AN EVALUATION OF THE INFORMATION CONTENT OF THE NEWS EVENT OF RATE RELIEF APPLICATION UPON UTILITY STOCK PRICES

by

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ABSTRACT

AN EVALUATION OF THE INFORMATION CONTENT OF THE NEWS EVENT OF RATE RELIEF APPLICATION UPON UTILITY STOCK PRICES

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The general objective of this study was to investigate the rapidity of investor reaction towards utility stock price changes as measured by secular utility stock price patterns. The news events of utility companies filing for rate relief with their public utility commission and the subsequent commission decisions after open hearings were defined as the independent variables. The interaction of these events upon the stock prices, the dependent variable, comprised the problem of the study.

The filing and decision dates were obtained by means of the questionnaires and daily stock prices from published sources. The sample was comprised of thirty-five firms with seventy-seven cases. Filing and decision dates were defined as "action" dates.

Lintener's market model was used to separate the systematic and unsystematic components of rate of return. The independent variable is unsystematic in nature. The unsystematic component of rate of return was tested by a t-test for the extent of price deviation from the action date price.

The results did not show statistically significant differences from the stock price before or after the event when compared to the stock price on the day of the event. The inference one can draw from the results is that these events did not have significant impact upon the stock price, although the stock price pattern of companies receiving a decision did deviate noticeably from their original price levels.

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CHAPTER I

INTRODUCTION

PUBLIC UTILITIES[1] have always been an integral and essential part of the American economic system. Beginning with the frontier economy the need for good communication lines, efficient transportation lines, and reliable power supply and transmission systems were seen as prerequisites to "settling the west." The modern industrial state, then, is the manifestation of an earlier availability of the products and services that utilities provided. Now, more than ever, utility services are of vital importance to continued economic growth and social well-being.

Rostow and other economic growth theorists[2] have articulated the key role that products of the utility

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[1]Public utilities are distinguished from the other businesses affected with a public interest because they are:

a. free from business competition to a substantial degree and are often pure monopolies;
b. required to change only reasonable rates that unjustly discriminatory;
c. allowed to earn but are not guaranteed a reasonable profit;
d. obligated to provide adequate service to the entire public on demand; and
e. closely associated with the processes of transportation and distribution.

Wallace F. Lovejoy and Paul J. Garfield, Public Utility Economics (Englewood Cliffs, New Jersey: Prentice-Hall, Inc.), p. 2.

[2]The literature on economic growth is prodigious. A discussion of the importance of social overhead capital is contained in Walt W. Rostow's, The Stages of Economic Growth (London: Cambridge University Press, 1960).

industry play in the development of any underdeveloped country. The social and economic functions profited by utilities have been referred to as "Social overhead capital,"[3] in an effort to recognize their key role in economic growth. Unfortunately, the social and economic functions derived from the utility industry can be in conflict. That is, contemporary man has defined those products of utilities as necessities rather than luxuries. Consequently, the demand for electric, gas, and telephone service is considered as very inelastic in the short run and somewhat inelastic in the long run;[4] that is, the quantity purchased is normally not significantly responsive to small price changes. The genesis of the conflict is implied by the peculiar economic rigidities inherent in the utility industry production function. That is, the utility production units are characterized as capital intensive, with the further problem of asset indivisibilities. For example, the typical electric generating facility, whether powered by coal, oil, or nuclear fuel requires great amounts of machinery in the form of rail cars and conveyors for coal movement, or tanks and pipe lines for oil use, plus the generating units. Very little labor is necessary in order to produce

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[3]Rostow, p. 1.

[4]The telephone industry may be a possible exception. For a general review of factors of decreasing costs, see Kahn, Ch. 5; William Lulo, Electric Utilities: Cost and Performance (Pullman, Wash: Bureau of Economic and Business Research, Washington State University, 1961).

a unit of electricity. Due to the high fixed cost nature of these enterprises, there exists a markedly decreasing cost function exhibiting decreasing costs over a wide scale of operations. Economists have referred to industries with decreasing cost curves as "natural monopolies."

Utility management, in a laissez faire environment, whose objective is to maximize profit can increase production to the capacity limit subject to the product demand schedule, and set the product unit price well above the costs of production to the financial detriment of consumers.

Regulation of utility pricing by governmental agencies attempt, in concept, to prevent monopolistic abuses, including high prices, extraordinary profits, and undue discrimination and inequities among users.[5]

The goal of utility regulation is the creation of an economic environment which allows the production of a product or service at a reasonable price and which simultaneously permits the company's shareholders to earn a fair rate of return on their invested capital.

The Problem

In the famous Hope Gas Company case (1943), the Supreme Court rendered the opinion that:

> From the investor's or company's point of view it is important that there be enough revenue not

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[5]Martin T. Farris and Roy J. Sampson, Public Utilities: Regulation, Management, and Ownership (Boston: Houghton Mifflin Company, 1973), p. 156.

> only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock. By that standard the return to the equity owner should be commensurate with returns on investment in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and attract capital.[6]

This court opinion has lead to the most perplexing, controversial, and important issue in public utilities rate case: "What is the price per unit which will permit a fair rate of return?" To answer this question one must first address the economic problems currently faced by utility firms, which eroad existing rates of return: increasing construction costs, high interest rates on debt, inflationary pressures, compulsory investments on non-productive assets like anti-pollution devices, and regulatory lag in taking decision in inflationary periods. There problems force the utility companies to request rate increases from the public utility commissions. The lapsed time between the date the rate relief is requested, and the date it is granted or denied is large. On an average, it runs to eleven months or more.[7] These long time intervals are normally due to the lengthy public hearing proceedings,

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[6]Douglas A. Hayes, "Regulation of Public Utility Returns on Equity; A Critical Appraisal," Financial Analysts Journal (September-October, 1970), p. 102.

[7]Based upon the information from Public Utilities Commission of Ohio. The author had a telphone call with one of the attorneys of Public Utilities Comm., October, 1975.

volume of applications, and the time that is necessary for the commission to evaluate the validity of the request. This gives rise to two events that are associated with a rate case, namely the filing date[8]-- the date on which the actual application is filed, and the decision date--the date on which the commission gives its verdict. The effect of these two events on a stock price is the problem of this study.

Objective and Hypothesis

The objective of this study is to investigate the stock price patterns prior to the filing and decision announcements, specifically, the reaction time of the investors to this information. The underlying assumption is that there will be no leakage of information before or after the events. The research hypotheses are as follows:

1. H_o: No price change after filing ($P_F = P_{F+n}$).

   H_1: There will be a change in price after the filing ($P_F \neq P_{F+n}$).

   Where P_F is the price of stock on the day of filing and P_{F+n} is the price n days later.

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[8] In terms of research methodology nomenclature, the filing date and the decision date can be considered independent variables and the stock price the dependent variable.

2. H_o: No price change after decision ($P_D = P_{D+n}$).

H_1: There will be a change in price after the decision ($P_D \neq P_{D+n}$).

Where P_D is the stock price on the day of decision and P_{D+n} is the price n days later.

Research Procedure

The rate of return associated with a common stock price movement can be split into two components, systematic and unsystematic. The systematic component is attributed to the market risk, whereas, the unsystematic component is due to the characteristics of the firm and its activities. The systematic component of rate of return is statistically separated from the total return by means of a characteristic line. Characteristic line is a regression line with market rate of return as the independent variable and the firm's rate of return as the dependent variable. The unexplained variations or residuals of this regression line is unsystematic component of rate of return.

Rate increase application events are unique to the individual firm, and therefore, are unsystematic in effect. Because the residuals of characteristic line are the unsystematic component rate of return, the investigative emphasis is upon the residual. If the stockholder perceives that the news is favorable, causing the price of the stock to go up,

the residuals value will increase, or vice versa, if the news is unfavorable.

The time period covered by this analysis included calendar years 1968 through 1972. The initial year, 1968, was selected because it marked the beginning of a rapid growth in rate applications and decisions rendered. The selection of 1972 as the terminal year of the analysis was dictated by the regulatory lag and availability of the data at the inception of the project.

To compare the potential impact of the announcement of the filing with the impact of the decision, only those cases were analyzed in which orders were issued by the respective regulatory commissions. A list of cases falling within the constraints of the study was compiled from publicly available sources represented by 119 gas and electric public utilities. Four holding companies were eliminated from further consideration because of the potentially complex price interactions on the parent company's common stock price due to concurrent rate application activities by their subsidiaries. A mail survey was sent to all remaining companies, comprising the population for purposes of this analysis. Forty-six companies responded. The list was further trimmed to thirty-five companies (see Appendix A), due to incomplete or inconsistent data, resulting in a sample of seventy-seven rate cases (e. g., seventy-seven rate relief

requests and corresponding seventy-seven decisions).[9] Filing dates and decision dates were defined as "action" dates. A time period beginning with the twenty-sixth day prior to the action date and ending on the twenty-seventh trading day after the action date was selected arbitrarily as a period likely to reflect the decision-time frame of traders in the equities market.

The three public utility averages used to compute the market rate of return were the Standard and Poor's, Dow-Jones, and New York Stock Exchange indexes. Three separate market rates of return were computed in order to insure that biased residuals did not occur due to choosing the "wrong" index. Daily stock prices were obtained from the Standard and Poor's Daily Stock Price Record[10] and the New York Stock Exchange.[11] Due to violating of sampling theory assumptions collecting the data resulted in a non-random sample.

The rate of return for the firm and for the market on a day-to-day basis was computed as the change in price between two consecutive days divided by the price of the day

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[9]The mail survey was conducted by Dr. Z. L. Melnyk of the University of Cincinnati, and Dr. Gerald Smolen of Youngstown State University.

[10]Daily Stock Price Record (New York: Standard and Poor's Corporations, 1968-72).

[11]New York Stock Exchange Common Stock Indexes (New York: New York Stock Exchange, Inc., 1974).

for which the rate is computed.[12] The rates of returns computed above for the three utility indexes and for the price of the stock were run on an SPSS[13] multiple regression program. The seventy-seven residuals from the regression model, which corresponded to the sample size, were cross-sectionally aggregated for each of the fifty-three days and their means were computed. To establish the total gain or loss in the price over the fifty-three day time series, algebraic sum of the means was calculated. Finally, the significance of the difference between the mean residual of the action date and mean residual of every day preceding that day was tested by a t-test.

Usefulness of Results

The results of this empirical research can give clues to how investors react to a news event, in establishing an equilibrium stock price at each point in time. The conclusions to be drawn from studying the investor behavior gives insight into predicting investor action in the stock market. Apart from its short-run practical use, the results also might add refinements to the theoretical underpinning of finance. The results can add evidence to either substantiate or weaken the theory of the efficient market hypothesis.

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[12] Jack C. Francis, Investments: Analysis and Management (New York: McGraw-Hill Book Co., 1972), p. 552.

[13] Statistical package for the Social Sciences.

CHAPTER II

LITERATURE REVIEW, THEORY AND METHODOLOGY

Literature Review

The theory of finance recognizes that news has a great impact upon the behavior of the investors. That is, the price of the capital assets is a function of the quality and type of information generated. Mandelbrot[14] and Samuelson[15] stated that, on the whole, the information variable reinforces the fact that capital market is efficient. Fama and Laffer[16] suggest that information has the following three uses:

1. information can be employed to earn trading profits;
2. information can improve the operating decisions of a firm or group of firms and, thereby, increase the stock price; and
3. information can reduce the risk of a firm or group of firms and, thereby, increase the stock price.

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[14]Benoit Mandelbrot, "Forecasts of Future Prices Unbiased Markets, and 'Martingale' Model," Journal of Business, Vol. 36 (January 1966), pp. 242-255.

[15]Paul A. Samuelson, "Proof That Properly Anticipated Prices Fluctuate Randomly," Industrial Management Review (Spring 1965), pp. 41-49.

[16]Eugene F. Fama and Arthur B. Laffer, "Information and Capital Markets," Journal of Business, Vol. 41, No. 3 (July 1971), pp. 289-298.

The information can be categorized as "macro," that is, affecting the complete market, or "micro," affecting only a specific industry or firm. The impact of news on the stock prices depends on the individual's interpretation of the news event. The potential impact of a "green" public news item on future market yields is subject to several sources of uncertainty:[17]

1. most news items reach the market before explicit confirmation by the relevant authorities, in the form of rumors, therefore, they contain a certain degree of unreliability; and
2. even if the news is officially confirmed, its final impact on stock yield is determined through a set of complicated systematic interrelationships unknown on the day the news is first made public. Stated more generally, there appears to be a direct relationship between the uncertainty on the final impact of the news item and the extent of disagreement among investors.

Barnea and Brenner,[18] in their study, investigated the effects of world events on the stock market variables,

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[17]Uncertainty is an event for which probability of occurrence cannot be assigned.

[18]Anier Barnea and Menachem Brenner, "The Effect of World Events on Stock Market Variables," Financial Analysts Journal (July 1974), p. 64.

by an experimental design which incorporated a panel of experts. The authors hypothesized that, (a) given a new item, the group will predict the actual change in the market price index, and (b) given a news item, the amount of agreement in the group will predict the actual change in the market volume. Unfortunately, the study results did not give support to their hypothesis. However, they found some evidence that macro news plays a systematic role of dependency between the volume and price.

A variation of previously mentioned studies was conducted by Dyl[19] on the effect of capital gains and year-end stock market behavior, where the tax return filing time is considered to have the same effect as a news event. The hypothesis was that the trading volume in December will be higher than other months due to the investors taking advantage of capital gains for tax purposes. The findings indicate that there was significantly abnormal trading volume in December in those stocks that have undergone a substantial price change during the preceding year. Still, this study does not clearly indicate that the effect was due to only capital gains. The only conclusion one can make is that the stocks selected for this study were highly price elastic.

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[19]Edward Dyl, "Capital Gains Taxation and Year End Stock Market Behavior," Research Paper No. 43 (College of Commerce and Industry, University of Wyoming, Laramie, Wyoming, 82071, September 1974).

The remaining research to be reviewed is of the micro level. Balog,[20] in his paper on the effect of mergers, discussed the components of stock as defined by the market criteria. The market criteria is that the market considers important (a) evaluating the acquisitions, and (b) how the market is influenced by "background radiation."[21] Balog found that earnings per share and the price-earnings ratio were the two major components that determine stock price--where these components' rate of change and their probability of occurring are given greater weight. The factors that potential investors look for are: the product line compatibility; earnings growth rate; balance sheet impact; sales growth rate; the reputation of the acquisition candidates, and the management compatibility. The author concluded that certain endogenous variables associated with the firms considering merger have a measurable impact upon the firm's stock price. In other words, it is the unsystematic component of risk which carries greater weight, in determining the stock price in the market.

Jaffe and Merville,[22] in their theoretical analysis of the impact of risk-reducing information, concluded that,

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[20]James Balog, "Why the Stock Market Reacts the Way It Does to Announcements of Mergers and Acquisitions," Financial Analysts Journal (July 1974), p. 64.

[21]The prediction of the investor's performance in the market is called background radiation.

[22]Jeffrey F. Jaffe and L. J. Merville, "The Value of Risk Reducing Information," Journal of Financial and Quantitative Analysis, 1974 Proceedings, Vol. 9, No. 5 (November 1974), pp. 697-707.

a firm which gives out risk-reducing information has a greater valuation, and (b) a small firm with returns that are independent of the returns of the entire economy gains little or nothing by releasing information early. The analysis in their paper was based upon a two-time period economy model with one product. This theory is a new direction for the field. The major criticism of this model is in its simplistic assumption that insiders and management do not use the available information for increasing their wealth or to improve the operating decision of the firm, respectively.

Jaffe,[23] in an adaptation of Lintener's[24] market model, examined the changes in the volume and profitability of insider trading after each of three important legal decisions concerning insiders behavior. The regression residuals which encompass the unsystematic component of risk were analyzed to establish any significant variation in the stock price due to the activities of insiders in the market. The study does not show conclusive evidence to establish a relationship among the variables.

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[23]Jeffrey F. Jaffe, "The Effect of Regulation Changes on Insider Trading," The Bell Journal of Economics and Management Science, Vol. 5, No. 1 (Spring 1974), pp. 93-121.

[24]John Lintener, "Security Prices, Risk and Maximal Gains from Diversification," Journal of Finance, Vol. 20 (December 1965), pp. 587-613.

Fama and others[25] used an adaptation of Lintener's market model to study the effect of stock split information upon the stock price as measured by regression residuals. The study showed evidence that the market realizes higher dividends following a stock split and uses the announcement of a split to reevaluate the stream of expected income from the shares. It can also be inferred from this study that the market reacts to the information effectively, and, therefore, is efficient.

Melnyk and Smolen[26] conducted a study on utility stock price variability caused by rate of return proceedings. The stock price variations were computed by four different statistical models which were tested for significance by a t-test. The study found evidence that rate change announcements do cause stock price variations. However, because this study was based on a relatively short time period (fourteen days) surrounding the event, the market might have capitalized the information prior to the announced rate change request.

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[25]E. Fama, et al, "The Adjustment of Stock Prices to New Information," International Economic Review, Vol. 20, No. 2 (February 1969), pp. 1-21.

[26]Lew Z. Melnyk and Gerald E. Smolen, "An Investigation of the Behavior of Common Stock Prices of Public Utilities Under Rate of Return Proceddings," 1975 Midwest AIDS Proceedings, Indianapolis, Indiana, April 1975

The Lintener's model, used by Bullard,[27] Kummer,[28] and Smith[29] and McCain and Miller,[30] to investigate the effect of mergers, forced divestiture, change in reporting procedure, and public information on the stock price respectively. Bullard's analysis was unable to causably link stock price change and merger information. Kummer concluded that a forced divestitures announcement has material negative informational impact on the firms' returns. But the adjustment of stock prices was not rapid enough to support the efficient market hypothesis. In a study on change in reporting procedure, Smith inferred that there was no permanent impact on stock price. McCain and Miller concluded that short run prices were significantly affected by the reports contained in the Wall Street Journal.

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[27]Ruth H. Bullard, "The Effect of Mergers on Acquiring Company's Stock 1967-1974," Presented before Midwest Finance Association 1976 Annual Meeting, St. Louis, Missouri, April 1-2, 1976.

[28]Don Kummer, "Stock Price Reaction to Announcements of Forced Divestiture Proceeding," Presented before Midwest Finance Association 1976 Annual Meeting, St. Louis, Missouri, April 1-2, 1976.

[29]Rodney F. Smith, "The Effects of an Income Reporting Format Change on Bank Stock Prices," Presented before Midwest Finance Association 1976 Annual Meeting, St. Louis, Missouri, April 1-2, 1976.

[30]John E. McCain and James A. Miller, "A Note on Public Information and Stock Prices," Journal of Business Research, Vol. 3, No. 1 (January 1975), pp. 61-64.

Conceptually this study is similar in its financial model and statistical model to the study conducted by Fama[31] on the effect of stock split information upon the stock price. However, this study differs in its data source and time dimension.

Theory

This section contains a discussion of the theoretical logic and basis of financial and statistical models used in this study.

Financial Theory

The financial theory for security analysis has three schools of thought: technical analysis, fundamental analysis, and the efficient market hypothesis. The major assumptions of technical analysis include: market valuation is determined solely by the interaction of supply and demand; supply and demand are governed by numerous factors both rational and irrational; and shifts in supply and demand, no matter why they occur can be detected sooner or later in charts of market action and some chart patterns tend to repeat themselves. In essence, technical analysts believe that past patterns of market action will re-occur in the future and can thus be used for predictive purposes. Some

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[31]Eugene F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," Elements of Investments: Selected Readings, Second Edition (New York: Holt, Rinehart and Winston, Inc., 1972).

of the techniques followed by technical analysts are Dow Theory, bar charts, point and figure charts, confidence index, odd-lot theory, breath of market calculations, and rate-of-change analysis. A major criticism of technical stock valuation is its lack of a cohesive, testable theoretical foundation.

Fundamental analysts approach the evaluating of capital assets by attempting to assess the firm's ability to fulfill its explicit and implied financial promises. If the achievement ability is high, investors tend to accord those securities a high value, but if it has low achievement, investors will place a low value on its security. The imputed value that fundamental analysis places on a security is called the intrinsic value of the security. If the intrinsic value of a security is higher than market value, investors desire a long position as optimal. The intrinsic value of a security is mechanically computed by capitalizing the normalized expected earnings at an appropriate discount rate for some time period, generally assumed to be infinity. The future returns are estimated by analyzing the financial ratios of the firm, market competition, quality of management, price-earnings ratio, sales growth, corporate objectives, and market performance. Notable security valuation models were given by Walters[32] and Gorden.[33] The Walters model

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[32]James E. Walter, "Divident Policies and Common Stock Prices," Journal of Finance, Vol. 11, No. 1 (March 1956), pp. 29-41.

[33]M. J. Gorden, "Dividends Earnings, and Stock Prices," Review of Economics and Statistics, Vol. 44 (1962), pp. 37-51.

discounted the expected dividends of the future and the capital gains at the time when the stock is sold. The Walters financial model is:

$$V = \frac{d}{k} + \frac{r(e-d)/k}{k} \qquad (2.1)$$

Where V is the value of the stock, d is the constant dividends, r is the internal rate of return, e is the earnings per share, k is the cost of capital to the firm.

A similar model was developed by Gorden, but his emphasis was only on the dividends flow of the future. The mathematical equation for the capitalization of dividends is:

$$V_o = \sum_{T=1}^{\infty} \frac{d_T}{(1+k)} \qquad (2.2)$$

Where V_o is present value of the stock, d_T is the dividend in the period T, and k is the cost of capital.

A simplified form of the above equation is as follows:

$$V_o = \frac{d_o}{k-g} \qquad (2.3)$$

where g is the growth rate of the dividends and $k \neq g$.

The third school of thought, which assumes that the market is efficient, is the most recent attempt to create a stock market theory. The development of this theory can be traced back to Markowitz's work. According to Markowitz[34]

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[34]Harry Markowitz, "Portfolio Selection," Journal of Finance, Vol. 7, No. 1 (March 1952), pp. 77-91.

rational investors would like to have maximum possible return for a given level of risk. He also demonstrated operationally that by selecting securities which are negatively correlated and putting them in a portfolio, a reduction of risk will result, where risk is measured as the standard deviation of past returns. The efficient frontier is an envelope of points in a two-space for securities or portfolios having maximum return for a given risk level. The securities and portfolios which are below this line were designated as inefficient portfolios. The practical problem with this model is that it requires a huge volume of computations.

Sharpe[35] and Lintener[36] individually developed statistical methodology to oversome the computational drawback of the Markowitz model. Basically, it is a regression model. The rate of return for a single firm or for a portfolio is regressed as a dependent variable against a market index, giving the form:

$$r_i{}^{37} = a_i + b_i I + e_i \qquad (2.4)$$

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[35]William F. Sharpe, "Capital Asset Pricing: A Theory of Market Equilibrium Under Conditions of Risk," Journal of Finance, Vol. 19, No. 3 (September 1964), pp. 425-442.

[36]Lintener, p. 13.

[37]r_i is computed as: $r_i = \frac{D_i + (P_{il} - P_{io})}{P_{io}}$. Where D_i is the dividends paid on stock i, P_{il} is the price of the stock in period 0.

Where r_i is the rate return of the firm a_i and b_i are parameters which can be determined for each security by least squares method, e_i is a random element. The variable, I, is the level of some appropriate market index, such as the Dow-Jones Industrial Average.

Later, Lintener modified his model by taking I as a percentage change over some period of time, rather than using the raw index. This step was necessary as the frequency distribution of prices overtime was non-stationary and the r-te of return was a stationary one.[38] The basic assumption in Lintener's model was that the residual variation e_i (which is a deviation from the regression line) is assumed to be independent for each stock, meaning that it is a characteristic feature of that stock and that stock alone. The conclusions about the parameters are: (1) other things being equal, the equilibrium market value of a given stock will vary directly with its intercept, (2) the value of a given stock will always vary inversely with its residual variance,[39] and (3) the value of any stock will be higher

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[38]L. Fisher and J. Lorie, "Rates of Return on Investment in Common Stock: The Year-by-Year Record, 1926-65, Journal of Business, Vol. 38, p. 315. Table A-2 (January 1964). The average NYSE stock's price rose 6.8 percent per annum from 1926 to 1950. This does not include dividends.

[39]Residual variance is the variance of the residual e_i.

$$\sigma^2_{ei} = \sum_{i=1}^{n} \frac{(e_i - \bar{e}_i)^2}{n}$$

(or lower) the greater (or smaller) its correlation with the general index.

Blume[40] showed that b_i is the non-diversifiable part of the risk which is common to all securities. Using the equilibrium approach b_i shows a constant proportionality between the risk premium of an individual security and the risk premium of the market. Babcock[41] made a third finding about b_i, that each firm can be defined either as a risky or less risky based on whether its b_i is more than or less than one.

The theoretical development presented up to this point enabled the separation of the risk associated with a stock into two components: systematic--the component that is associated with the market, and unsystematic--the component that is associated with the individual firm. The slope of the market line b_i is the systematic part of the risk and e_i is the unsystematic part. Sharpe's contention is that the price has no relation to the residual. Lintener, on the other hand, stated that,

> . . . other things equal, stock values . . . will always vary inversely with the residual variance of their regression on either external index of

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[40]Marshall E. Blume, "On the Assessment of Risk," The Journal of Finance (1971), pp. 1-10.

[41]Guilford Babcock, "A Note on Justifying Beta as a Measure of Risk," Journal of Finance, Vol. 27, No. 3, p. 699.

> business conditions or the composite market performance of the entire group of stock composing the market.[42]

This market model was criticized by Miller and Scholes,[43] in that, when the stock prices were plotted against risk they exhibited the property of heteroskedasticity and the residuals had a mean with a skewed distribution to the right, which violates the normality assumption of the least square regression model. Given these weaknesses, the model appears as the best one available to analyze risk.

Cootner[44] suggested that security prices can be viewed as a series of constrained random fluctuations around the true intrinsic value. He hypothesizes the existence of two groups of investors. The first group can be referred to as the "naive investors," those who have access only to the public news media for their information. They might be chartists, amateur fundamental analysts, dart throwers or speculators; they base their investment decision upon their interpretations of the public news and their financial circumstances. Naive investors will recognize few, if any, divergences from intrinsic values. They are more

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[42]Lintener, p. 13.

[43]Meton H. Miller and Myron Scholes, "Rates of Return in Relation to Risk: A Re-examination of Some Recent Findings," Studies in the Theory of Capital Markets, ed. by Michael C. Jensen (New York: Praeger Publisher, 1972).

[44]P. H. Cootner, "Stock Prices: Random Versus Systematic Changes," Industrial Management Review, Vol. 3, No. 2 (Spring 1962), pp. 24-45.

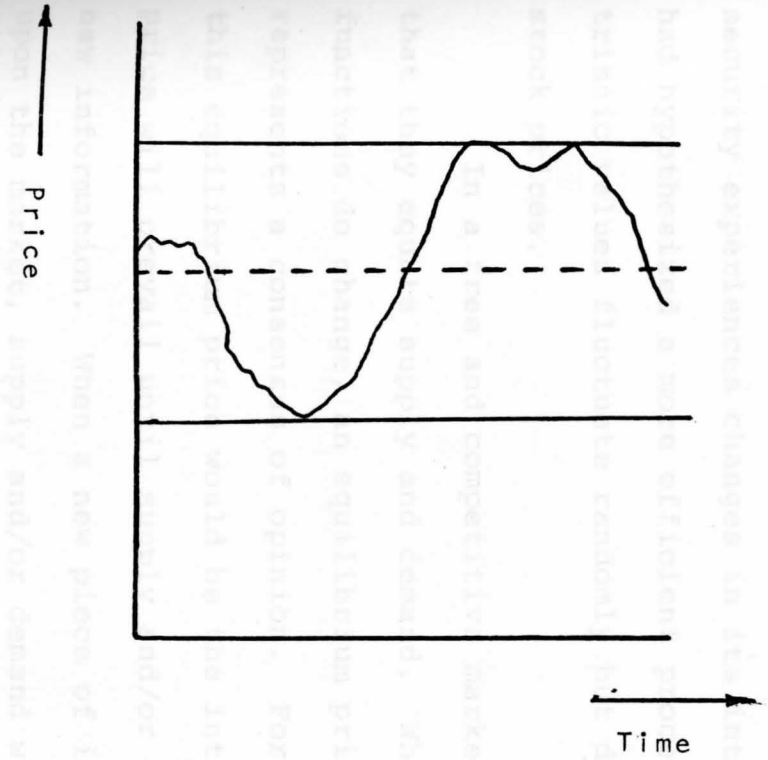
likely to invest on the basis of "hot tips" when they have excess liquidity.

The second group of investors are the "professional investors," those who have the resources to discover news and develop clear-cut estimates of the intrinsic value before the naive investors ever get the news. As a result, the professionals will recognize significant deviations from intrinsic value and initiate trading that tends to align the market price with the intrinsic value.

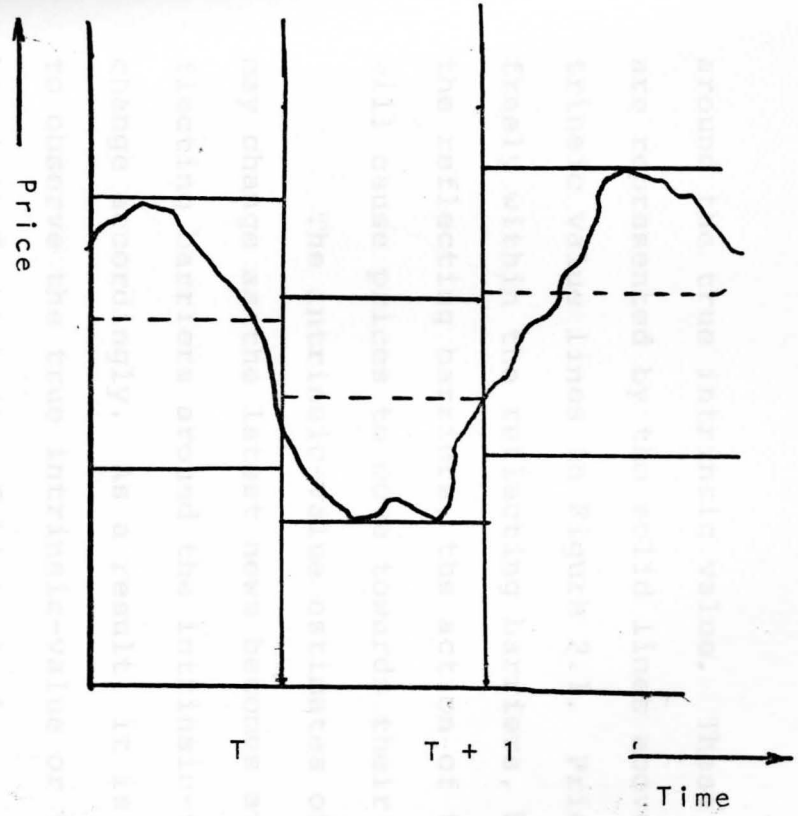
Figure 2.1 shows how security prices might fluctuate over time in the market Cootner describes. The dotted lines represent the true intrinsic value of the security as estimated by the professional investors. Trading by the naive investors is not necessarily based on a correct interpretation of the latest news. As a result, naive investors may be buying securities whose market prices are above their intrinsic values or vice versa.

These naive traders are largely responsible for the aimless price fluctuations which can cause prices to diverge from intrinsic values.

When a security price does differ significantly from its true intrinsic value, the professional investors find it profitable to correct this disequilibrium. Small deviations will not be profitable to correct, but when prices are significantly out of line, the professionals will bid up low prices or liquidate over-priced securities. In effect, the professionals erect "reflecting barriers"



(a) No change in intrinsic value



(b) Intrinsic value changes at Periods T and T + 1

Figure 2.1 Intrinsic Value of a Stock

around the true intrinsic value. These reflecting barriers are represented by the solid lines above and below the intrinsic value lines in Figure 2.1. Prices will fluctuate freely within the reflecting barriers, but when prices reach the reflecting barriers, the action of the professionals will cause prices to move towards their intrinsic value.

The intrinsic-value estimates of the professionals may change as the latest news becomes available. The reflecting barriers around the intrinsic-value will, therefore, change accordingly. As a result, it is not usually possible to observe the true intrinsic-value or the reflecting barriers from charts of historical security prices. Price charts like the one shown in Figure 2.1 will occur when a security experiences changes in its intrinsic value. Fama[45] had hypothesized a more efficient process in which the intrinsic values fluctuate randomly but do not differ from stock prices.

In a free and competitive market, prices adjust so that they equate supply and demand. When supply and demand functions do change, an equilibrium price will emerge which represents a consensus of opinion. For equity securities this equilibrium price would be the intrinsic value. That price will prevail until supply and/or demand are changed by new information. When a new piece of information is cast upon the market, supply and/or demand will react, and a new

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[45] E. Fama, "The Behavior of Stock Market Prices," Journal of Business (January 1955), p. 36.

price will be formed. The faster that news is assimilated, the faster the new equilibrium price emerges, implying a more efficient securities market.

Statistical Theory

The regression model, a type of multivariate analysis model, forms the basis of the statistical model used in this study. Conceptually, regression attempts to measure the relationship between paired variables, the dependent and independent variable. To accomplish that one needs: (1) a set of paired observations of these variables--a sample, and (2) a decision rule which chooses both (a) a particular mathematical form for the relationship (for example, linear or quadratic) and (b) parametric estimates of that form. The set of paired observations are the rate of return for the firm and rate of return for the market. The rate of return for the firm is computed as:

$$r_{iT} = \frac{P_{iT+1} - P_{iT}}{P_{iT}} \tag{2.5}$$

Where r_{iT} is the rate of return for the i^{th} firm for the T^{th} day, P_{iT} are the prices of i^{th} firms stock on $T + 1$ and T^{th} days, respectively. Market rate of return is computed as:

$$r_{mT} = \frac{I_{T+1} - I_T}{I_T} \tag{2.6}$$

Where r_{mT} is the market rate of return for the T^{th} day, I_{T+1} and I_T are the level of market index on T + 1 and T^{th} days, respectively.

The relationship theorized between the two variables is a linear one. The parameters are estimated by solving the normal equations simultaneously on a computer, by matrix solution. The general regression equation is given as:

$$Y_i = a + b X_i + e_i \qquad (2.7)$$

Where Y_i is the dependent variable value, a and b are the parameters of the equation, X_i is the value of the independent variable, and e_i is the value of the residual.

The regression model is subject to the following assumptions:

(a) e_i is a random variable, with a mean zero

(b) e_i has some variance which is constant throughout the length of the regression line. This condition is called homoskedasticity

(c) e_i and e_{i+k} do not covary for any value of k so that cov (e_i and e_{i+k}) = 0

(d) e_i and X_i do not covary so that cov (e_i and X_i) = 0

For the present problem the general regression equation takes the following form:

$$r_{iT} = a + b I_{mT} + e_{iT} \qquad i = 1,2...N \qquad (2.8)$$

Where a is the intercept, b is the systematic component of rate of return and e_{iT} is the unsystematic component of rate of return. The extent of violation of the assumptions are discussed in the financial theory section, page 23.

Methodology

The methodology used in this study involves aggregating the estimated mean residuals of the individual firms. The calendar date of the announcement event is standardized to the twenty-seventh day, the action date. Mean residual return across N firms for day T is given by:

$$\bar{e}_T = \frac{1}{N} \sum_{i=1}^{N} e_{iT} \qquad (2.9)$$

The cumulative mean residual, $\bar{e}$, is given by:

$$\bar{e}_T = \sum_{T=1}^{T} \bar{e}_T \qquad (2.10)$$

By the above equation the cumulative mean residual for any day between the time span of this study can be computed.

A t-test has been used to determine whether the estimated mean residuals are significantly different from the mean residual of the action day. The value of the t-test is represented as T(T,27), giving the value of the t^{th} day against the action day.

CHAPTER III

ANALYSIS OF THE PROBLEM

The analysis of this study was done for New York Stock Exchange Utility Index only. The results of Dow-Jones and Standard and Poor's Utility indexes are given in the form of graphs and tables in the appendix. The NYSE[46] Index was selected for discussion in the text because the index is based on the entire population of public utility stocks, thus, the effects of market trend can be removed more effectively than the Dow-Jones or Standard and Poor's indexes.[47]

The mean residuals for filing and decision using the NYSE Index (see Figures 3.1 and 3.2, respectively) are graphed for the time period of the study. The figures show the apparent randomness of the price fluctuations. But this does not give much evidence to prove or disprove the

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[46]Hereafter, the New York Stock Exchange Utility Index is referred to as NYSE Index.

[47]In computing the index, the share prices are first multiplied by the number of shares outstanding and the total value of capitalization is aggregated up. Next, the sum is divided by the total capitalization value based on December 31, 1965 prices. The result is then multiplied by 50. The figure of 50 has been chosen because it represents an approximation of the average price per share on the New York Stock Exchange as of the time of inception of the index. Thus, the index's value has some semblance to the arithmetical average price recorded in the market. Frank G. Zarb and Gabriel T. Kerekes, The Stock Market Handbook, (Homewood, Illinois: Dow-Jones Irwin, Inc., 1970), p. 982.

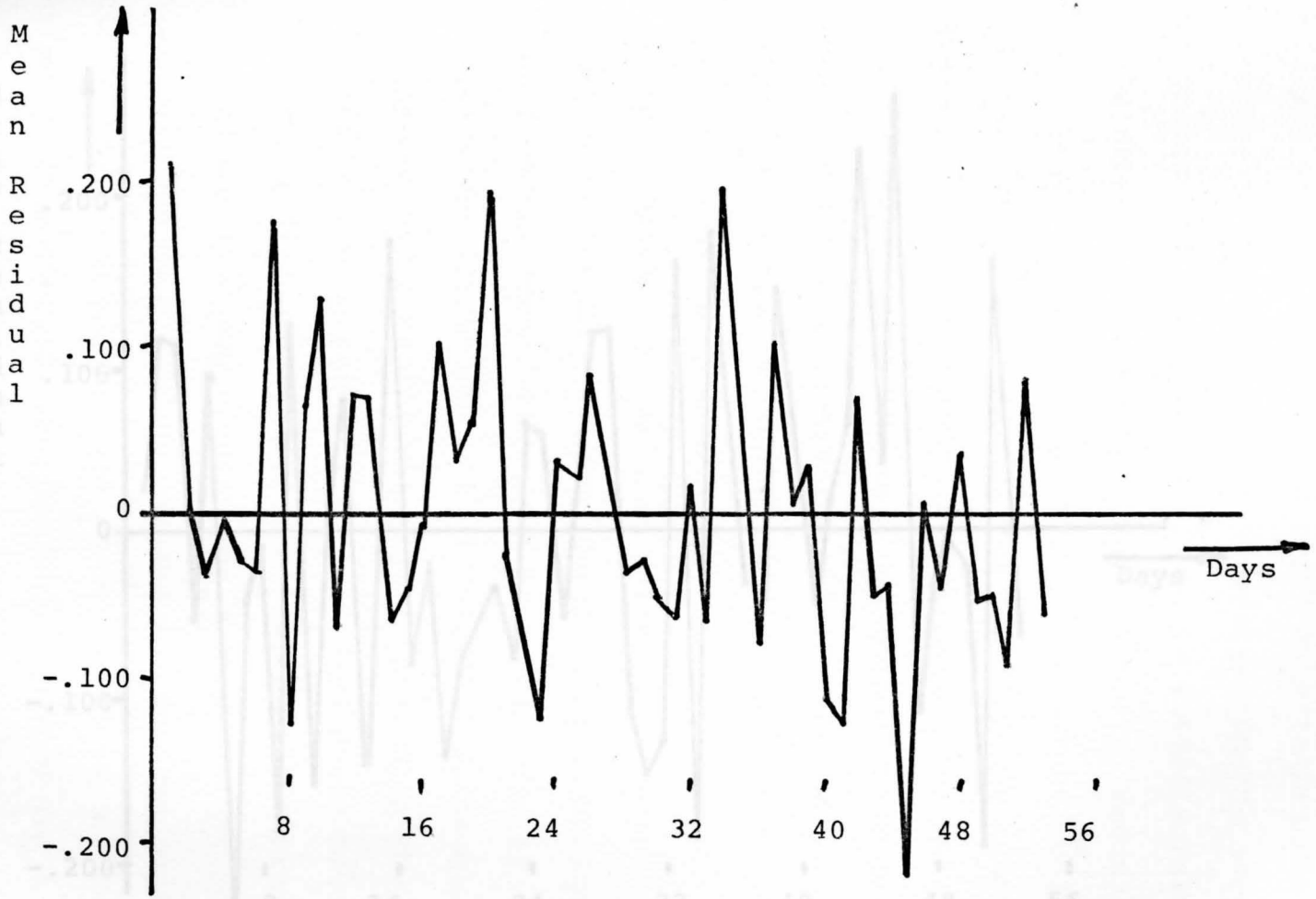

Figure 3.1 NYSE Mean Residuals for Filing

NEW YORK STOCK EXCHANGE INDEX (CONT.)

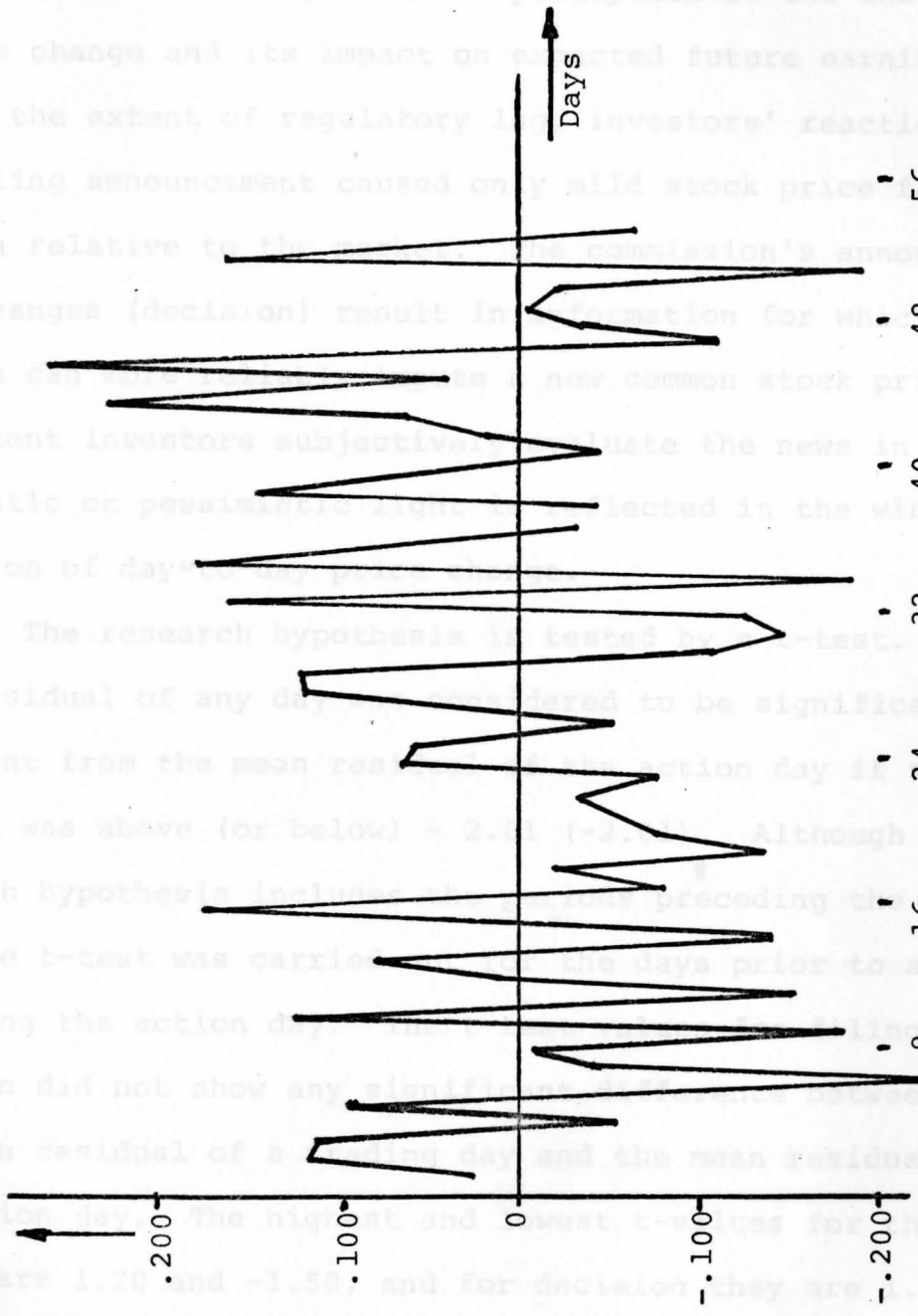

Figure 3.2 NYSE Mean Residuals for Decision

research hypothesis. An observation between the residual patterns of the two figures is that the mean residual variations for decision is more extreme than for filing. A possible cause in the difference of residual variation between filing and decision events could be attributable to the investors differing in their perception of the announced revenue change and its impact on expected future earnings. Due to the extent of regulatory lag, investors' reaction to the filing announcement caused only mild stock price fluctuation relative to the market. The commission's announced rate changes (decision) result in information for which investors can more reliably impute a new common stock price. The extent investors subjectively evaluate the news in an optimistic or pessimistic light is reflected in the wide variation of day-to-day price change.

The research hypothesis is tested by a t-test. The mean residual of any day was considered to be significantly different from the mean residual of the action day if the t-value was above (or below) + 2.01 (-2.01). Although the research hypothesis includes the periods preceding the action day, the t-test was carried out for the days prior to and following the action day. The t-test values for filing and decision did not show any significant difference between the mean residual of a trading day and the mean residual of the action day. The highest and lowest t-values for the filing are 1.20 and -1.58, and for decision they are 1.20 and -1.68. Thus, there is not enough evidence to

statistically substantiate the hypothesis.[48] The t-test values of the residual for each day is presented in parenthesis, below the mean residual in Table 1.

Although the research hypothesis was rejected, the cumulative mean residual graphs for the filing and decision cases showed the extent of investor anticipation to the request and decision announcements (Figures 3.3. and 3.4). The filing cumulative mean residual values are presented in Table 1 and are graphed in Figure 3.3., showing a positive cumulative mean residual, with its highest value around the action day. This residual pattern indicates that the price changes in Figure 3.1 (file) are upward weighted prior to and just after the company announcement. Investors are apparently anticipating the rate change request as favorable news and are bidding the company's stock price well above the market price. A second observation, from the price patterns, is the rate of secular out-performance of the market by this group of stocks, whose peak does not occur at the announcement event day. Fama[49] in his study showed that the increase in intrinsic value is close to action time. A possible reason for the pattern in Figure 3.3. might be that some of the investors were informed of the filing action before the

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[48]Because the data sample was not random, the t-test should only serve as a qualitative measure of statistical difference.

[49]E. Fama, et al, "The Adjustment of Stock Prices to New Information," International Economic Review, Vol. 10, No. 1 (February 1969), pp. 1-21.

TABLE 1

RESULTS FOR NYSE UTILITY INDEX*

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(1,27)	0.2066 (0.96)	0.207	0.0259 (-0.14)	0.026
T(2,27)	0.0037 (-0.06)	0.211	0.1183 (0.41)	0.144
T(3,27)	-0.0418 (-0.34)	0.169	0.1155 (0.38)	0.259
T(4,27)	0.0024 (-0.07)	0.171	-0.0591 (-0.58)	0.200
T(5,27)	-0.0322 (-0.28)	0.139	0.0925 (0.24)	0.293
T(6,27)	-0.0393 (0.36)	0.100	-0.2399 (-1.68)	0.053
T(7,27)	0.1769 (0.99)	0.277	-0.0427 (0.53)	0.010
T(8,27)	-0.1304 (-0.90)	0.147	-0.0038 (-0.32)	0.006
T(9,27)	0.0636 (0.34)	0.211	-0.1839 (-1.35)	-0.178
T(10,27)	0.1275 (0.69)	0.338	0.1248 (0.41)	-0.053
T(11,27)	-0.0741 (-0.55)	0.264	-0.1599 (-1.11)	-0.213
T(12,27)	0.0792 (0.44)	0.343	0.0054 (-0.25)	-0.208
T(13,27)	0.0775 (0.42)	0.420	0.0799 (0.18)	-0.128

TABLE 1--Continued

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(14,27)	0.0749 (-0.58)	0.345	-0.1479 (-1.10)	-0.276
T(15,27)	-0.0477 (-0.41)	0.297	0.0262 (-0.13)	-0.250
T(16,27)	-0.0047 (-0.12)	0.292	0.1775 (0.73)	-0.073
T(17,27)	0.1049 (0.61)	0.397	-0.0876 (-0.78)	-0.161
T(18,27)	0.0277 (0.09)	0.425	-0.0191 (-0.38)	-0.180
T(19.27)	0.0562 (0.22)	0.481	-0.1409 (-1.12)	-0.321
T(20,27)	0.1981 (0.78)	0.679	-0.0780 (0.72)	-0.399
T(21,27)	-0.0315 (-0.30)	0.648	-0.0546 (-0.60)	-0.454
T(22,27)	-0.0810 (-0.61)	0.567	-0.0313 (-0.47)	-0.485
T(23,27	-0.1299 (-0.92)	0.437	-0.0807 (-0.72)	-0.566
T(24,27)	0.0340 (0.13)	0.471	0.0642 (0.08)	-0.502
T(25,27)	0.0244 (0.07)	0.495	0.0594 (0.06)	-0.443
T(26,27)	0.0901 (0.47)	0.585	-0.0576 (-0.57)	-0.501

TABLE 1--Continued

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(27,27)	0.0139 (0.00)	0.599	0.0492 (0.00)	-0.452
T(28,27)	-0.0375 (-0.33)	0.561	0.1222 (0.39)	-0.330
T(29,27)	-0.0279 (-0.26)	0.533	0.1239 (0.42)	-0.206
T(30,27)	-0.0489 (-0.41)	0.484	-0.1083 (-0.88)	-0.314
T(31,27)	-0.0674 (-0.56)	0.417	-0.1515 (-1.12)	-0.465
T(32,27)	0.0200 (0.04	0.437	-0.1245 (-1.01)	-0.890
T(33,27)	-0.0637 (-0.51)	0.373	0.1644 (0.65)	-0.426
T(34,27)	0.1990 (1.20)	0.572	-0.1880 (1.32)	-0.614
T(35,27)	0.0544 (0.24)	0.626	0.1809 (0.76)	-0.433
T(36,27)	-0.0816 (-0.61)	0.544	0.0464 (-0.02)	-0.387
T(37,27)	0.1047 (0.60)	0.649	-0.0330 (-0.51)	-0.420
T(38,27)	-0.0038 (-0.12)	0.645	-0.0453 (-0.58)	-0.465
T(39,27)	0.0332 (0.12)	0.678	0.1498 (0.63)	-0.315

TABLE 1--Continued

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(40,27)	-0.1172 (-0.90)	0.561	0.0249 (-0.14)	-0.290
T(41,27)	-0.1324 (-0.97)	0.429	-0.0487 (-0.55)	-0.339
T(42,27)	0.703 (0.33)	0.499	0.0150 (-0.20)	-0.324
T(43,27)	-0.0534 (-0.43)	0.446	0.0606 (0.07)	-0.263
T(44,27)	-0.0432 (-0.33)	0.403	0.2308 (1.06)	-0.032
T(45,27)	-0.2161 (-1.53)	0.187	0.0346 (-0.09)	0.003
T(46,27)	0.0071 (-0.05)	0.194	0.2576 (1.20)	0.261
T(47,27)	-0.0486 (-0.42)	0.145	-0.1121 (-0.85)	0.149
T(48,27)	0.0356 (0.14)	0.181	-0.0385 (-0.48)	0.110
T(49,27)	-0.0538 (-0.45)	0.127	-0.0034 (-0.29)	0.107
T(50,27)	-0.0514 (-0.39)	0.076	-0.0214) (-0.41)	0.086
T(51,27)	-0.0972 (-0.68)	-0.021	-0.1924 (-1.39)	-0.106
T(52,27)	0.0801 (0.42)	0.059	0.1660 (0.69)	0.060

TABLE 1--Continued

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(53,27)	-0.0596 (-0.48)	-0.001	-0.0621 (-0.62)	0.122

* t-Values are given in parentheses below the mean residual values.

NEW YORK STOCK EXCHANGE INDEX (CONT.)

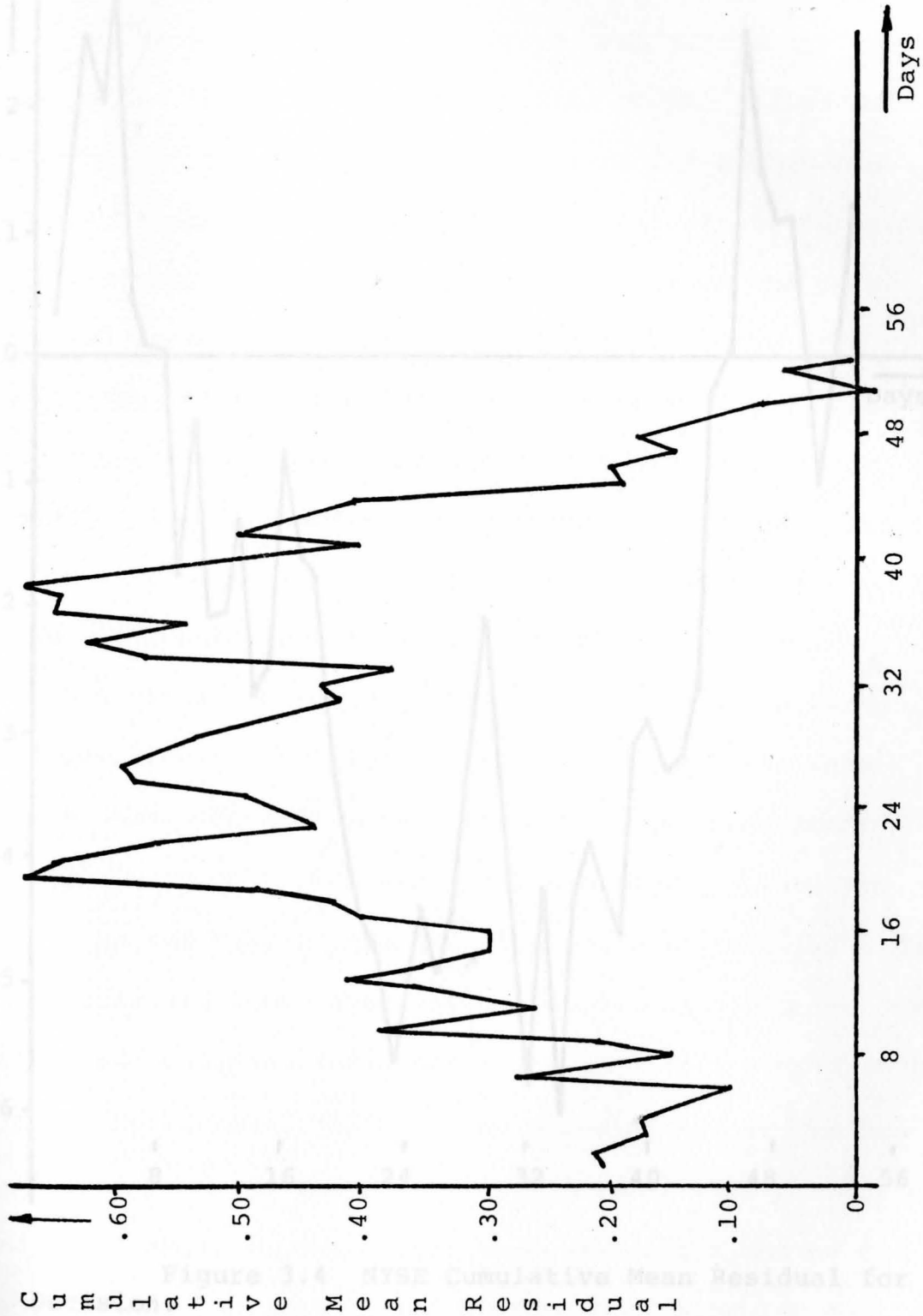

Figure 3.3 NYSE Cumulative Mean Residuals for Filing

NEW YORK STOCK EXCHANGE INDEX (CONT.)

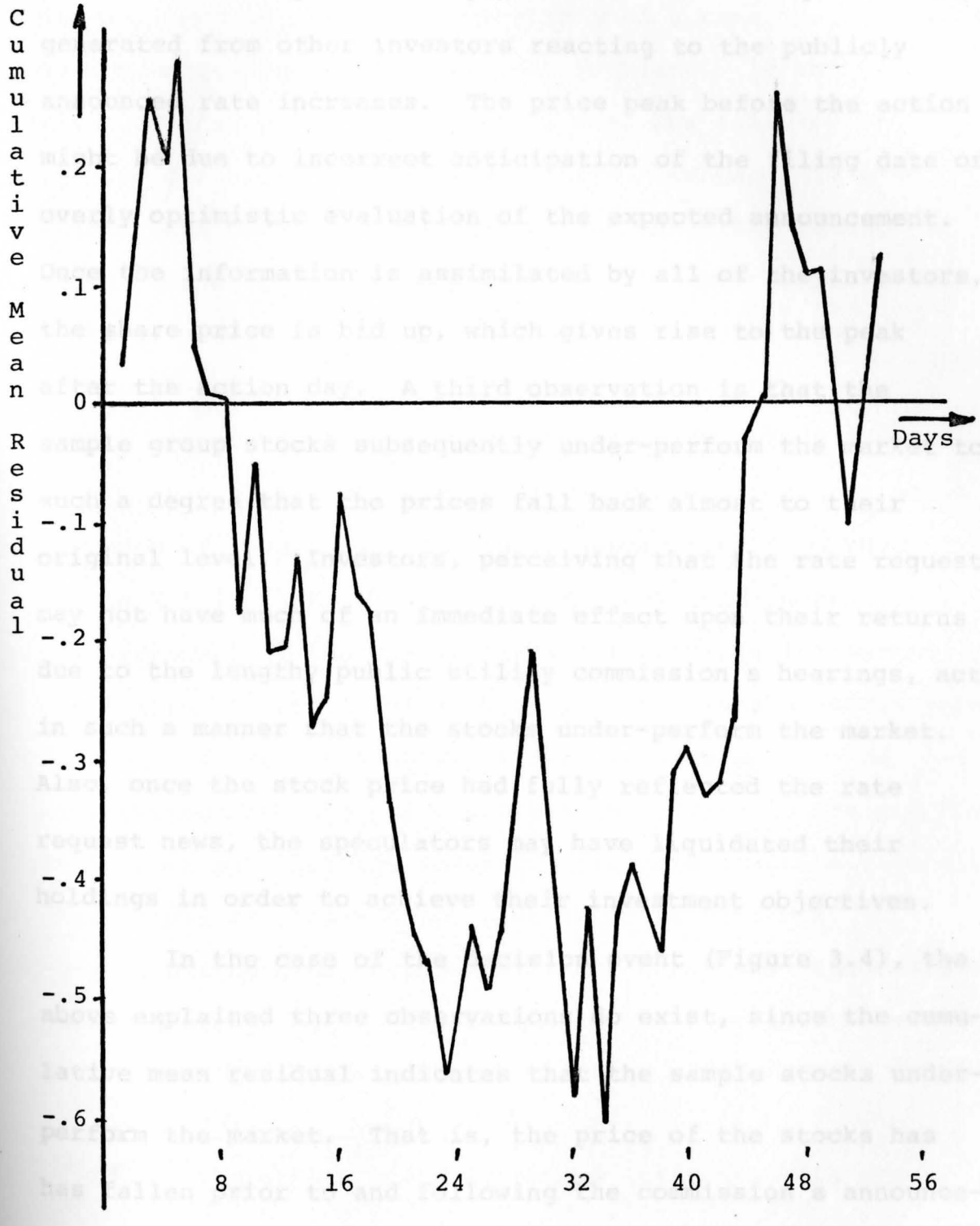

Figure 3.4 NYSE Cumulative Mean Residual for Decision.

event by some insiders. These investors then purchased shares in anticipation of speculative short run gains being generated from other investors reacting to the publicly announced rate increases. The price peak before the action might be due to incorrect anticipation of the filing date or overly optimistic evaluation of the expected announcement. Once the information is assimilated by all of the investors, the share price is bid up, which gives rise to the peak after the action day. A third observation is that the sample group stocks subsequently under-perform the market to such a degree that the prices fall back almost to their original level. Investors, perceiving that the rate request may not have much of an immediate effect upon their returns due to the lengthy public utility commission's hearings, act in such a manner that the stocks under-perform the market. Also, once the stock price had fully reflected the rate request news, the speculators may have liquidated their holdings in order to achieve their investment objectives.

In the case of the decision event (Figure 3.4), the above explained three observations do exist, since the cumulative mean residual indicates that the sample stocks under-perform the market. That is, the price of the stocks has has fallen prior to and following the commission's announcement. The negative cumulative mean residual might be due to the less than jubilant "tone" or mood of the public hearings.

On the average, the time interval between the open hearing and the actual decision is about a month.[50] To a certain degree, one can determine how strong of a case the firm has toward achieving its rate request increase. If the commission judgment is for less than what was asked by the utility firm, the investors will have a tendency to seek stocks with more favorable returns at same risk level, thereby bidding the price down. In the sample under consideration, except for one firm,[51] all of the others were granted less than the amount requested. The two peaks before and after the decision day can be explained just as in the case of filing--a delayed reaction to the news among the mass of investors. The third observation from the Figure 3.4 is that, after the news event, the cumulative mean residual of the sample firms out-performs the market until about twenty trading days; then the sample stocks perform no differently than the market index stocks. The explanation for this price pattern is similar to the one for filing, except that the investors can more accurately impute their rates of return after a decision is rendered.

The results computed from Dow-Jones and Standard and Poor's Utility indexes are basically the same as the New York Stock Exchange Index. One exception is a discrepancy in the

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[50]The author had a telephone interview with one of the attorneys at the Ohio P. U. C., in this regard.

[51]One firm received 105 percent of the amount requested.

results with Standard and Poor's Utility Index in comparison with the other two indexes. This difference, shown in the computed results after the fortieth trading day, is due to a sample bias introduced by the particular index (see Appendix B and Appendix C for Dow-Jones and Standard and Poor's indexes, respectively).

CHAPTER IV

SUMMARY AND CONCLUSIONS

Summary

This research was an attempt to investigate the rapidity of investor reaction towards utility stock price changes as measured by secular utility stock price patterns. The utility companies file for State relief with their public utility commission and the commission, after open hearings decides to grant, deny, or partially grant the amount requested. The effect of these events upon the stock prices is the problem of this study.

In this analysis the procedure of receiving rate relief was divided into two events, namely, filing and the decision--the time at which the decision was taken. The investors' behavior towards the stocks of the firms which requested rate relief were studied in a time frame surrounding these two events. The research hypothesis stated that the price of the stock for both events will not be significantly different from the stock price on the day of the event and the stock price of any day after the event. The alternative hypothesis was that there is a significant difference between the stock price on the day of the event and the days thereafter.

A questionnaire was sent to all firms that had rate relief action in the period 1968-1973, excepting those that were subsidiaries of another utility company. Forty-six firms responded to the questionnaire. Because some of the questionnaires were not answered fully, the usable sample size dropped to thirty-five firms with seventy-seven cases. The filing and decision dates were defined as "action" dates. A time period beginning with the twenty-sixth trading day prior to the action date was subjectively selected as a sufficient time period likely to reflect behavior of traders in the equity market. Three public utility averages were used to adjust for systematic price change: New York Stock Exchange, Dow-Jones, and Standard and Poor's. Daily stock prices were obtained from the Standard and Poor's Stock Price Record.

Lintener's financial market model was used, in order to separate the market effect and individual firm's effect upon the stock price trend. The statistical component of the Lintener model uses a linear regression model with rate of return of a firm as a dependent variable, and rate of return of the market as the independent variable. The residual of the regression is interpreted, according to finance theory, as that component of the rate of return attributable to the business activities of the firm, including the rate change process. Residual means corresponding to each firm per unit of time was computed. The mean residuals for all the fifty-three time periods give rise to a time series of mean

residuals for an event. This procedure was followed in developing the mean residual time series for both the events. The mean residual of the days after the event were tested against the mean residual of the action days by a t-test. Graphs were plotted for the mean residual and for the cumulative mean residual, against time. The analysis was carried out only for the NYSE Index, as it is computed for the complete population.

The t-tests did not show significant statistical differences between the stock prices on the file and decision action days and each of the respective stock prices on the subsequent days. Hence, the research hypothesis had to be accepted. However, the mean residual graph showed a wider variation of price for decision event than for filing event. The cumulative mean residual graph showed an increase (decrease) in price about twenty trading days before the filing (decision) event. After the action date the price trend was downward (upward) for filing (decision), leveling off in a price range near the pre-action level. The results obtained for Dow-Jones and Standard and Poor's indexes were basically the same as the NYSE Index.

Conclusions

The conclusions drawn from this study indicate that, though the investors at first perceive an increase in the intrinsic value of a stock due to an action event, at a later time they see that their returns have not been changed by the

event. The results also showed that the price fluctuations on both sides of the decision event are greater than the fluctuations for the filing event. The price of stock on any day prior to or preceding the events is not significantly different from the price of the stock on the day of the event. The increase (decrease) in price of stocks is about a month prior to the filing (decision) event, suggesting that investors have exceptional perception of management's intended filing, or that there is inside information available to investors.

Further Research

The study could be stratified to a larger degree by separating the population into smaller populations representing more specific characteristics. For example, the population may be split up as to the quality of the utility as reflected by the rating agency credit ratings (Moody's and/or Standard and Poor's). As it may be noticed, the size of the rate request may be of some influence. The type of decision may, also, affect the results of the study. Faborable decisions (e. g., 75 percent of requested rate increase is granted) versus unfavorable decisions may be looked at. The problem can be extended by taking broker/dealer trading commissions into consideration, to check for trading system profitability.

APPENDIX A

List of Companies in Sample

APPENDIX A

LIST OF COMPANIES IN SAMPLE*

Atlantic City Electric; 1

Arizona Public Service Company; 2

Baltimore Gas and Electric; 3

Central Maine Power Company; 1

Cincinnati Gas and Electric; 5

Detroit Edison Company; 4

Duquesne Light Company; 2

Florida Power and Light; 1

Florida Power Company; 1

Illinois Power Company; 2

Iowa Power and Light Company; 1

Kansas City Power and Light; 2

Kansas Power and Light Company; 1

Louisville Gas and Electric Company; 1

Missouri Public Service Company; 2

Montana Power Company; 2

New York State Electric and Gas; 5

Ohio Edison Company; 2

Otter Tail Power Company; 2

Pacific Power and Light; 3

Pennsylvania Power and Light; 2

Portland General Electric Company; 3

APPENDIX A (CONT.)

Philadelphia Electric Company; 3

Public Service Company of Colorado; 2

Public Service Electric and Gas; 2

Public Service of Indiana; 2

Public Service of New Mexico; 1

Puget Sound Power and Light; 1

Rochester Gas and Electric; 5

South Carolina Electric and Gas; 1

Southern California Edison Company; 3

Tampa Electric Company; 2

United Illuminating Company; 1

Utah Power and Light; 4

Virginia Electric and Power; 2

* The number of cases used for each company follows the company's name.

APPENDIX B

Dow-Jones Index

APPENDIX B

Dow-Jones Index

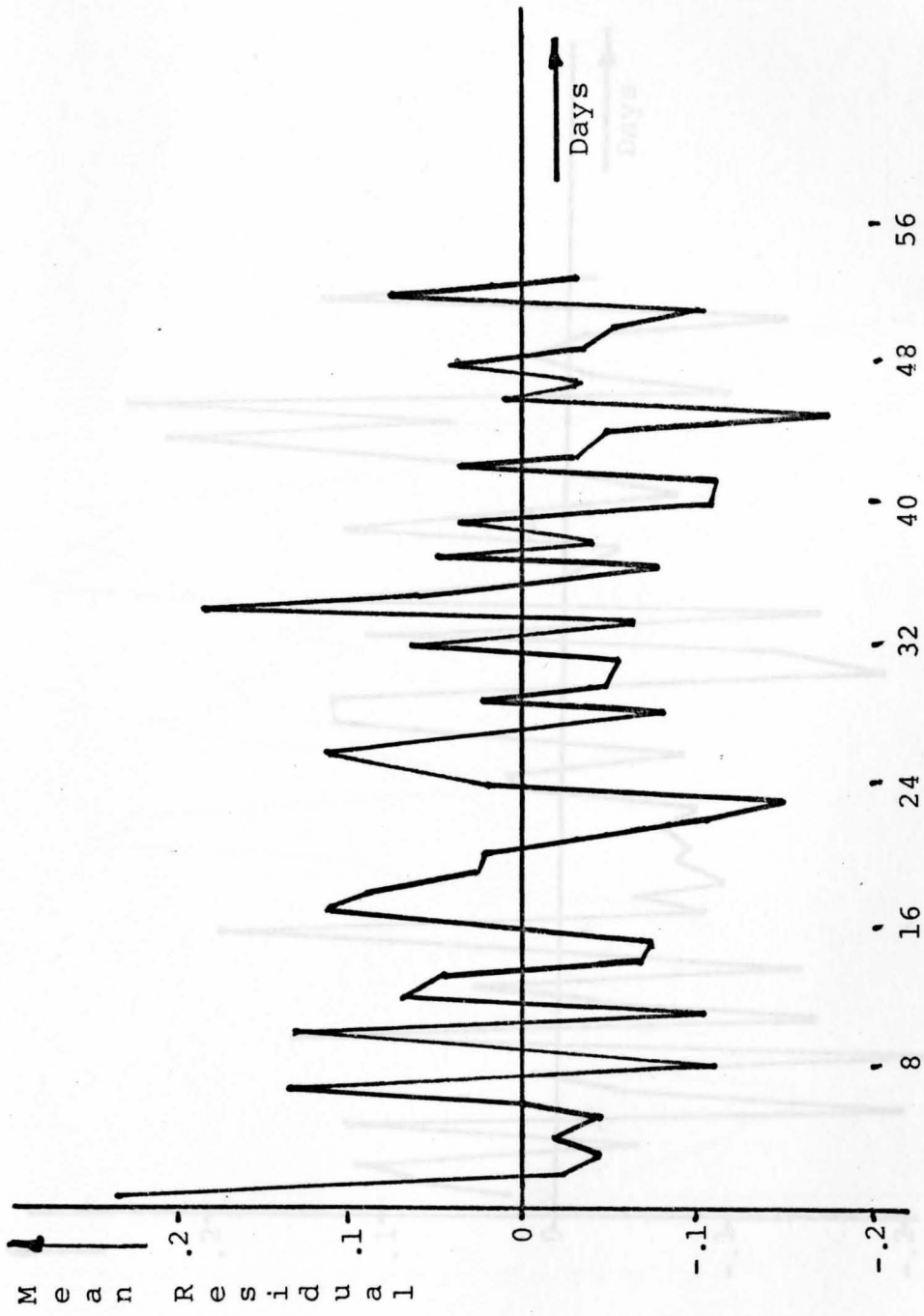

Figure 1. Mean Residuals for Filing

DOW-JONES INDEX (CONT.)

Figure 2. Mean Residuals for Decision

DOW-JONES INDEX (CONT.)

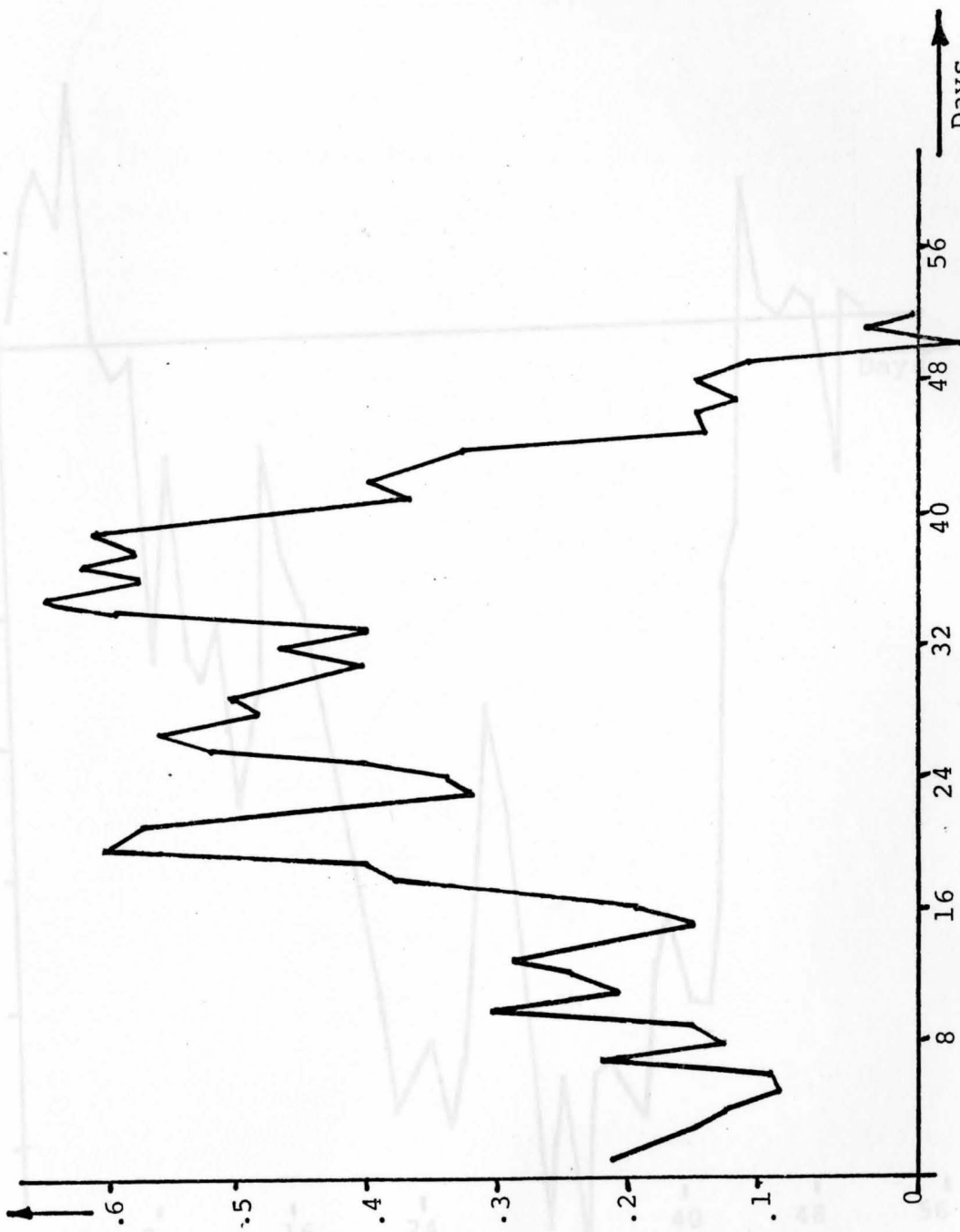

Figure 3. Cumulative Mean Residuals for Filing

DOW-JONES INDEX (CONT.)

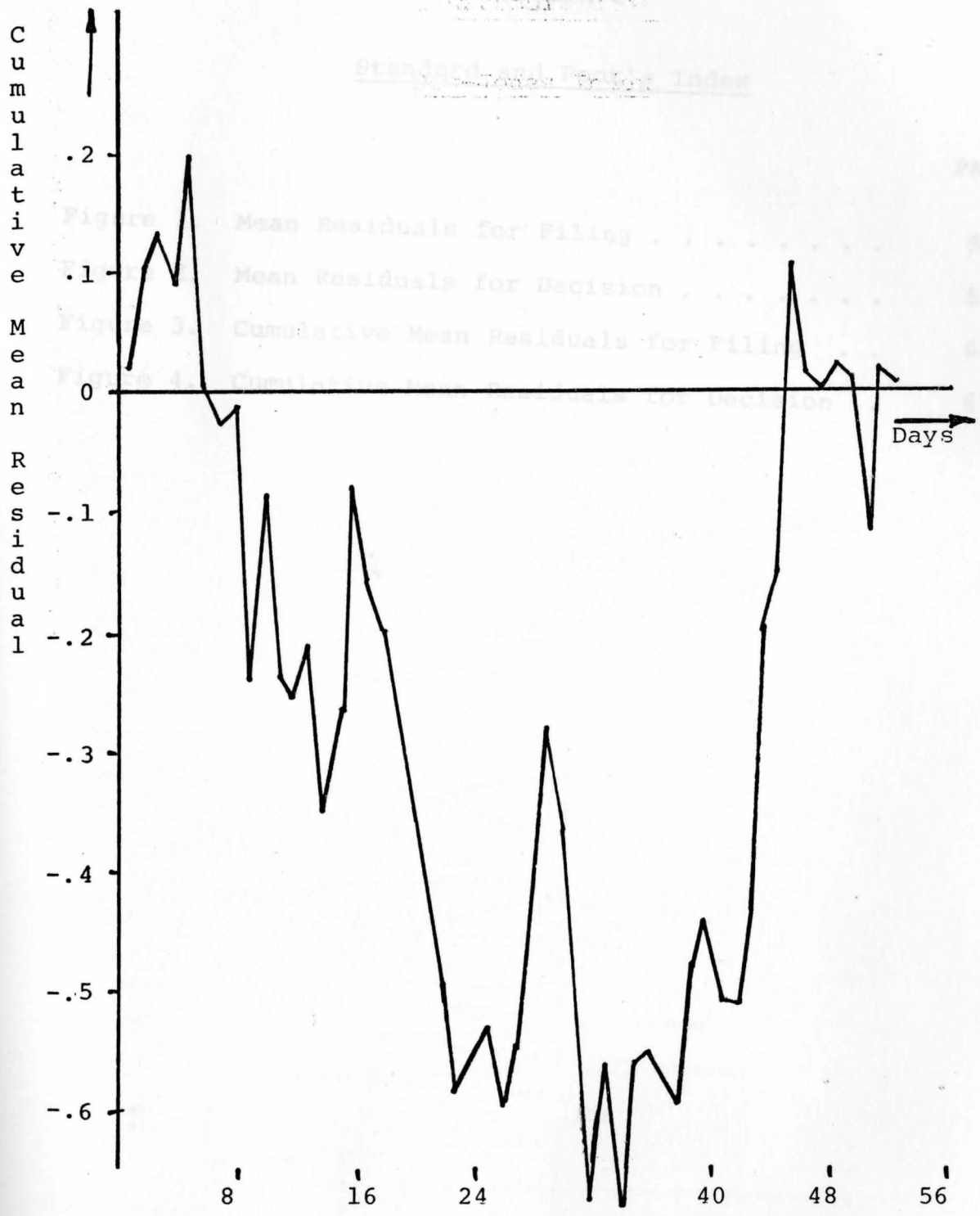

Figure 4. Dow-Jones Cumulative Mean Residual for Decision.

APPENDIX C

Standard and Poor's Index

PAGE

APPENDIX C

Standard and Poor's Index

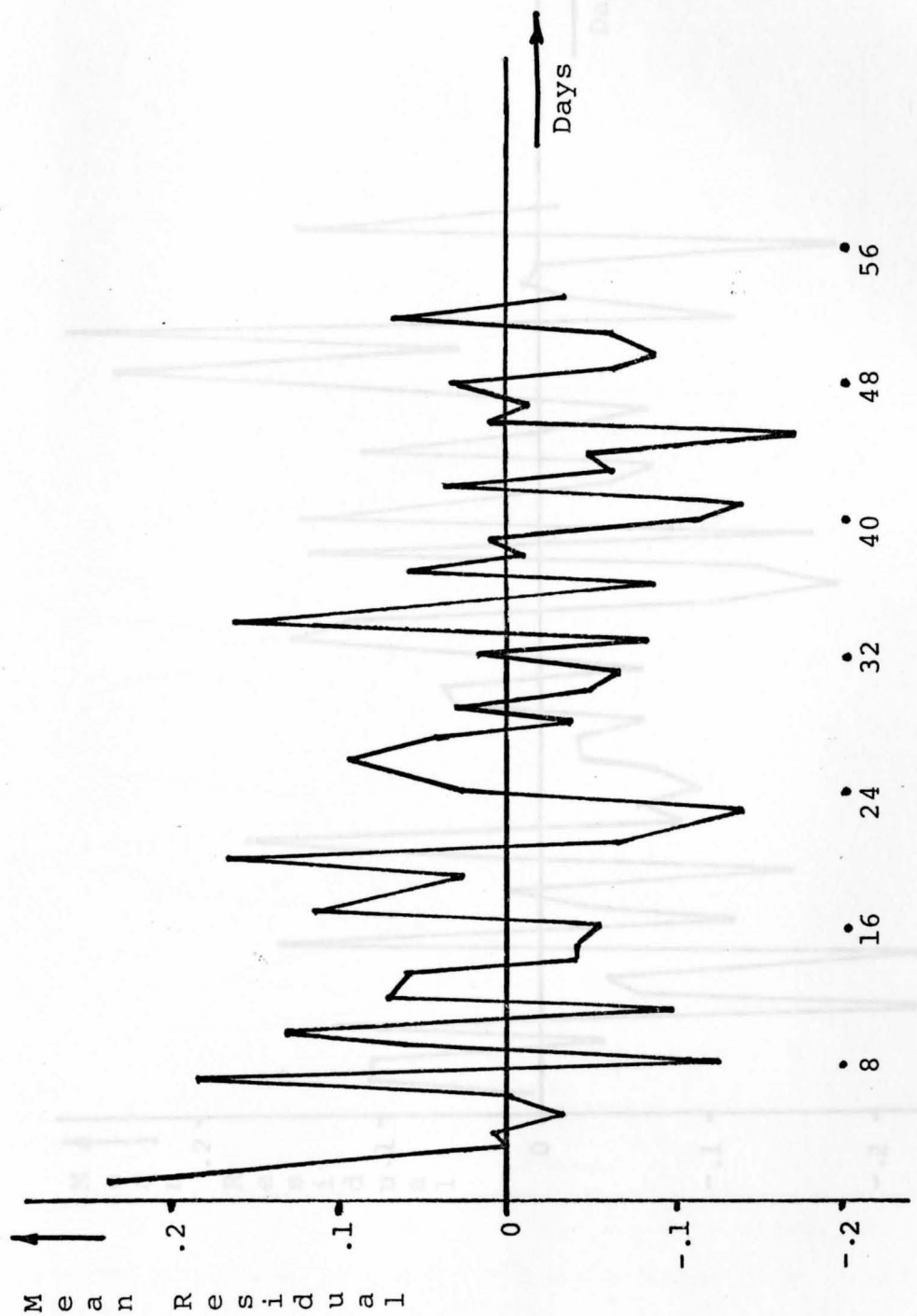

Figure 1. Standard and Poor's Mean Residuals for Filing

STANDARD AND POOR'S INDEX (CONT.)

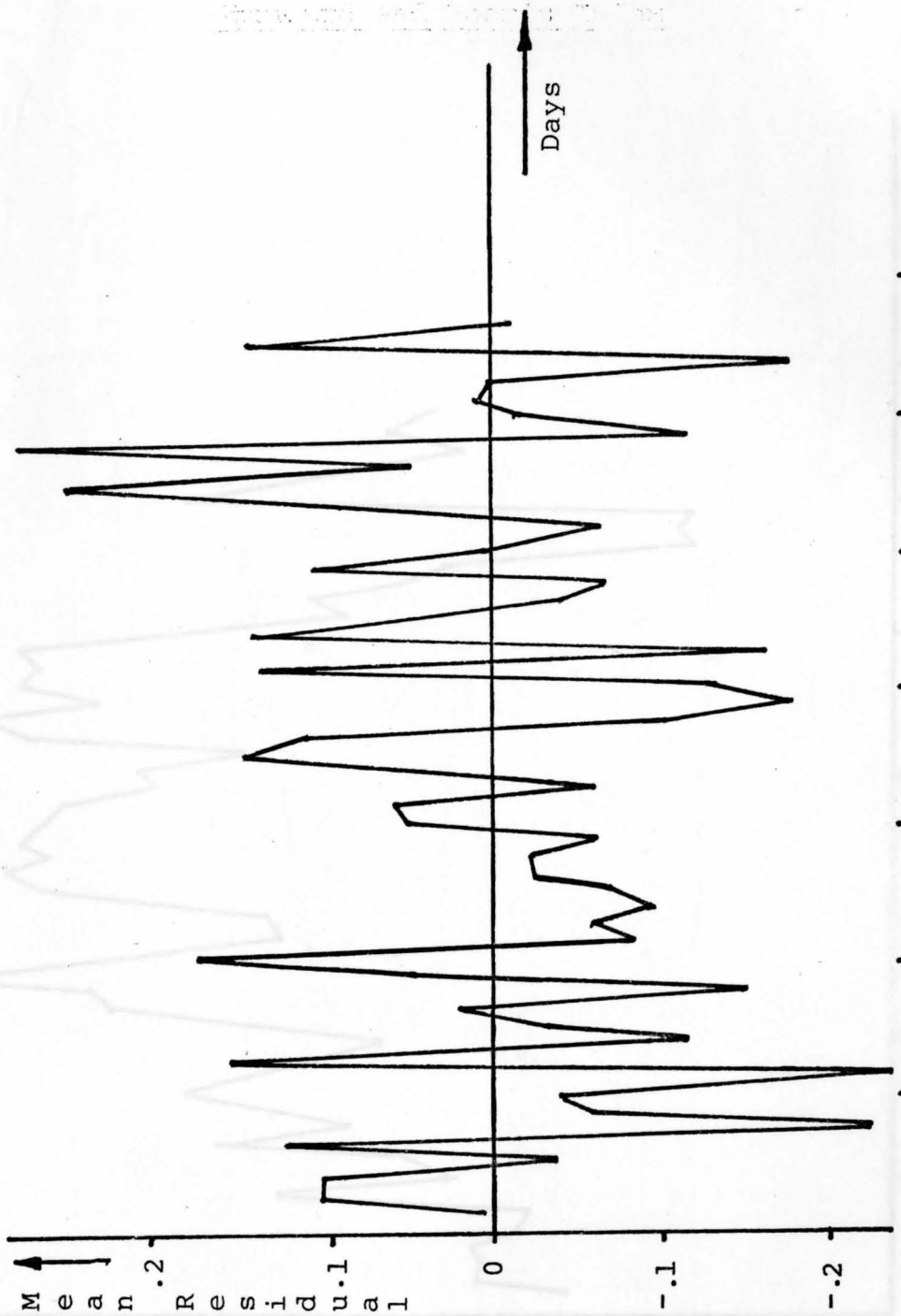

Figure 2. Standard and Poor's Mean Residuals for Decision

STANDARD AND POOR'S INDEX (CONT.)

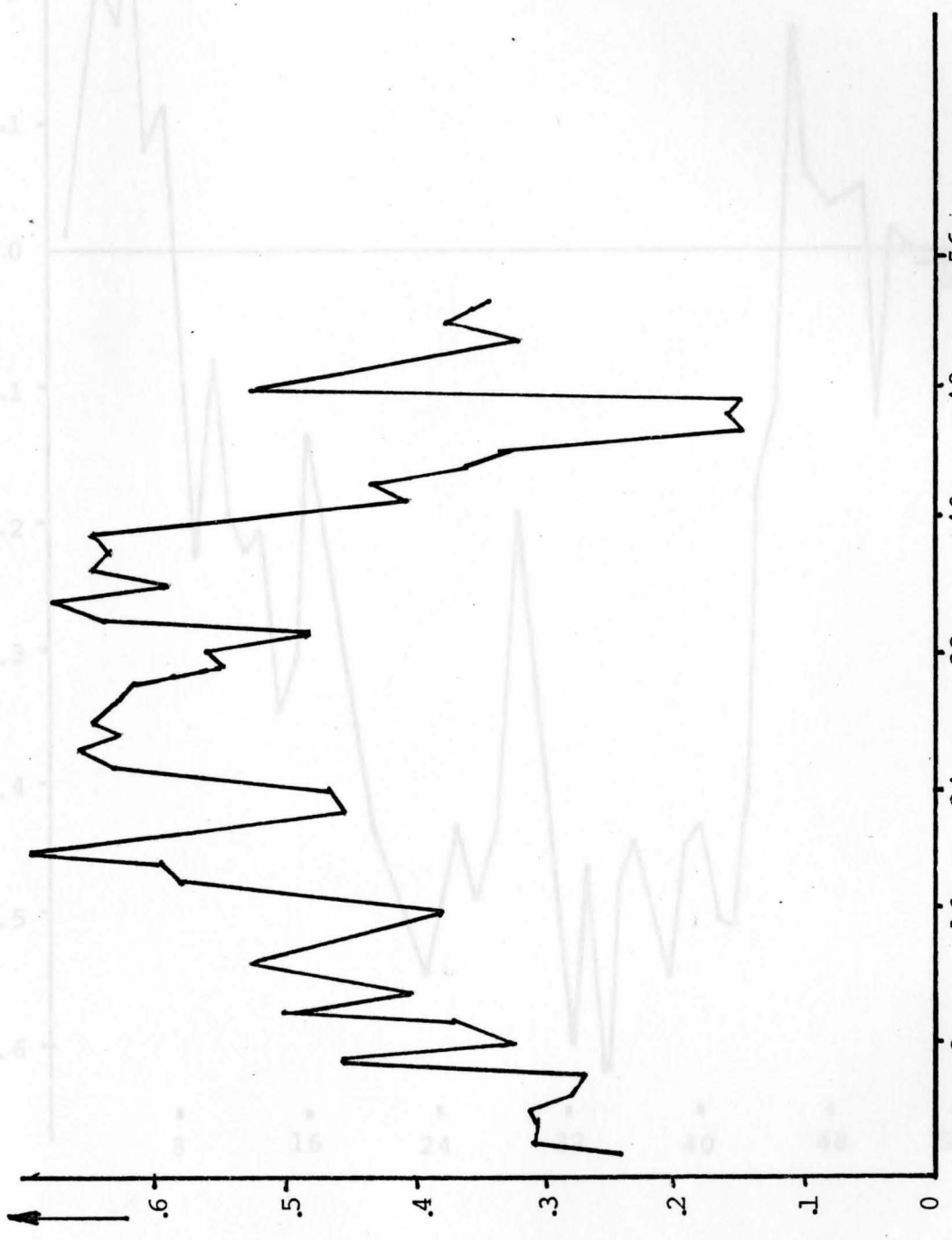

Figure 3. Standard and Poor's Cumulative Mean Residuals for Filing

STANDARD AND POOR'S INDEX (CONT.)

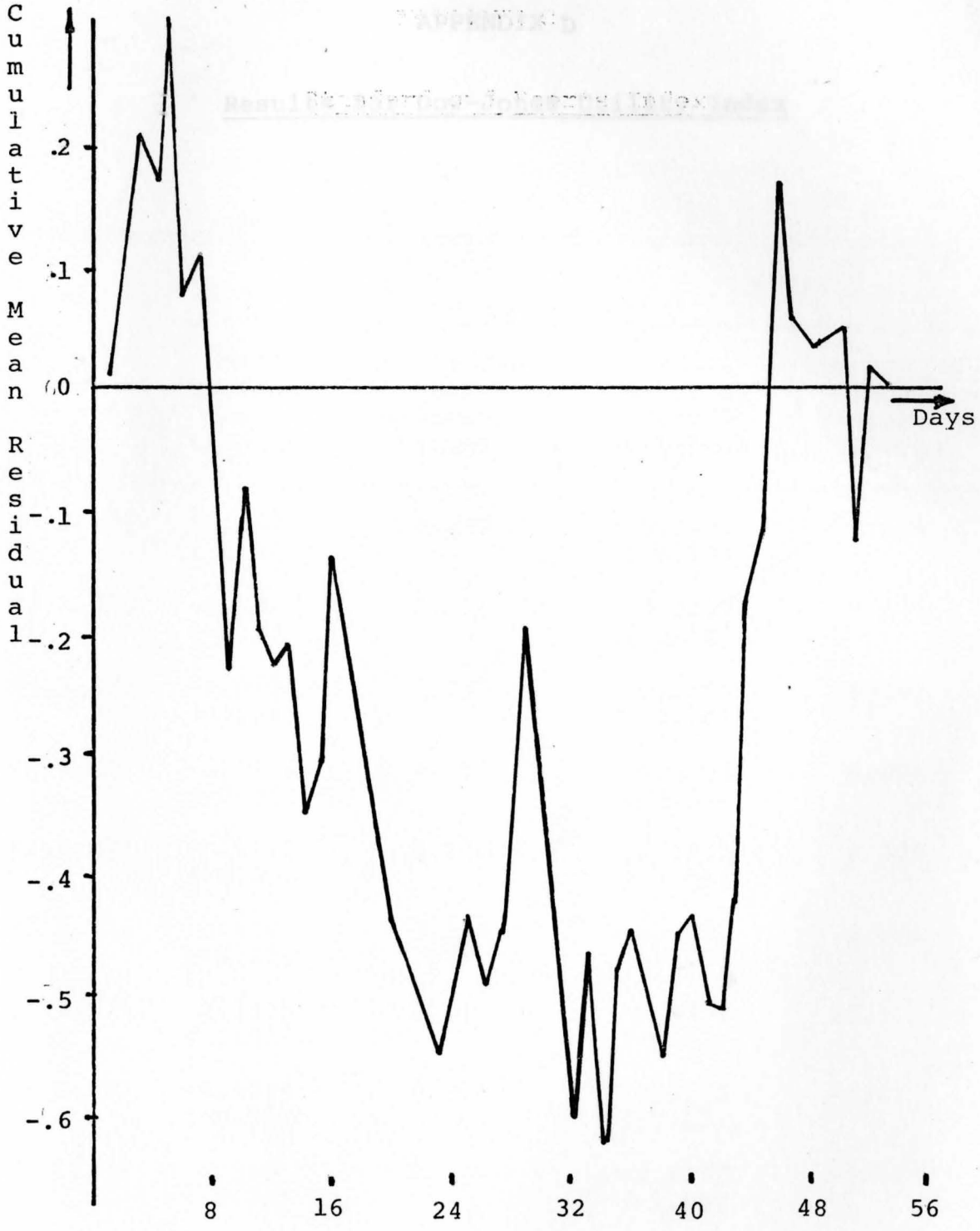

Figure 4. Standard and Poor's Index. Cumulative Mean Residuals for Decision.

APPENDIX D

Results for Dow-Jones Utility Index

APPENDIX D

Table 2

Results for Dow-Jones Utility Index*

	Filing		Decision	
Days	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(1,27)	0.2373 (0.94)	0.237	0.237 (-0.18)	0.024
T(2,27)	-0.0211 (-0.37	0.216	0.0833 (0.18)	0.107
T(3,27)	-0.0434 (-0.54)	0.173	0.1155 (0.38)	0.141
T(4,27)	-0.0163 (-0.35)	0.157	-0.0505 (-0.57)	0.091
T(5,27)	-0.0472 (-0.55)	0.110	0.1183 (0.36)	0.209
T(6,27)	0.0044 (-0.27)	0.114	-0.2034 (-1.15)	0.006
T(7,27)	0.1315 (0.52	0.246	-0.0352 (-0.53)	-0.029
T(8,27)	-0.1014 (-0.91)	0.145	0.0162 (-0.23)	-0.013
T(9.27)	0.330 (-0.08)	0.178	-0.2302 (-1.65)	-0.243
T(10,27)	0.1258 (0.47)	0.304	0.1583 (0.58)	-0.085

TABLE 2--Continued

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(11,27)	-0.1029 (-0.90)	0.201	-0.1498 (-1.09)	-0.235
T(12,27)	0.0660 (0.13)	0.267	-0.0249 (-0.45)	-0.260
T(13,27)	0.0460 (0.00)	0.313	0.0481 (-0.03)	-0.212
T(14,27)	-0.0679 (-0.72)	0.245	-0.1405 (-1.09)	-0.352
T(15,27)	-0.0719 (-0.76)	0.173	0.0798 (0.15)	-0.272
T(16,27)	0.0195 (-0.16)	0.193	0.1959 (0.82)	-0.076
T(17,27)	0.1127 (0.43)	0.306	-0.0867 (-0.82)	-0.163
T(18,27)	0.0903 (0.28)	0.396	-0.0395 (0.51)	-0.203
T(19,27)	0.0284 (-0.09)	0.424	-0.0973 (-0.91)	-0.300
T(20,27)	0.2024 (0.65)	0.626	-0.0726 (-0.73)	-0.373
T(21,27)	-0.0281 (-0.47)	0.598	-0.0765 (-0.77)	-0.450
T(22,27)	-0.1065 (-0.96)	0.492	-0.0567 (-0.65)	-0.507
T(23,27)	-0.1503 (-1.20)	0.342	-0.0792 (-0.74)	-0.587

TABLE 2--Continued

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(24,27)	0.0212 (-0.15)	0.363	0.0209 (-0.18)	-0.565
T(25,27)	-.0660 (0.13)	0.429	0.0327 (-0.12)	-0.532
T(26,27)	0.1152 (0.41)	0.544	-0.0717 (-0.67)	-0.604
T(27,27)	0.0457 (0.00)	0.590	0.0534 (0.00)	-0.551
T(28,27)	-0.0845 (-0.82)	0.505	0.1338 (0.44)	-0.417
T(29,27)	0.0258 (-0.12)	0.531	0.1331 (0.47)	-0.284
T(30,27)	-0.0495 (-0.60)	0.481	-0.086 (-0.80)	-0.371
T(31,27)	-0.0558 (-0.68)	0.425	-0.1892 (-1.37)	-0.560
T(32,27)	0.0659 (0.13)	0.491	-0.1241 (-1.04)	-0.684
T(33,27)	-0.0694 (-0.73)	0.422	0.1174 (0.37)	0.567
T(34,27)	0.1860 (0.89)	0.608	-0.1476 (-1.13)	-0.715
T(35,27)	0.0642 (0.11)	0.672	0.1485 (0.55)	-0.566
T(36,27)	-0.0797 (-0.73)	0.592	0.0104 (-0.26)	-0.556

TABLE 2--Continued

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(37,27)	0.0500 (0.003)	0.642	-0.0195 (-0.45)	-0.575
T(38,27)	-0.0432 (-0.56)	0.599	-0.0325 (-0.54)	-0.607
T(39,27)	0.0320 (-0.08)	0.631	0.1267 (0.47)	-0.480
T(40,27)	-0.1102 (-1.03)	0.521	0.0342 (-0.12)	-0.446
T(41,27)	-0.1330 (-1.20)	0.388	-0.0640 (-0.66)	-0.510
T(42,27)	0.0349 (-0.06)	0.423	-0.-142 (-0.39)	-0.517
T(43,27)	-0.0341 (-0.43)	0.389	0.0823 (0.17)	-0.435
T(44,27)	-0.0486 (-0.55)	0.340	0.2318 (1.05)	-0.203
T(45,27)	-0.1781 (-1.46)	0.162	0.0605 (0.04)	-0.142
T(46,27)	0.0091 (-0.24)	0.171	0.2532 (1.22)	0.111
T(47,27)	-0.0356 (-0.52)	0.135	-0.0956 (-0.79)	0.015
T(48,27)	0.0395 (-0.04)	0.174	-0.0150 (-0.39)	0.000
T(49,27)	-0.0403 (-0.55)	0.134	0.0227 (-0.17)	0.023

TABLE 2--Continued

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(50,27)	-0.0563 (-0.60)	0.078	-0.0098 (-0.37)	0.013
T(51,27)	-0.1053 (-0.90)	-0.027	-0.1292 (-1.05)	-0.116
T(52,27)	0.0635 (0.11)	0.036	0.1397 (0.52)	0.024
T(53,27)	-0.0357 (-0.52)	-0.000	-0.0173 (-0.39)	0.007

* t-Values are given in parentheses below the mean reaidual values.

APPENDIX E

Results for Standard and Poor's Utility Index

APPENDIX E

Table 3

Results for Standard and Poor's Utility Index*

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(1,27)	0.2374 (0.99)	0.237	0.0080 (-0.21)	0.008
T(2,27)	0.0723 (0.21)	0.309	0.1030 (0.36)	0.111
T(3,27)	-0.0009 (-0.24)	0.308	0.1023 (0.33)	0.213
T(4,27)	0.0063 (-0.19)	0.314	-0.0414 (-0.46)	0.172
T(5,27)	-0.0387 (-0.47)	0.275	0.1263 (0.46)	0.298
T(6,27)	-0.0048 (-0.29)	0.270	-0.2255 (-1.56)	0.073
T(7,27)	0.1870 (0.91)	0.457	-0.0593 (-0.60)	0.014
T(8,27)	-0.1359 (-1.10)	0.321	-0.0156 (-0.36)	-0.002
T(9,27)	0.0465 (0.05)	0.368	-0.2376 (-1.61)	-0.240
T(10,27)	0.1351 (0.57)	0.503	0.1576 (0.62)	-0.082

TABLE 3--Continued

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(11,27)	-0.1054 (-0.87)	0.398	-0.1171 (-0.86)	-0.199
T(12,27)	0.0698 (0.20)	0.468	-0.0324 (-0.43)	-0.231
T(13,27)	0.0590 (0.13)	0.527	0.0195 (-0.15)	-0.211
T(14,27)	-0.0430 (-0.53)	0.484	-0.1490 (-1.07)	-0.360
T(15,27)	-0.0431 (-0.54)	0.441	0.0446 (0.01)	-0.315
T(16,27)	-0.0576 (-0.62)	0.383	0.1778 (0.76)	-0.127
T(17,27)	0.1173 (0.51)	0.500	-0.0845 (-0.74)	-0.221
T(18,27)	0.0765 (0.24)	0.577	-0.0581 (-0.56)	-0.279
T(19,27)	0.0212 (-0.09)	0.598	-0.0957 (-0.86)	-0.375
T(20,27)	0.1673 (0.54)	0.765	-0.0684 (-0.64)	-0.443
T(21,27)	-0.0688 (-0.70)	0.696	-0.0239 (-0.39)	-0.467
T(22,27)	-0.1033 (-0.92)	0.593	-0.0234 (-0.39)	-0.490
T(23,27)	-0.1467 (-1.17)	0.446	-0.0616 (-0.59)	-0.552

TABLE 3--Continued

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(24,27)	0.0230 (-0.11)	0.469	0.0513 (0.04)	-0.501
T(25,27)	0.0641 (0.16)	0.533	0.0622 (0.11)	-0.439
T(26,27)	0.0939 (0.32)	0.627	-0.0592 (-0.55)	-0.498
T(27,27)	0.0396 (0.00)	0.667	0.0437 (0.00)	-0.454
T(28,27)	0.0434 (-0.54)	0.624	0.1483 (0.56)	-0.306
T(29,27)	0.0304 (-0.06)	0.654	0.1119 (0.39)	-0.194
T(30,27)	-0.0433 (-0.53)	0.611	-0.1052 (-0.84)	-0.299
T(31,27)	-0.0689 (-0.74)	0.542	-0.1790 (-1.22)	-0.478
T(32,27)	0.0184 (-0.14)	0.560	-0.1270 (-0.99)	-0.605
T(33,27)	-0.0872 (-0.83)	0.473	0.1389 (0.54)	-0.466
T(34,27)	0.1634 (0.81)	0.636	-0.1642 (-1.16)	-0.630
T(35,27)	0.0429 (0.02)	0.679	0.1453 (0.59)	-0.485
T(36,27)	-0.0937 (-0.84)	0.585	0.0370 (-0.04)	-0.448

TABLE 3--Continued

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(37,27)	0.0635 (0.16	0.648	-0.0406 (-0.51)	-0.489
T(38,27)	-0.0153 (-0.36)	0.633	-0.0676 (-0.69)	-0.557
T(39,27)	0.0152 (-0.15)	0.646	0.1067 (0.39)	-0.450
T(40,27)	-0.1073 (-0.99)	0.539	0.0074 (-0.22)	-0.443
T(41,27)	-0.1432 (-1.24)	0.396	-0.0657 (-0.61)	-0.509
T(42,27)	0.0385 (-0.01)	0.434	-0.0066 (0.29)	-0.516
T(43,27)	-0.0678 (-0.68)	0.366	0.0947 (0.29)	-0.421
T(44,27)	-0.0457 (-0.50)	0.320	0.2556 (1.25)	-0.165
T(45,27)	-0.1776 (-1.46_	0.142	0.0470 (0.02)	-0.118
T(46,27)	0.0142 (-0.17)	0.156	0.2854 (1.40)	0.167
T(47,27)	-0.0134 (-0.35)	0.143	-0.1165 (-0.84)	0.051
T(48,27)	0.0377 (-0.01)	0.523	-0.0199 (-0.36)	0.031
T(49,27)	-0.0641 (-0.67)	0.459	0.0134 (-0.17)	0.044
T(50,27)	-0.0882 (-0.77)	0.371	0.0038 (-0.23)	0.048

TABLE 3--Continued

Days	Filing		Decision	
	Mean Residual and t-Values	Cumulative Mean Residual Values	Mean Residual and t-Values	Cumulative Mean Residual Values
T(51,27)	-0.0637 (-0.63)	0.307	-0.1801 (-1.26)	-0.132
T(52,27)	0.0670 (0.17)	0.374	0.1467 (0.62)	0.015
T(53,27)	-0.0367 (-0.49)	0.337	-0.0134 (-0.31)	0.002

* t-Values are given in parentheses below the mean residual values.

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He entered the graduate school at Youngstown State University in September 1974, and received the Master of Business Administration degree in March 1977, with a major in Accounting/Finance.