000	76,138,000
International Business Machines (IBM)	132.98	96,293,000	109,183,000
Intel (INTC)	141.05	34,209,000	48,143,000
Johnson and Johnson (JNJ)	190.59	47,348,000	53,317,000
J. P. Morgan (JPM)	123.41	56,931,000	1,157,248,000
Coca Cola (KO)	100.07	21,962,000	31,327,000
Mcdonalds (MCD)	40.6	19,064,700	27,837,500
3 M (MMM)	57.3	20,011,000	20,708,000
Altria Group (MO)	151.44	81,832,000	96,175,000
Merck (MRK)	57.48	22,938,600	42,572,800
Microsoft (MSFT)	265.46	39,788,000	70,815,000
Pfizer (PFE)	156.62	52,516,000	123,648,000
Proctor and Gamble (PG)	134.9	56,741,000	61,527,000
SBC Communications (SBC)	75.99	40,787,000	108,844,000
United Technologies (UTX)	52.17	37,445,000	40,035,000
Verizon Communications (VZ)	81.63	71,283,000	165,958,000
Wal Mart Stores (WMT)	190.32	287,989,000	120,223,000
Exxon Mobil (XOM)	349.12	298,035,000	195,256,000
MEAN	117.00	30,883,353.33	148,607,750

This study uses the standard risk adjusted event study methodology from the literature to test the stock market's response to the Federal Reserve's announcements of federal funds decreases on August 21, 2001 and June 25, 2003 and federal funds increases on September 21, 2004 and March 21, 2000. The announcement date (day 0) is the date of the federal funds rate change announcement. The required historical financial data, i.e. the stock price and S&P index during the event study period were obtained from the internet website <http://finance.yahoo.com/>.

- The historical stock prices of the 30 DOW companies, and S&P 500 index, for the event study duration of -180 to +30 days (with day -30 to day +30 defined as the event period and day 0 the announcement date) were obtained.
- Then, holding period returns of the companies (R) and the corresponding S&P 500 index (R_m) for each day in this study period were calculated using the formula:
Current daily stock return= $\frac{\text{current day close price} - \text{previous day close price}}{\text{previous day close price}}$
Current daily index return= $\frac{\text{S\&P current close} - \text{S\&P previous close}}{\text{S\&P previous close}}$
- A regression analysis was performed using the actual daily return of each company (dependent variable) and the corresponding S&P 500 index daily return (independent variable) over the pre-event period day -180 to -31 (period prior to the event period of day -30 to day +30) to obtain the alpha (the intercept) and the beta (standardized coefficient). Table 2 shows alphas and betas for each firm.

TABLE 2. STUDY SAMPLE ALPHAS AND BETAS

Firm	Alpha	Beta	Firm	Alpha	Beta
AA	-0.00027	1.666758	JNJ	0.000751	0.524563
AIG	-2.8E-05	1.230763	JPM	0.000646	1.12492
AXP	0.00075	0.853516	KO	-0.00079	0.716781
BA	0.001149	1.207695	MCD	0.000964	0.712793
C	3.56E-05	1.11359	MMM	-0.0002	1.141891
CAT	0.000396	1.43501	MO	-0.00015	0.645091
DD	4.67E-05	0.979456	MRK	-0.00201	0.905285
DIS	0.000769	1.264681	MSFT	0.000381	0.912696
GE	0.000778	1.106702	PFE	-0.00067	1.022084
GM	-0.00101	1.226134	PG	0.000335	0.652666
HD	0.000994	1.122348	SBC	0.000357	0.876562
HON	0.000556	1.389645	UTX	0.000222	0.992843
HPQ	-0.00043	1.450021	VZ	0.001023	0.849081
IBM	9.09E-05	0.779778	WMT	0.000305	0.722536
INTC	-0.00122	1.337728	XOM	0.001062	0.806286

- For this study, in order to get the normal expected returns, the risk-adjusted method (market model) was used. The expected return for each stock, for each day of the event period from -30 to +30, was calculated as:
 $E(R) = \text{alpha} + \text{Beta} (R_m)$, where R_m is the return on the market i.e. the S&P 500 index.
- Then, the Excess return (ER) was calculated as the Actual Return (R) minus the Expected Return E(R)
- Average Excess Returns (AER) were calculated (for each day from -30 to +30) by averaging the excess returns for all the firms for given day.

$$\text{AER} = \text{Sum of Excess Return for given day} / n$$
, where n = number of firms in sample i.e. 30
- Also, Cumulative AER was calculated by adding the AERs for each day from -30 to +30.

- The graph of Cumulative AER was plotted for the event period day -30 to day +30.

QUANTITATIVE TESTS AND RESULTS

Did the market react to the announcements of the increase or decrease in the federal funds rate? Was the information surrounding the event significant? One would expect the average excess daily returns (Day -30 to Day +30) to be significantly different from 0 and therefore significantly different from cumulative average excess returns over the corresponding time period if the information surrounding the event impounds new, significant information on the market price of the firms' stock. If a significant risk adjusted difference is observed, then this type of information did in fact significantly impact stock price as hypothesized. To statistically test for a difference in the risk adjusted daily average excess returns and the cumulative average excess daily returns (for the firms over the time periods day -30 to day +30), a paired sample t-tests was used for the combined federal funds rate increases and the same for the rate decreases and found a statistically discernable difference at the 1% level of significance for the DOW firms. This finding supports our hypothesis of the significant effect of the rate change information around the announcement based on the sample's reaction.

Is it possible to isolate and observe the sample's daily response to the announcement of either the decrease or the increase in the federal funds rate from day -30 to day +30? If so, at what level of efficiency (weak, semi-strong, strong form according to efficient market theory) did the market respond to the information and what are the implications for market efficiency and the Federal Reserve's discretionary monetary policy? Another purpose of this analysis tests the efficiency of the market in reacting to the announcement of federal

funds rate change events. Specifically, do we observe weak, semi-strong, or strong form market efficiency as defined by Fama, 1970, in the efficient market hypothesis? The key in the analysis or tests is to determine if the CAER (Cumulative Average Excess Return) are significantly different from zero or that there is a visible graphical or statistical pattern between time and CAER. T-tests of daily average excess return and cumulative average excess return tested different from zero at the 1% level of significance. Likewise, observation of Exhibit 1 (graph of CAER from day -30 to day +30 for two federal funds rate decreases) and Exhibit 2 (graph of CAER from day -30 to day +30 for two federal funds rate increases) confirms the response by the sample of 30 DOW firms significant reaction prior to the announcement of the federal funds rate change event.

Exhibit 1. Cumulative Average Excess Return Over Event Period For Federal Funds Decreases on August 21, 2001 and June 25, 2003

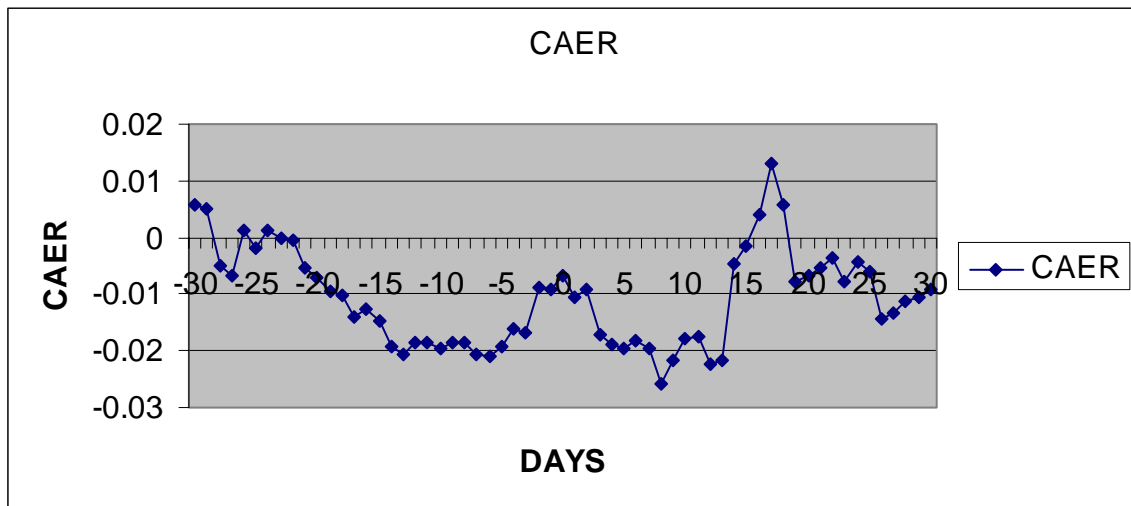
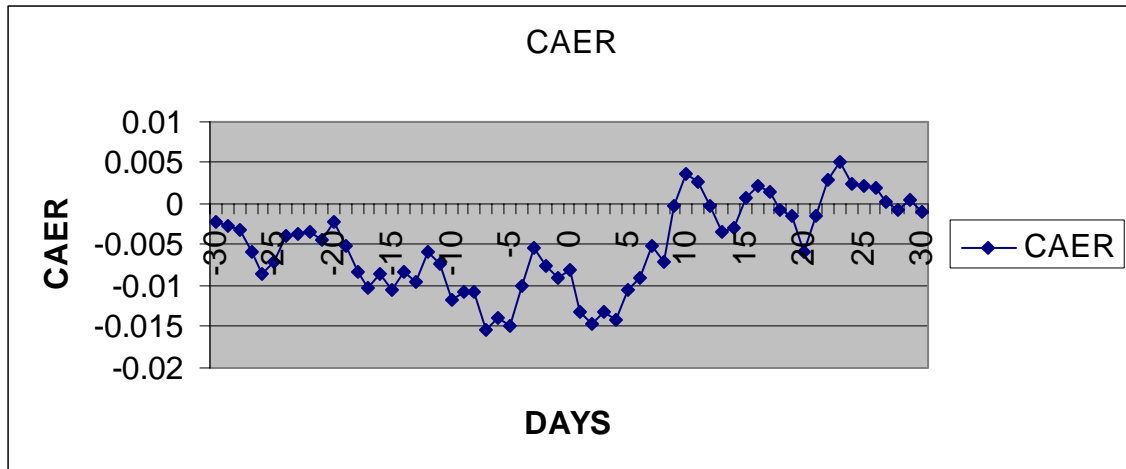


Exhibit 2. Cumulative Average Excess Return Over Event Period For Federal Funds Increases on September 21, 2004 and March 21, 2000



Interestingly for both rate changes, the graphs demonstrate that the federal funds rate change announcement had a negative impact on the firms' share price up to 25 days prior to day 0, the announcement date. This is consistent with the semi-strong form market efficiency hypothesis which states that the stock price reflects all publicly available information. Apparently, the market associates possible economic instability with any Federal Reserve intervention into the adjustment of market interest rates and views this discretionary monetary policy action as a negative signal. This is consistent with Milton Friedman's monetarist theory stating that Keynesian discretionary monetary policy creates rather than corrects economic instability. According to the evidence, the market appears to side with Friedman by reacting negatively even 25 days before the Federal Open Market Committee Meeting.

Likewise post event (day 0) for the federal funds rate decreases and increases, the stock price seems to rebound to pre event period levels or higher. As expected, the rate decrease elicited a stronger positive market reaction though delayed by some 10 days. Further investigation is necessary to determine if extraneous events other than the rate change announcements (i.e. strong positive or negative economic news during the event study periods) may have been the driving force behind these results. Likewise, the study needs to include a larger sample of rate change events.

CONCLUSION

Summary

This study tested the effects of two federal funds rate increase announcements and two federal funds rate decrease announcements since year 2000 on stock price performance as measured by the 30 DOW companies. Using standard risk adjusted event study methodology with the market model, the study analyzed 22,444 recent observations on the thirty DOW firms with total market capitalization of three and one-half trillion dollars and the S&P 500 Index for four rate change announcements to examine the impact of the federal funds rate change announcement on stock price.

Appropriate statistical tests for significance were conducted. Results show a significant negative market reaction prior to the announcement of both increases and decreases in the federal funds rate. Apparently, the market associates possible economic instability with any Federal Reserve intervention into adjusting market interest rates and views this discretionary monetary policy action as a negative signal. This is consistent with Milton Friedman's monetarist theory stating that

Keynesian discretionary monetary policy creates rather than corrects economic instability.

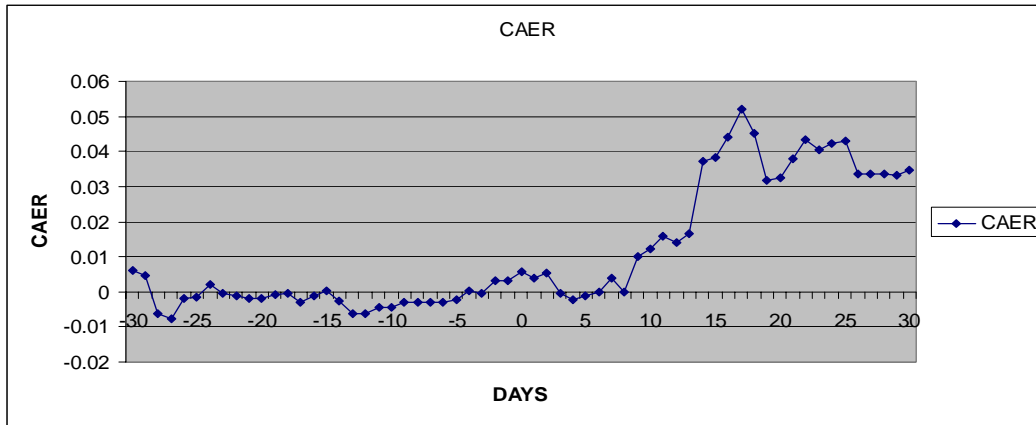
Findings also support efficient market theory at the semi-strong form level as documented by Fama (1970). Similar too many other event study findings in the finance literature (stock splits, repurchases, dividend announcements and etc.), apparently trading activity on the basis of the anticipated announcement surfaces prior to it being made public.

Study Limitations and Further Research

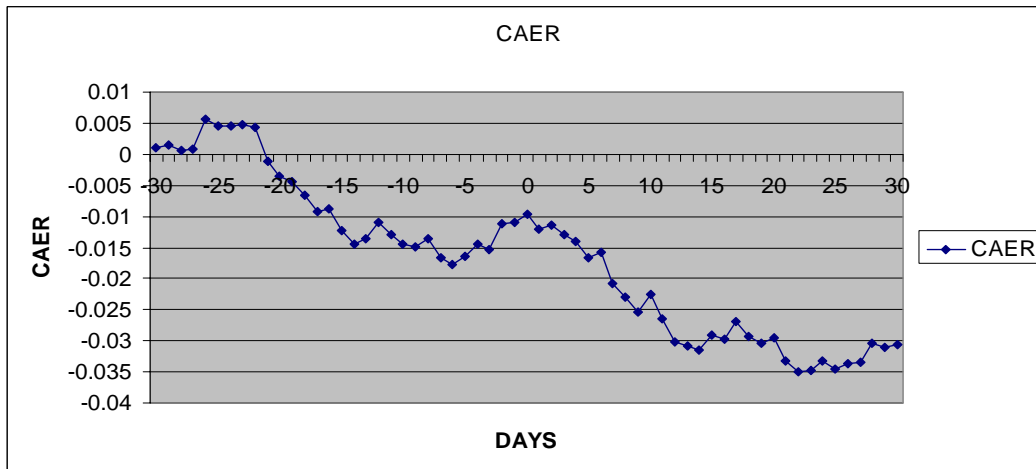
This type of event study aims to isolate the effects of the federal funds rate change event on the stock price of the sample of firms selected. However, to assure that the study results are free of extraneous effects, further analysis is necessary to identify and control for other possible events (i.e. hurricanes, terrorist attacks, or oil price changes) that could have occurred during the study's event periods covered by the sample of the four federal funds rate changes analyzed in this paper. Without data availability and analysis tools restraints, a larger sample of federal funds rate changes cleansed of extraneous effects is necessary to strengthen the results presented. Likewise, to further enhance findings of this study, the sample of firms representing the market should be financial firms. Since the assets of financial firms face significant interest rate sensitivity, a stronger hypothesis of the effects of changes in the federal funds rate on the stock price of a sample of financial firms arises.

APPENDIX

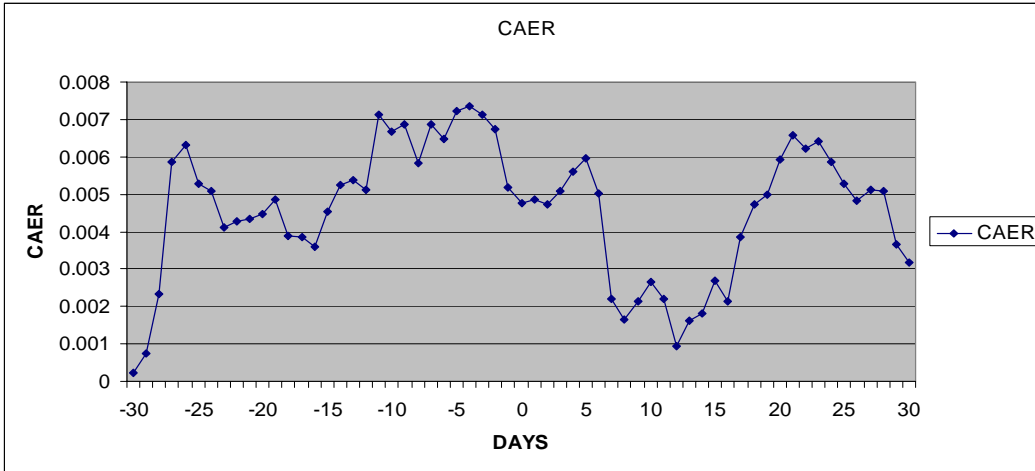
Graph of 8/21/2001 Decrease



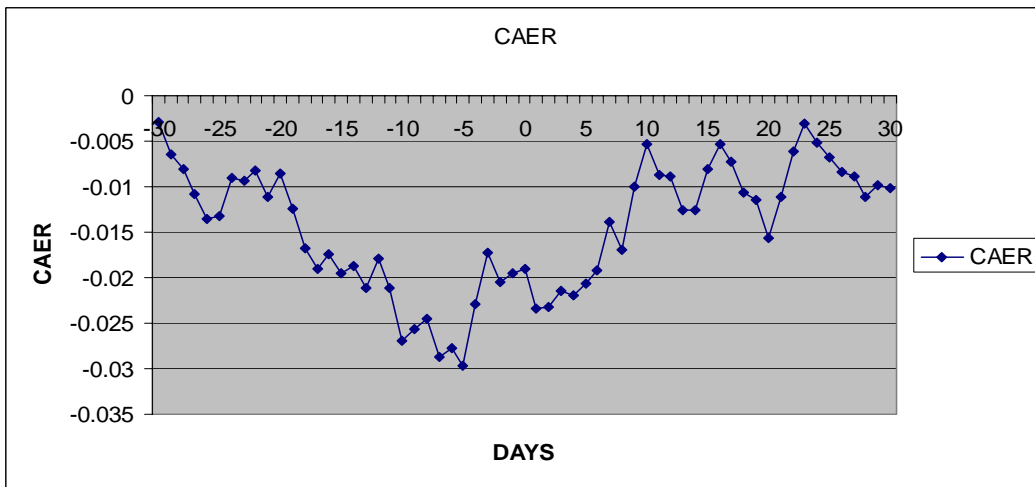
Graph of 6/25/2003 Decrease



Graph of 9/21/2004 Increase



Graph of 3/21/2000 Increase



REFERENCES

- Aharony, J., and I. Swary, "Quarterly Dividend and Earning Announcements and Stockholders' Returns: An Empirical Analysis," *Journal of Finance*, March 1980, 1-12.
- Alexander, S. S., "Price Movements in Speculative Markets: Trends or Random Walks," *Industrial Management Review*, May 1961, 7-26.
- Ball, R., and P. Brown, "An Empirical Evaluation of Accounting Income Numbers," *Journal of Accounting Research*, Autumn 1968, 159-178.
- Black, F., "Yes Virginia, There is Hope: Tests of the Value Line Ranking System," *Financial Analysts Journal*, September/October 1973, Vol. 29, 10-14.
- Branch, B., "A Tax Loss Trading Rule," *Journal of Business*, April 1977, 198-207.
- Bray, A., and P. Gompers, "Myth or Reality? The Long-Term Underperformance of Initial Public Offerings: Evidence from Venture and Nonventure Capital-Backed Companies," *Journal of Finance*, 1997, Vol. 52, 1791-1821.
- Brennan, M., and T. Copeland, "Beta Changes around Stock Splits," *Journal of Finance*, September 1988a, 1009-1013.
- Brennan, M., and T. Copeland, "Stock Splits, Stock Prices, and Transaction Costs," *Journal of Financial Economics*, December 1988b.
- Chen, N. F., Copeland, T. E., and Mayers, D., "A Comparison of Single and Multifactor Portfolio Performance Methodologies," *Journal*

of Financial and Quantitative Analysis, December 1987, Vol. 22, No. 4, 401-417.

- Copeland, T., *Financial Theory and Corporate Policy* (The Addison-Wesley Series in Finance, 4th ed.) United States: Addison-Wesley (2005).
- Copeland, T., "Liquidity Changes Following Stock Splits," *Journal of Finance*, March 1979, 115-141.
- Copeland, T. E., and D. Mayers, "The Value Line Enigma (1965-1978): A Case Study of Performance Evaluation Issues," *Journal of Financial Economics*, November 1982, 289-321.
- Dann, L., D. Mayers, and R. Raab, "Trading Rules, Large Blocks and the Speed of Adjustment," *Journal of Financial Economics*, January 1977, 3-22.
- Dharan, B., and D. Ikenberry, "The Long-Run Negative Drift of Post-Listing Stock Returns," *Journal of Finance*, 1995, Vol. 50, 1547-1574.
- Dyl, E., *The Effect of Capital Gains Taxation on the Stock Market*, Ph.D. dissertation, Stanford University Graduate School of Business, August 1973.
- Fama, E. F., "The Behavior of Stock Market Prices," *The Journal of Business*, January 1965, 34-105.
- Fama, E. F., "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance*, May 1970, 383-417.
- Fama, E. F., *Foundations of Finance*. Basic Books, New York, 1976.
- Fama, E. F., "Market Efficiency, Long-Term Returns, and Behavioral Finance," *Journal of Financial Economics*, September 1998, 283-306.

- Fama, E. F., and M. Blume, "Filter Rules and Stock Market Trading Profits," *Journal of Business*, January (spec. supp.) 1966, 226-241.
- Fama, E. F., L. Fisher, M. Jensen, and R. Roll, "The Adjustment of Stock Prices to New Information," *International Economic Review*, February 1969, 1-21.
- Farrar, D. E., *The Investment Decision under Uncertainty*. Prentice-Hall, Englewood Cliffs, N.J., 1962.
- Finnerty, J. E., "Insiders and Market Efficiency," *Journal of Finance*, September 1976, 1141-1148.
- Foster, T., III, and D. Vickrey, "The Information Content of Stock Dividend Announcements," *Accounting Review*, April 1978, 360-370.
- French, K., "Stock Returns and the Weekend Effect," *Journal of Financial Economics*, March 1980, 55-69.
- Friend, I., M. Blume, and J. Crockett, *Mutual Funds and Other Institutional Investors*. McGraw-Hill, New York, 1970.
- Friend, I., and D. Vickers, "Portfolio Selection and Investment Performance," *Journal of Finance*, September 1965, 391-415.
- Givoly, D., and D. Palmon, "Insider Trading and the Exploitation of Inside Information: Some Empirical Evidence," *Journal of Business*, January 1985, 69-87.
- Granger, C. W. J., and O. Morgenstern, *Predictability of Stock Market Prices*. Heath Lexington Books, Lexington, Mass., 1970.
- Grinblatt, M., R. Masulis, and S. Titman, "The Valuation Effects of Stock Splits and Stock Dividends," *Journal of Financial Economics*, December 1984, 451-490.

- Gultekin, M., and N. B. Gultekin, "Stock Market Seasonality: International Evidence," *Journal of Financial Economics*, December 1983, 469-481.
- Henricksson, R., "Market Timing and Mutual Fund Performance: An Empirical Investigation," *Journal of Business*, January 1984, 73-96.
- Ikenberry, D., J. Lakonishok, and T. Vermaelen, "Market Underreaction to Open Market Share Repurchases," *Journal of Financial Economics*, 1995, Vol. 39, 181-208.
- Ikenberry, D., G. Rankinem and E. Stice, "What Do Stock Splits Really Signal?" *Journal of Finance and Quantitative Analysis*, 1996, Vol. 31, 357-377.
- Jaffe, J., "Thee Effect of Regulation Changes on Insider Trading," *Bell Journal of Economics and Management Science*, Spring 1974, 93-121.
- Jensen, M., "The Performance of Mutual Funds in the Period 1945-64," *Journal of Finance*, May 1968, 389-416.
- Jensen, M., "Risk, The Pricing of Capital Assets, and the Evaluation of Investment Portfolios," *Journal of Business*, April 1969, 167-247.
- Joy, M., R. Litzenberger, and R. McEnally, "The Adjustment of Stock Prices to Announcements of Unanticipated Changes in Quarterly Earnings," *Journal of Accounting Research*, Autumn 1977, 207-225.
- Keim, D., "Size-Related Anomalies and Stock Return Seasonality: Further Empirical Evidence," *Journal of Financial Economics*, June 1983, 13-32.
- Kraus, A., and H. R. Stoll, "Price Impacts of Block Trading on the New York Stock Exchange," *Journal of Finance*, June 1972, 569-588.

- Lakonishok, J., and T. Vermaelen, "Anomalous Price Behavior around Repurchase Tender Offers," *Journal of Finance*, 1990, Vol. 45, 455-477.
- Logue, D. E., "On the Pricing of Unseasoned Equity Offerings: 1965-1969," *Journal of Financial and Quantitative Analysis*, January 1973, 91-104.
- Loughran, T., and J. Ritter, "The New Issues Puzzle," *Journal of Finance*, 1995, Vol. 50, 23-51.
- Lowrey, M., and G. W. Schwert, "IPO Market Cycles: Bubbles or Sequential Learning?" *Journal of Finance*, June 2002, 1171-1200.
- Mains, N. E., "Risk, the Pricing of Capital Assets, and the Evaluation of Investment Portfolios: Comment," *Journal of Business*, July 1977, 371-384.
- McDonald, J. G., and A. K. Fisher, "New Issues Stock Price Behavior," *Journal of Finance*, March 1972, 97-102.
- Mikkelson, W., and M. Partch, "Stock Price Effects and the Costs of Secondary Distribution," *Journal of Financial Economics*, June 1985, 165-194.
- Madura, J. (2003). *Financial Markets and Institutions* (J. W. Calhoun & A. McGuire, Eds., 6th ed.). United States: Thomson South-Western.
- Mitchell, M., and E. Stafford, "Managerial Decisions and Long-Term Stock Price Performance," working paper, Graduate School of Business, University of Chicago, 1997.
- Ohlson, J., and S. Penman, "Volatility Increases Subsequent to Stock Splits: An Empirical Aberration," *Journal of Financial Economics*, June 1985, 251-266.

- Patell, J., and M. Wolfson, "Anticipated Information Releases Reflected in Call Option Prices," *Journal of Accounting and Economics*, August 1979, 117-140.
- Reilly, F. K., and K. Hatfield, "Investor Experience with New Stock Issues," *Financial Analysts Journal*, September/October 1969, 73-80.
- Reinganum, M., "The Anomalous Stock Market Behavior of Small Firms in January: Empirical Tests for Tax-Loss Selling Effects," *Journal of Financial Economics*, June 1983, 89-104.
- Roll, R., "The Turn-of-the-Year Effect and the Return Premia of Small Firms," *Journal of Portfolio Management*, Winter 1983, 18-28.
- Ross, S. (2005). *Corporate Finance* (Stephen A. Ross, Randolph W. Westerfield, Jeffery Jaffe.- 6th ed.). United States: McGraw-Hill Companies.
- Scholes, M., "The Market for Securities: Substitution vs. Price Pressure and the Effects of Information on Share Prices," *Journal of Business*, April 1972, 179-211.
- Sharpe, W. F., "Mutual Fund Performance," *Journal of Business*, January 1966, 119-138.
- Shaw, D., "The Performance of Primary Stock Offerings: A Canadian Comparison," *Journal of Finance*, December 1971, 1103-1113.
- Stickel, S., "The Effect of Value Line Investment Survey Rank Changes on Common Stock Prices," *Journal of Financial Economics*, March 1985, 121-144.
- Stickney, C. P., Jr., *A Study of the Relationships of Accounting Principles and Common Stock Prices of Firms Going Public*, Ph.D. dissertation, Florida State University, Tallahassee, 1970.

- Summers, L. H. (1986, July). Does *the Stock Market Rationally Reflect Fundamental Values?* *Journal of Finance*, 41(3), 591-601.
- Stigler, G., "Public Regulation of Security Markets" *Journal of Business*, April 1964, 117-142.
- Szwewczyk, S. H., Tsetsekos, G. P., & Zantout, Z. (1997, Spring). *Do Dividend Omissions Signal Future Earnings or Past Earnings?* *Journal of Investing*.
- Treynor, J. L., "How to Rate Mutual Fund Performance," *Harvard Business Review*, January/February 1965, 63-75.
- Watts, R., "Systematic 'Abnormal' Returns after Quarterly Earnings Announcements," *Journal of Financial Economics*, June/September 1978, 127-150.
- Weinstein, M., "The Seasoning Process of New Corporate Bond Issues," *Journal of Finance*, December 1978, 1343-1354.
- Woolridge, J. R., "Ex-date Stock Price Adjustment to Stock Dividends: A Note," *Journal of Finance*, March 1983a, 247-255.
- Woolridge, J. R., "Stock Dividends as Signals," *Journal of Financial Research*, Spring 1983b, 1-12.