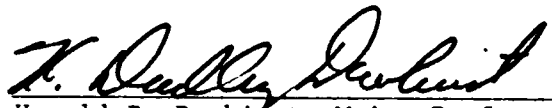


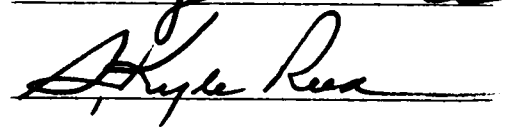
To the Graduate Council:

I am submitting herewith a dissertation written by Michael H. Lubatkin entitled "A Market Model Analysis of Diversification Strategies and Administrative Experience on the Performance of Merging Firms." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Business Administration.

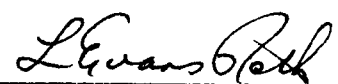

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We have read this dissertation
and recommend its acceptance:

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Vice Chancellor
Graduate Studies and Research

A MARKET MODEL ANALYSIS OF DIVERSIFICATION STRATEGIES AND
ADMINISTRATIVE EXPERIENCE ON THE PERFORMANCE
ON MERGING FIRMS

A Dissertation
Presented for the
Doctor of Business Administration
Degree
The University of Tennessee, Knoxville

Michael H. Lubatkin

August 1982

3063264

DEDICATION

I dedicate this research effort to my family.

To my wife, Christa, who kept my life in balance during the maniac-depressive times that came with writing this dissertation (I love you, Frau Doctor).

To my boy, Justin, who knew when not to bother Daddy.

To my girl, Eleah, who came unexpectedly during my comprehensive exam week and didn't know when not to bother Daddy.

To my parents, Abraham and Rose, who gave all us Lubatkins the best start possible.

To my sister, Marsha, and my brother-in-law, Rob, who encouraged me to start the process that culminated with me writing this dedication page.

To my brother, Howard, and my sister-in-law, Ann, who kept my spirits high through all my past careers.

To my mother-in-law, Trudy, who was always willing to help.

To me, because when all is said and done, without me this dissertation would never have gotten written.

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ABSTRACT

The purpose of this study has been to re-investigate empirically the market for acquisitions to determine if mergers can be justified from the viewpoint of the stockholders of the acquiring firms. This question was investigated from a new perspective--one obtained by integrating the literature on merger from the fields of finance, strategic management, and industrial organizations. The act of merging was viewed as a heterogeneous phenomena. Two taxonomies were developed. The intent of one taxonomy was to form portfolios of mergers homogeneous to the strategic fit of the acquiring and acquired firm; the intent of the other taxonomy was to form portfolios of mergers homogeneous to the amount of experience the acquiring firms have in the administrative task of consolidating organizations. Two basic hypotheses were tested using performance measures developed from the capital asset pricing model. Samples of acquiring firms were selected from the Federal Trade Commission's listing of major mergers over the years 1948 through 1979. The first hypothesis tested predicted a relationship between the strategic fit of the acquiring and acquired firms and the performance of the acquiring firm as a result of merging. The second hypothesis predicted a relationship between the experience level of the acquiring firm in consolidating firms and the performance of the acquiring firm as a result of merging.

The findings suggest that mergers can be justified from the viewpoint of the stockholders of the acquiring firms. The acquiring firms, on average, exhibited abnormal returns of greater than 8 percent

during the twenty-two months preceding the merger. When the overall samples of mergers were broken down into four subsamples, homogeneous to strategic fit, differences across merger types were noticed, indicating that a relationship does exist between the strategic fit of the acquiring and acquired firms and the performance of the acquiring firm as a result of merger. The actual ranking of merger strategies by performance, however, defies current strategic management theory on diversification strategies in general and on mergers in specific. In particular, vertical mergers and conglomerate mergers appear to outperform horizontal and concentric mergers. No strong relationship was found between administrative experience and performance.

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GLOSSARY

1. Alpha (α)--The intercept of the characteristic line, estimated by regressing over time the firm's excess returns and the market's excess returns. Alpha is believed to be a measure of the security's inferior or superior performance over time.
2. Average Abnormal Returns (AR)--An equally weighted average of abnormal returns for a portfolio of merging firms computed for each month relative to the merger event.
3. Beta (β)--The slope of the characteristic line, estimated by regressing over time the firm's excess returns and the market's excess returns. Beta depicts the sensitivity of the firm's security to changes in the market portfolio.
4. Clean-Data--Performance measures calculated for a merger by the CAPM that are believed to be free from the contaminating influences of other mergers.
5. Cumulative Average Residuals (CAR)--The sum of the average residuals (AR) over a specified period of time.
6. Efficient Markets--The future benefits of all new information is incorporated instantaneously into a security's stock price.
7. Financial-Constrained (FC) Mergers--Neither a buyer-seller relationship nor a functional relationship in distribution or manufacturing exists between the acquiring and acquired firms.
8. Firm-Adjusted--The correction for possible firm-effect dependencies existing between the residuals of two or more mergers in the sample.

9. Paired-Difference--A performance measure which examines the change in performance of the acquiring firm due to merger.
10. Perfectly Competitive Acquisition Market--A market that recognizes prior to the time of the merger the soon-to-be acquired firm's unique resources and bid up its stock price until all of the gain of the merger goes to the stockholders of the acquired firm.
11. Product/Market Constrained (PMC) Mergers--Either the combining companies have products that are identical and in the same markets or the companies have identical products but sell them in different markets.
12. Product/Market-Related (PMR) Mergers--The combining companies have products which are not identical nor do the products sell to the same markets. However, the products are functionally related in terms of product technologies and/or are functionally related in terms of distribution technologies.
13. Residuals--The excess monthly performance of the firm not explained by the market portfolio.
14. Time-Adjusted--The correction for possible time-effect dependencies existing between the residuals of two or more mergers in the sample.
15. Trough--The point in which the merger begins to influence returns, as determined visually by the plot of the CAR's.
16. Unadjusted--No dependencies are believed to exist between the residuals of two or more mergers in the sample.
17. Vertical-Constrained (VC) Mergers--Combining companies which could, or did have, a buyer-seller relationship.

CHAPTER I

INTRODUCTION

A. THE PRESENT STUDY AS RELATED TO RESEARCH ON MERGERS

"Can mergers be justified from the point of view of the stockholders of the acquiring firms?"¹ Studies from the fields of finance and strategic management have both examined this question, but have come to very different conclusions.

In the area of finance, most researchers indicate that the stockholders of acquiring firms do not benefit from merging.² They attribute this to the fact that the acquisitions market is perfect. According to the perfectly competitive acquisitions market hypothesis (Mandelker, 1973), competition will equate the expected rates of returns on assets of similar risk. Therefore, there is no monopoly source of gain due solely to merging as a way of obtaining productive capacity. The market place will recognize prior to the time of the merger the soon to be acquired firm's unique resources and bid up its stock price until all of the gain of the merger goes to the stockholders of the acquired firm. If the perfectly competitive acquisitions market hypothesis is true, then a firm should be indifferent between the choices of growth through various merger strategies and through internal means. Studies supporting this hypothesis

¹There is a general consensus that the principal goal of a firm should be the maximization of stockholders' wealth.

²These studies will be reviewed in Chapter II.

treated all mergers as equal, and thus did not consider the possible impact of strategy on the returns to stockholders of the acquiring firms.

In contrast, studies on merger completed in the area of strategic management have considered the impact of strategy. Merger represents one of the two means a firm has to change its strategic profile. The other is through internal means. Certain strategies are found to consistently lead to higher performance than others. The studies in strategic management that dealt specifically with the content of merger strategies, however, are conceptually based and lack empirical verification.

The purpose of the current research is to re-examine the market for acquisitions to answer the basic question, "Can mergers be justified from the acquiring firms' stockholders' point of view?" The study proposes to investigate this question from a new perspective; a perspective obtained by integrating the literature on merger from the fields of finance and strategic management and industrial organizations. Merging will be viewed as an act of strategy. As such, management has more options available than simply to merge or not to merge. If the option to merge is selected, management can choose from a variety of merger strategies. Just as strategic management studies have shown that certain strategies are more effective in improving the performance of a firm than other types, it is presumed by this study that certain merger strategies should out perform other types of merger strategies.³ The assumption is made that each acquiring firm

³For a definition of the construct of merger strategy, refer to Appendix I.

has a unique synergistic relationship with the acquired firm.⁴ If this is true, the acquisition market may not be perfectly competitive because no two or more potential acquiring firms will be competing for identical potential synergistic gains. The criteria to be employed in evaluating performance will be a market-based, risk-adjusted rate of return measure as developed in the capital asset pricing model (CAPM) literature.

Two taxonomies of merger strategies will be developed and investigated. One will use the "strategic fit" of the acquiring and the acquired firm as a means for assessing the acquiring firm's strategy.⁵ The FTC's classification of five merger types can be used as a proxy for defining the strategic fit. The second taxonomy will categorize merger strategies in terms of the frequency in which the acquiring firm participates in the external acquisitions market.

There is some justification found in the literature of finance for developing a taxonomy to categorize mergers into subgroups according to the strategic fit achieved. Mandelker (1973) states, "It is possible that each one of these hypotheses (i.e., efficient and perfect acquisition market hypotheses) may be relevant for different subsamples of mergers" (p. 61).⁶ Melicher and Nielsen (1977-78) attempted to

⁴Synergy occurs when two operating units can be run more efficiently (i.e., with a lower average cost curve) and/or effectively together than they could be run operating independently.

⁵Thompson and Strictland (1981) define "strategic fit" as a measure of synergy that comes from engaging in activities that have a unifying feature. Such a fit should have a positive impact on the firm's overall effectiveness and efficiency.

⁶These two hypotheses will be described in Chapter II.

examine a diverse sample of 116 mergers by breaking the sample down into more homogeneous merger subsamples. These included mergers involving the extension of product lines, mergers involving acquiring firms with diversification objectives, and mergers involving acquiring firms that became conglomerates.⁷ They concluded that the premium payment explanatory results are substantially improved when the mergers are examined on the basis of somewhat more homogeneous subgroups. Pashley (1980) in an unpublished paper suggests that stratifying a sample of mergers by type is attractive because it might lead to a different set of conclusions for each type of merger. Finally, Langetieg, Haugen, and Wichern (1980) subaggregated their total sample of 149 mergers into five types of mergers, based on the Federal Trade Commission (FTC) classification of each. However, they did not analyze the results of their study by type. They state that, "subaggregation with respect to characteristics such as industry or type of merger needs further theoretical justification" (p. 706). They conclude that "further research is warranted with respect to the examination of additional explanatory variables" (for example, "type") (p. 709).

The literature from the field of strategic management, as it will be shown, provides the theoretical justification to examine mergers by type. This justification can be found by reviewing the

⁷Originally, five subgroups were intended, each representing one of the five types of mergers as defined by the FTC. However, only the product extension subgroup had a sample size large enough to analyze separately.

topics dealing with the content of effective strategies and the content of effective merger strategies.

Probably the most comprehensive study on the content of effective strategies is Rumelt's research of the strategies followed by 249 of Fortune's 500 companies in 1949, 1959, and 1969 (1974). Building on Wrigley's work (1970), Rumelt identified nine types of strategies. They are single business firms, dominant-vertical firms, dominant-constrained firms, dominant-linked firms, dominant-unrelated firms, related-constrained firms, related-linked firms, acquisitive conglomerate firms, and unrelated-passive firms. He concluded that the best performers are firms which follow related strategies; i.e., firms with some product-market diversification, but with all activities related to some central skill. Vertically integrated firms and firms in unrelated activities were the lowest performers, while single product firms, firms with weakly related businesses, and acquisitive conglomerates were in the middle. Though Rumelt did not specifically study mergers, the strategy concept as he developed it might prove useful in defining types of mergers for the purpose of evaluating the effect mergers have on the performance of the acquiring firm.

Others in the field of strategic management address the issue of the content of successful merger strategies. For example, Salter and Weinhold (1978) state, "The most significant benefits to stockholders occur in related diversification when special skills and industry knowledge of one merger partner apply to the competitive problems and opportunities facing the other." Rappaport (1979) states, "Acquisition planning begins with a review of corporate objectives and product-market strategies for various strategic



business units. Companies should define their potential direction for corporate growth and diversification in terms of corporate strengths and weaknesses and the external environment." Ellis and Pekar (1978) suggest that firms "know what you do well first, and then try to exploit it." Levitt (1975) states, "Diversify sensibly into sound, related activities with cognisant technologies, understandable markets and comfortable management."

The discussion above should be sufficient to illustrate the point that effective strategies, a subset of which are effective merger strategies, are based on a framework of matching a firm's strengths with opportunities it faces in the external environment. Synergies should occur when a firm's strengths relate well to the abilities required by the new situation to compete successfully. The better the strategic fit between the acquiring firm, the better should be the performance of the acquiring firm.

Kitching (1967) developed a taxonomy of merger types, categorized according to the fit between the acquiring and acquired firms, and then rank ordered according to the amount of synergy hypothesized would be attained from each merger type. Howell (1970) also developed a taxonomy of merger types, ordered on the predicted synergistic benefits of each type. Neither study was empirically tested using actual performance data.

The ranking of merger types by the predicted benefits accruing to the stockholders of the acquiring firm is based on the assumption that the potential synergies of each merger type are realized. As Howell and Kitching observed, to release these synergies, varying

degrees of consolidation of functions between the two merged firms is necessary. The higher the potential payoff, the greater is the amount of consolidation required. Consolidation, however, tends to be resisted by the existing managerial hierarchies of the two merged firms (Kitcing, 1967; Howell, 1970; Pitts, 1974). In other words, administrative problems may prevent merger types from realizing their full potential.

As was discussed by Kitcing, these problems need not occur. The key to successful mergers may be "superior management"; that is, management that know how to consolidate firms successfully. An obvious problem with any empirically based study on mergers is accounting for this intervening factor. To truly consider this factor, reliable measures would have to be developed that could rank management on their ability to consolidate firms. If such measures could be developed, the study would still be hampered by data availability. It is most unlikely that a sufficient number of firms would have management teams willing to be tested on this measure so that meaningful statistical results could be obtained.

This study proposes an alternative means for accounting for this factor. The assumption is made that management learns by experience. In other words, superior management can be developed through the act of merging. This idea is an extension of Chandler's thesis. In his book, Strategy and Structure (1962), he states that, "changes in a firm's strategy results from an awareness of the opportunities and needs to employ existing or expanding resources more profitably. The new strategy brings about new administrative problems which are

noticed as effectiveness drops. These problems are solved by refashioning the structure." Relating Chandler's statement to the current study, merging represents an act of strategy. This strategy, if it is new to the firm, brings about administrative problems. These problems are eventually noticed and solutions for them are eventually found; i.e., management learns how to consolidate two structures into a new, effective structure.⁸ With each succeeding merger, management should become more adept at finding the necessary structure and at avoiding the administrative problems that have a negative influence on performance. In other words, as management becomes more familiar with the strategic act of merging, the performance of the firm should more closely reflect the full potential synergies theoretically possible between the merging firms. The basic assumption expressed above relates well to learning theories in general and to theories more germane to management such as "learning curve" theory described in basic operations management textbooks and the Boston Consulting Group's "experience curve."⁹

⁸The point might be raised that structural changes within the organization might be tacit proof that management is acting "superior." Studies by Chandler, Scott (1963), Wrigley (1970), Rumelt (1979), and others have examined the relationship between strategy and structure. However, it is felt by this researcher that the adjustments made by management to deal effectively with consolidation may be too subtle to detect given the limitations of data availability. Furthermore, each type of merger may require a unique adjustment given the particular demands each merger places on the organization and the fit between those requirements and the current organizational structure of the firm. The current taxonomies of organizational structure are believed to be too broad to assess these organizational changes and therefore would not be able to reliably evaluate the superiority of management.

⁹See page 33 for further explanation of the Experience Curve.

A second taxonomy of merger strategies is therefore developed which will categorize acquiring firms in terms of how active they are in the merger market. It is hypothesized that the benefits resulting from mergers increase as a firm participates in mergers frequently enough as to allow its management to gain the necessary experience to learn how to effectively consolidate two firms.

A review of finance literature on this subject shows that this factor is either overlooked or systematically avoided. The main reason that this has occurred is that the capital asset pricing model, as it is developed, places a methodological restriction on the sample of mergers that are acceptable to study. This point will be discussed in more detail in Chapter II.

There is evidence in the finance literature, admittedly scarce, to justify the hypothesis that the frequency of merger activity on the part of a firm can effect the returns realized by merging.¹⁰ By examining the results of the major studies that used the CAPM a trend can be detected. This trend tentatively points out that as the screening criteria for selecting firms on the basis of "clean data" is made less stringent, the results indicate higher returns to the stockholders of acquiring firms. "Clean data" refers to the data, which measures the performance of one and only one merger and therefore is not by definition contaminated by the influence of other major mergers. A major merger is one involving an acquired firm that is

¹⁰ All the studies referred to are discussed in greater detail in Chapter II.

large enough to be listed on the New York Stock Exchange and/or has assets with a book value of at least \$10 million.

Mandelker (1973, 1974) found that during the 18 months immediately prior to the merger, the average acquiring firm yielded abnormal returns of 3.9 percent. His sample was heavily weighted towards very infrequently merging firms.¹¹ Langetieg (1978), using a screening criteria that may have allowed for firms to be included in the sample that merged more frequently than those in Mandelker's sample, found that during the same time period the average acquiring firm yielded abnormal returns of 6.11 percent. Langetieg attributes the difference in the results of the two studies to his refinements in the CAPM. It is possible, however, that the results reflect a systematic difference between the two samples tested with respect to the activity level of the firms selected. An earlier study by Halpern (1974) used even a less stringent screening criteria. Firms, to be included in the sample, had to have clean data for a minimum of only two years; one year before and one year after the date of the merger. Examining the gains received by both the acquiring and acquired firm together, rather than apart, he finds that the total adjusted gain of 9.97 percent over 23 months preceding the merger is shared equally between both firms. His results suggest that mergers can be justified from the stockholders' point of view. Using a similar sampling screen, Elgers and Clark (1980) found that stockholders of the acquiring firm received abnormal returns of 10.2 percent over the same time period. Finally, Ellert (1976)

¹¹ Over half of his sample included firms that merged no more than once every 13-1/4 years.

found abnormal returns for acquiring firms' stockholders of 8.5 percent for twenty-four months preceding the merger. Ellert's sample was not screened for clean data.

A quick review of studies performed during the past decade on merger that do not use the CAPM as a performance measure and are therefore not constrained at all by the requirements of clean data found that the act of merger is a means for firms performing at some sub-average levels to obtain at least average levels of performance (Weston and Mansinghka, 1971; Melicher and Rush, 1974; Lev and Mandelker, 1972).

The evidence as described is hardly strong support for the experience hypothesis, but since this issue has not been carefully examined in the finance literature, it will have to suffice. Combined with the conceptual support coming out of strategic management literature, the hypothesis is well based and deserves further examination. At the very least, an examination of this issue will help resolve the question of whether the results obtained by the studies employing the CAPM are statistical artifacts caused by selecting samples of firms that are systematically biased towards infrequently merging firms. Of course, to test this hypothesis, a methodology will have to be developed to apply the CAPM to more frequently merging firms. This methodology is described in the appropriate section of Chapter III and IV.

The current study will be, to the best of this researcher's knowledge, the first attempt to empirically determine if there is a hierarchial order to mergers in terms of the impact that various

merger strategies have on the performance of the acquiring firm. Such determinations should have a wide appeal. First, it may provide guidelines for management to establish strategies for mergers, for stockholders for evaluating proposed mergers, and for government as it attempts through antitrust to find the proper balance between consolidation and competition. Next, it could help to resolve differences among existing hypotheses. For example, one predicts a relationship between merger strategy and performance, while the perfectly competitive acquisition market hypothesis predicts no such relationship. Additionally, unexpected results may provoke questions which challenge conventional wisdom. Finally, these determinations will be a valuable contribution towards the emerging general theory in the strategic management area.

CHAPTER II

LITERATURE REVIEW

A. Explaining Performance: The Influence of Mergers

Many studies have been made investigating the relationship of mergers to the performance of the acquiring firm. In a 1970 paper that incorporated a survey of past research on mergers, Hogarty concluded:

What can fifty years of research tell us about the profitability of mergers? Undoubtedly the most significant result of this research has been that no one who has undertaken a major empirical study of mergers has concluded that mergers are profitable; i.e., profitable in the sense of being "more profitable" than alternative forms of investment. A host of researchers, working at different points in time and utilizing different analytical techniques and data but one major difference: whether mergers have a neutral or a negative impact on profitability (p. 389).

Studies performed during the 1970's, in general, seem to support the findings of the earlier studies on merger. Mergers appear to earn at best slightly above normal returns for the stockholders of the acquiring firm. This section will review in chronological order the major research on merger in the past decade that used accounting based measures to evaluate the performance of the acquiring firm.¹ The merits of the market based performance measures will then

¹Accounting based performance measures refers to the measures derived from a firm's balance sheet and income statement. Such measures include "return on assets," and "return on equity."

be discussed.² Finally, the major works that use the capital asset pricing model (which uses a risk adjusted market based measure to evaluate the performance of acquiring firms will be reviewed. Table I summarizes these merger studies.

Hogarty (1970) examined the profitability of the acquiring companies' stockholders and compared their results with four profitability indices for their respective industries. Using 43 heavily merging firms as the sample and a time span from two years before the merger up to 1964, he found that acquiring firms performed on average about as well as did their representative industries. There are, however, a number of problems with this study. The sample of firms is small and only three industries are represented. The benchmarks used for all four indices do not allow for a reliable comparison of the firm's performance before and after the merger. Finally, his tests implicitly assume that the risk of a firm is equal to the risk of the industry index he uses.

Weston and Mansinghka (1971) investigated the profitability of conglomerate mergers. Using accounting based performance measures, they compared the performance of conglomerate firms against two control groups, one made up of both industrial and non-manufacturing firms and one of only industrial firms. Conglomerates were defined as firms that have entered into a broad program of diversification achieved primarily through acquisition. Both groups outperformed

²Market based measures are determined by the stock market's evaluation of a firm's performance. "Price/Earnings" ratios and "stock price appreciation" are examples of this type of performance measure.

TABLE I
SUMMARY OF MERGER STUDIES BY CHRONOLOGICAL ORDER

Author(s)/Date	N	Performance Measure	Results
Hogarty (1970)	43	Accounting	Acquiring firm performs as well as the average firm in its industry
Weston & Mansinghka (1971)	63	Accounting	Conglomerate strategies tend to bring a firm's performance up to average performance, but no higher
Lev & Mandelker (1972)	69 77	Accounting Market	Acquiring firms appear more profitable Acquiring and acquired firms gain equally from merger
Melicher & Rush (1974) Mandelker (1973, 1974)	90 241	Accounting Market	Supports Weston & Mansinghka (1971) Acquired firm's stock appreciated 14 percent due to merger; acquiring firm's stock appreciated only 3.9 percent
Haugen & Langetieg (1975) Ellert (1976)	59 772	Market Market	Mergers do not lead to synergistic benefits Acquiring firm's stock appreciated 8.5 percent over 24 month period prior to merger
Mason & Goudzwaard (1976)	22	Accounting	Simulated portfolios selected randomly outperformed conglomerates
Langetieg (1978)	149	Market	Acquired firm's stock appreciates 12.9 percent Acquiring firm's stock appreciates only 6.11 percent
Melicher & Nielson (1978)	116	Accounting	Acquiring firms likely offset any possible P/E gains by paying a premium for firms with relatively lower P/E ratios
Elgers & Clark (1980)	337	Market	Acquiring firm's stock appreciated 7.9 percent due to merger
Langetieg, Haugen, & Wichern (1980)	149	Market	Acquiring firm's risk increases due to merger
Choi (1980)	81	Market	Merger portfolio appreciates 8.7 percent due to operational and financial synergies

the conglomerates in 1958, the initial year of the study. By 1968, however, the performance between the conglomerates and the control groups were not significantly different. The conclusion reached by the researchers is that the conglomerates during the last decade of the study followed a defensive strategy whereby their performance was brought up to par with the profitability of the control sample. The conglomerates were not, however, able to achieve abnormally high returns.

Lev and Mandelker (1972) examined the profitability of mergers from the acquiring firm's point of view. Using a paired sample method that compared a five year average of thirteen financial characteristics of the merged firm with those same characteristics of the acquiring firm before the merger, they concluded that the acquiring firm appears more profitable than its pre-merger counterpart for at least one of the measures, net income to total assets. A weakness in their study, as the authors acknowledge, is that the criteria used for matching were not sufficient and thus elements of bias could be present. In addition, the sample studied was restricted to acquisitions of relatively large firms whose characteristics may differ markedly from the acquiror's. The results, therefore, may lack external validity.

Melicher and Rush (1974) examined certain pre-merger financial characteristics of conglomerate firms as well as the companies they acquired. Only mergers completed during the 1960's were considered. Merger prospectus statements were requested and received from 132 acquiring companies--61 involving conglomerate firms and 71 nonconglomerate firms. They observed that the conglomerates were able to

achieve immediate reductions in their pre-merger leverage ratios by acquiring firms with relatively lower debt ratios. Additionally, conglomerate firms acquired firms characterized by relatively higher levels of operating profitability. However, the firms acquired by conglomerates were no more profitable than firms acquired by non-conglomerates. The above finding was attributable to the "relatively lower" pre-merger operating profit levels for the conglomerate firms. This finding added support to the study by Weston and Mansinghka (1971).

Mason and Goudzwaard (M-G) (1976) compared the performance of 22 conglomerate firms against that of randomly selected portfolio where both groups have similar asset structures. The asset structure of the conglomerates was obtained by a questionnaire sent out to management of conglomerates requesting them to indicate a percent breakdown of their respective firms' assets among SIC classification. M-G found that investors would have earned higher rates of return on the simulated portfolios than on the conglomerates. The performance measure used in the study is earnings before interest and taxes over total assets.

Melicher and Nielson (1977-78) attempted to examine a diverse sample of 116 mergers by breaking the sample down into more homogeneous merger subsamples. These included mergers involving the extension of product lines, mergers involving acquiring firms with diversification objectives, and mergers involving acquiring firms that became conglomerates. Their study explored the extent to which financial data relationships in merger explain the payment of premiums. They found that the acquiring firms paid larger premiums in

mergers where their pre-merger price earnings ratios were higher than those of the firms they were acquiring. These higher premiums, it was surmised, likely offset the relative P/E ratio advantages that allegedly cause an instant increment in earnings per share as described in the literature on the "instantaneous profit motive."³ They also observed that the premium payment explanatory results are substantially improved when the mergers are examined on the basis of somewhat more homogeneous subgroups.

All the finance studies cited above used accounting based measures to evaluate the performance of firms participating in mergers. There are, however, a number of problems associated with using accounting based measures. The main criticisms with these measures are: (1) there is no one measure that reflects the viewpoint of the common shareholder while not having leverage effects imbedded in it (Weston and Mansingha, 1971). The general consensus among those in the field of finance is that the principle goal of the firm should be the maximization of stockholders' wealth (Mandelker, 1973, 1974); (2) accounting based measures ignore the impact of changes in risk with changes in return, yet it is quite possible that shareholders may be no better off with higher returns if the risk burden is also increased (Fama, 1971); (3) accounting based measures cannot be used

³The "instantaneous profit motive" is said to occur when a firm with a high P/E stock is able to fool the investment community into believing that the one-time instant increment in earnings per share that it receives from acquiring a firm with a lower P/E stock represents real growth in earnings. If the market is efficient, then this phenomena will not occur (Lintner, 1971).

to isolate a specific event such as a merger. It may take years before a firm's profitability measures reflect the benefits of a merger (Kitching, 1967), and by that time other firm specific and market specific events will also have influence on these measures.

Perhaps the best measure to date is the Capital Asset Pricing Model (CAPM). Developed in the 1960's by Sharpe (1964), Lintner (1965), Mossin (1966), and Fama (1968, 1971); extended by Black (1972), and tested by Black, Jensen, and Scholes (1972), Miller and Scholes (1972), and Fama and MacBeth (1973), this model recognizes the critical importance of risk. It thus serves as a useful technique for evaluating financial as well as strategic decisions. Prior to the CAPM, performance of an asset was judged simply by comparing ex-post returns over some period of time with the returns by some general market index. Overlooked was whether the returns were commensurate with the level of risk of an asset.

The model distinguishes between an asset's systematic risk, unsystematic risk, and the arithmetic sum of the two known as total risk. Systematic risk, or beta, depicts the sensitivity of the security's returns in excess of the risk free rate to the excess returns of the market portfolio (i.e., excess in the sense of being greater than the risk free rate). It represents the marginal effect the security has on the standard deviation of an efficiently diversified portfolio. A beta of one means that the excess returns for a stock varies proportionately with the excess returns for the market portfolio; a beta greater than one means that the stock has a higher systematic risk than the market as a whole. Whereas systematic risk

cannot be diversified away because it is due to the overall market risk, unsystematic risk can be diversified away. Unsystematic risk is that risk unique to a particular firm.⁴

According to the CAPM, the relevant risk of an individual security is the security's systematic risk. The model implies a linear relationship between the expected return of a security and its unavoidable or systematic risk. This relationship is known as the security market line. The expected return is equal to a riskless rate of interest (the treasury bill rate) plus a risk premium commensurate with the security's systematic risk.

Fundamental to this model is the belief that the capital market acts efficiently; i.e., stock price will adjust instantaneously to new information.⁵ As Mandelker (1973) stated, "If the capital market is efficient with respect to mergers, then any information on a merger should be incorporated instantaneously into the corresponding stock prices." Empirical studies such as those done by Mandelker (1973), Langetieg (1978), and others have generally found strong support for this theory.

The CAPM has a number of simplifying assumptions. To the extent that these assumptions do not hold in the real world, unsystematic risk becomes a factor affecting valuation.⁶ However, a

⁴Markowitz (1959) was one of the first to rigorously show the power of diversification to reduce risks in portfolios of securities without sacrificing expected returns.

⁵Fama (1971) discusses in greater detail the theory of efficient capital markets.

⁶For an overview of the CAPM and its limitations, see Ross (1978).

number of authors have expanded the model by relaxing the major assumptions and have found the theory to be fairly robust even with such relaxations.⁷

Perhaps the most significant criticism of the CAPM is aimed not at its assumptions, but at researchers' inability to properly estimate beta. As was stated earlier, beta is derived by comparing the excess returns of a stock with those for a market portfolio. Roll (1977) points out that there are problems in using any index as a proxy for the overall market portfolio. The "true" market portfolio consists of all assets--stocks, bonds, real estate, and human capital. Even so broad an index as the Standard and Poor's Index of 500 stocks has inherent flaws as a proxy for the entire market. Roll contends that the flaws are so serious that they produce distortions in beta numbers. The reason the S & P index is inefficient is because there are better portfolios that will yield higher returns for less risk. Treynor, editor of Financial Analyst's Journal, states that there are a number of factors, not just a single factor, influencing the overall direction of the stock market. For example, interest rates influence the overall direction of the stock market, but affect different groups of stocks differently. In defense of the CAPM, Langetieg (1978) stated, "until a better theoretically-based performance index is invented, we must tolerate what is available."

A limitation of the model, from the perspective of this study, is that it suggests that the sample of mergers studied have clean

⁷For example, see Jensen (1972) and Rogylski and Tince (1978).

data for a minimum of three years preceding the date of the merger and three years or more following the merger date.⁸ Clean data here refers to data that is not contaminated by the influence of other major mergers, i.e., a merger where the acquired firm is at least large enough to be listed on the New York Stock Exchange. The clean data is needed so that the parameters of the model can be estimated with reasonable confidence to properly study the influence of a single merger on the performance of the merging firms. For example, in the sample of acquiring firms selected in Mandelker's (1973, 1974) study, over half were firms that merged only once in a minimum of a 13-1/4 years period. The remaining 113 firms have clean data for a minimum of seven years. As stated in Langetieg, Haugen, and Wichern (1980), "the use of the screening criteria unavoidably limits the sample to successful mergers between large, infrequently-merging firms" (p. 693).

The first study that applied the CAPM to evaluate the performance of firms participating in mergers was one done by Halpern (1973). He studied the monthly returns of 77 acquiring firms and 78 acquired firms for 23 months preceding a merger. To be included in the sample, firms had to have clean data for a minimum of only two years; one year before and one year after the date of the merger. He concluded that the acquiring and the acquired firm gain equally from the merger. These results clearly contradict earlier studies that suggest that the acquiring firm did not profit by merging. Halpern suggests that both the acquiring and acquired firms have some unique factors, though their

⁸Most recent applications of the model accept this convention.

security prices do not reflect the potential merger gain. This gain is realized only when the two companies formally "fit" together. This idea of each firm having unique factors is based on Lintner's theory of mergers (1971). His theory, referred to by Mandelker (1973) as the "Abnormal Gain" hypothesis, identifies many diverse reasons why mergers are bound to provide abnormal returns to the acquiring firm's stockholders.

Mandelker (1973, 1974) researched the market for acquisitions and the impact of mergers on the returns to the stockholders of the constituent firms. Using the two-factor market model that considers changes in risk in analyzing the impact of mergers on stock price, he found that stockholders of acquiring firms seem to earn normal returns from mergers as from other investment-production activities with commensurate risk levels. Stockholders of acquired firms earn abnormal returns of approximately 14 percent on the average in the seven months preceding the merger. Abnormal returns refer to returns above the competitive rate; the latter being defined by the risk free rate plus a risk premium. The sample used in the study included 241 acquiring firms and 252 acquired firms selected from mergers occurring during a time span of January 1935 through June 1968. The results arrived at are consistent with the hypothesis that the market for acquisitions is perfectly competitive.

Haugen and Langetieg (1975) made an empirical effort directed at determining whether the legal union of two firms produces different risk attributes from those which might otherwise accompany an informal purchase of both companies' shares by the portfolio investor. The

study covers 59 industrial mergers that took place during the period 1951 through 1958. In each case, the two firms participating in merger are matched with two other N. Y. S. E. firms which become part of the control group. The results show little evidence that merger changes or lowers the risk attributes of the distribution of stock returns, and that any stockholder could have obtained the same results in terms of risk and return on his own by combining the shares of the two companies in the appropriate proportions in his portfolio.

Ellert (1976) attempted to determine the effects of antitrust enforcement on the wealth position of the affected stockholders. His sample included 772 mergers listed on the FTC major merger series, 1950-1970, where the acquiring firm is listed on the NYSE. No clean data screening criteria were applied. He found that the average abnormal gain to the acquiring firm's stockholders was 8.5 percent over the twenty-four month period preceding the merger, of which 4.4 represented the gain to stockholders one year prior to the merger. Though not discussed in the body of his paper, Table IV in his paper allows for a descriptive comparison of the performance of single acquisition firms to that of the sample as a whole which contains more frequently merging firms. Apparently, the stockholders of the acquiring firms that participated in only one major merger during the time period under study experienced greater abnormal returns during the twenty-four months preceding the merger than did the total sample over the same time period. Over the full 100 months preceding the merger, however, the single acquisition firms experienced abnormal returns that were less than that experienced by the total sample.

Langetieg (1978) re-examined the magnitude of stockholder gains from merger. The data base used in the study consists of 149 mergers taken from the period 1929 through 1969. The firms included in his sample may have merged more frequently than those in Mandelker's sample. However, his sample does not contain frequently merging firms. Firms were required to have a minimum of six years of clean data. Four alternative market models were employed in combination with a matched non-merging control group. The results, using all four models, supported Mandelker's findings. Langetieg found that the acquiring firm exhibited, on the average excess return that from the most optimistic perspective was only 6.11 percent for the eighteen month period preceding the merger. "Too small," he stated, "to conclude that enhancement of stockholder welfare is the sole motive for merger." The acquired firm achieved an average excess return of 12.9 percent for the same time period.

Langetieg, Haugen, and Wichern (1980) used the same data set as Langetieg (1978) to study changes in risk associated with merger. They find that on the average, merger tends to be associated with an unexpected increase in the levels of systematic, total, and diversifiable risk for the consolidated firm. This result is surprising as merger is rarely viewed as risk-increasing. Their tentative explanation for their findings is that the increasing risk level may reflect an aggressive management in the acquiring firm.

Elgers and Clark (1980) studied 337 New York Stock Exchange buyer firms which participated in major mergers, as defined by the FTC during the period 1957-1975. In addition, to be included in the sample the buyer firm could not have participated in another merger

for a forty-eight month period surrounding the merger date. The acquired firms were found to out-perform a randomly selected equivalent risk portfolio by 7.9 percent over the eighteen months preceding the merger and the gain to the stockholders of the buyer firms were found to be significantly above the normal returns of the market portfolio. Of interest was their finding that conglomerate mergers appear to benefit both the buyer shareholders and the seller shareholders more than non-conglomerate mergers, though the differences were not found to be statistically significant.

Finally, Choi (1980) attempted to measure the merger gains to stockholders of the acquiring and acquired firms. Rather than study the gains of each stockholder group separately, a merger portfolio consisting of a value weighted portfolio common stocks from each group was created. The portfolio approach allowed the gains of both groups to be examined without being influenced by the effect of the acquisition premium payment. The purpose of his study was to determine whether or not mergers produce synergism. Defining synergism as the incremental wealth of shareholders which is generated from the merger, but which cannot be obtained through "homemade diversification," he found that the average merger portfolio yielded merger related gains of 8.7 percent for the eighteen month period preceding the merger. In other words, the two firms are worth more together than apart, affirming the existence of merger synergism. Both operational and financial synergies, due to merger and net of the portfolio related potential gains which individual shareholders could achieve through homemade diversification on the stocks of the two firms, were

found to be present. He concluded that the existence of these synergies could "indicate that no two or more potential acquiring firms may be competing for identical potential synergistic gains" (p. 33). The fact that shareholders of acquiring firms share synergistic gains undermines the perfectly competitive acquisitions market as defined by Mandelker (1973-1974), and is more consistent with Halpern's findings.

B. Conceptual Arguments Justifying Mergers

In theory, a firm will extend its boundaries to include activities that it can do more efficiently by internal controls than by external market transactions (Thompson, 1967). There are basically two options that a firm has to expand. One is through internal means; the other is through merger.

The previous section reviewed the recent studies on merger completed in the field of finance. These studies find that stockholders of acquiring firms do not earn abnormal returns or do not earn abnormal returns that are high enough to conclude that the sole motive of merger is the maximization of stockholders' wealth. Management, on the other hand, appears to be quite enthusiastic about merger. For example, since the first of four merger waves began in this country in 1844, thousands of merger have taken place.

A list of motives have been assembled over the years to explain management's enthusiasm for merging.⁹ Basically, firms should merge

⁹See Litner (1971), Steiner (1974), Lewellen (1971), Gort (1966), for a sample of such lists.

to achieve synergy. There are three fundamental types of synergies that are theoretically possible through merger. They are technical economies, pecuniary economies, and diversification economies. These three types of synergies will be reviewed in this section. Strategic management studies that deal directly with mergers will also be reviewed in this section. These studies order mergers by type according to the amount of predicted synergism.

Reference is made throughout this section to the five types of mergers as classified by the Federal Trade Commission. Horizontal mergers involve two firms with closely related products in the same geographic market. Vertical mergers involve a potential buyer-seller relationship prior to the merger. There are three types of conglomerate mergers. Product extension mergers are when two firms combine that were functionally related in production and/or distribution but sell products that did not directly compete with one another (e.g., a soap and bleach manufacturers). Market extension mergers involve two companies that sell the same product, but they sell them in different geographic markets. Finally, pure conglomerate mergers involve two firms that are essentially unrelated in terms of products and markets.

As this section is read, it is important to keep in mind that though the ideas expressed may appear to justify certain merger activity, the majority of the ideas are conceptual at best and have not been empirically verified.



Technical Economies

Technical economies occur when the physical process inside the firm is altered so that the same amount of inputs, or factors of production, produce a higher quantity of outputs. The firm, by using its resources more efficiently, is able to lower its average cost curve and thus enjoy an advantage over competing firms.

Technical economies relevant to mergers are known as economies of scale. Economies of scale are one form of synergy and occur when average costs decline as volume increases. There are six technical economies associated with merger. They are: (1) marketing economies, (2) production economies, (3) experience economies, (4) scheduling economies, (5) financial management economies, and (6) compensation economies.

Marketing and production economies are the ones most widely mentioned in the literature. They can most easily be realized in horizontal mergers where common manufacturing and marketing technologies are shared. These economies come primarily from the elimination of duplicate facilities, distribution networks, and staff.

Economies are also possible when the abilities and experience of management in one firm easily transfer in a merger situation to the requirements and skills needed by the other firm. This source of economies is known as the "experience curve effect." The Boston Consulting Group (BCG) (1968) first used this term to describe the relationship that they found between the average cost of processing a unit of output and the accumulated experience, measured in total number of units processed, the firm has with that output. Based on an

empirically based study, they found a "consistent pattern of cost decline per unit by a constant percentage of 20 to 30 percent with each doubling of the total number of units produced." Differing from the "learning curve" which related only to labor and capital inputs, the "experience curve" encompasses all costs (capital, administrative, marketing, etc.). The BCG maintain that certain experience bases are at least partially transferable to other businesses where the two businesses share common technologies.

Technical economies may also be realized in vertical mergers. Vertical economies, gained by joining firms at two levels of production are possible if, through combining stages, costs can be reduced through more efficient scheduling and coordination of the stages involved as well as through a reduction in shipping costs. Better utilization of managerial skills may also be a possible source of cost reduction, although not the degree possible through horizontally related mergers (Levitt, 1975).

Howell (1970) suggested two technical economies possible even for conglomerate mergers. One such economy can occur through consolidating the banking relationships of both firms. An acquired company normally brings with it a number of banking relationships. Many such relationships require compensating balances. Straight-forward economies of scale can result, therefore, by combining the number of these relationships and the outstanding cash requirements that may go with them. The benefits from this economy, however, are likely to be small compared to the four economies mentioned previously.

The second economy mentioned by Howell comes from the savings per employee that might result from the consolidation of the two firms compensation plans. Lower rates can often be obtained on group life insurance premiums, pension plans and other fringe benefits when the package covers a larger pool of employees. This saving, however, is likely to have rapidly diminishing returns as a firm grows beyond a certain minimum size and like the economy related to the consolidation of banking relationships, the benefits of this economy is likely to be small compared to the first four economies mentioned.

If technical economies exist, studies should be able to empirically verify them.¹⁰ Such has not occurred. A conclusion that could be reached is that economies of scale are over-rated as a motive for consolidation. There are, however, a number of reasons why this conclusion may not be valid. First, as Shepherd (1979) states, "at the firm level, fewer than ten industries have been reliably estimated more recently than 1960" (p. 258). A sample of ten is hardly sufficient to draw accurate conclusions for the economy at large. In addition, these studies appear to be primarily concerned with production economies, and thus overlooks other sources of economies such as the elimination of duplicate marketing, managerial and financial costs as well as overlooking the experience effect "that is related to size." Finally, the studies are industry specific; the industry being defined by four digit SIC codes. It is quite possible that a corporation may enjoy economies

¹⁰ Examples of these studies include: Bain (1956), Stigler (1958), Pratten (1971), Scherer (1975), and Weiss (1976).

of scale by running two related businesses involved in different SIC classifications. Due to accounting methods employed, these economies may not show up at the very levels examined by these studies; i.e., the firm and the industry levels.

Pecuniary Economies

Pecuniary economies also involve a synergistic advantage to the recipient firm, either through a reduction in the firm's average cost curve or through obtaining a higher rate of return for its output. This gain is achieved by the ability of the firm to dictate prices through exerting market power. This market power is obtained primarily through size. Unlike technical economies where the average cost curve may be lowered due to genuine efficiencies in the physical transformation of inputs, pecuniary economies offer society no such efficiency gains, assuming that these gains are not passed on to the consumer. Rather, pecuniary gains represent merely a transfer of income from the less powerful to the more powerful.

The main source of pecuniary gain comes from a firm's ability to extract excess profits by forcing buyers to accept higher prices (Shepherd, 1979). This behavior is typically associated with monopolists, but is also common with dominant firms, oligopolists and cartels. An obvious example where prices were raised many times above costs is the OPEC cartel.

The second most common source of pecuniary gain comes from a firm's ability to obtain lower prices for its inputs. Input prices for capital, utility services, advertising, and other purchases are

generally lower for large business. For example, the price of capital tends to be lower for larger firms. This fact can be observed in the Survey of Bank Loans, a source put out periodically by the Federal Reserve that categorizes interest rates by the size of the loans and the borrowers. The Federal Power Commission's Utility Rate Schedules shows that electricity may cost on the average at least one-third less to a large user than to a small one. Transport services usually offer a variety of quantity discounts. Discounts to large buyers are common for advertising services.¹¹ Large buyers also tend to obtain easier access to prime time advertising and the more conspicuous pages in print. The large firm may be offered, or secure by exploiting its power, the more desirable shelf space from its retail outlets. There are many other such examples of this type of gain.

Perhaps the fastest way to achieve pecuniary economies is through merging with another firm. Horizontal merger is the most obvious type because it most directly increases a firm's market power through acquiring a firm with which it previously competed within the same market.¹² However, pecuniary economies could be realized also in

¹¹Volume discounts are a common form of price cutting and may contain both pecuniary and technical economies. The supplier may realize technical economies if the buyer's orders, because of the volume, reduces the suppliers unit costs of producing and handling.

¹²After 1920, most dominant firms were informally on notice that any horizontal mergers would instigate antitrust action. The Clayton Act of 1914, however, had a merger loophole that allowed almost any merger. That loophole was closed in 1950 with the Keller-Kefauver Act. This act reached its present strict limits in 1966. Since that time, any horizontal mergers combining over 10 percent of the market will usually be challenged. For details on merger rules, see W. G. Shepherd and Clair Wilcox, Public Policy Toward Business, 6th ed. (Homewood, Ill.: Richard Irwin, 1979), Chapter 6.

mergers where the products and markets are different but related closely enough to share certain common inputs or distribution channels. Vertical mergers may lead to economies if capital barriers for entry are raised or if the availability of inputs on the open market are reduced.¹³ Even pure conglomerate mergers where the products and markets of the two firms are unrelated, can enjoy certain types of pecuniary economies such as the potential for attracting quality managers.

As economists readily admit, evaluating the size of pecuniary gains is a very inexact science. There are no techniques available for measuring the gain. In addition, since size is the source of many of these gains as well as the source of many technical gains, their impact on the performance of firms and industries are difficult to isolate. However, it is generally held that large firms do enjoy a substantial amount of such gains (Shepherd, 1979, Ch. 12) and thus they represent a powerful motive for firms to participate in mergers.

Diversification Economies

A third motive to merge is known as diversification economies. There are two such economies associated with merger. The first is referred to as portfolio management economies. Berg (1965) stated that a corporation has the capacity to engage in long-term projects that can provide a return greater than that which could be achieved by each division if each division operated as a separate unit. Similarly, Williamson (1975) argues that a multidivisional firm has

¹³Vertical merger since 1966 have usually been challenged when approximately 10 percent of the market at both levels are combined.

an advantage of acting as a miniature capital market that possesses informational flows more perfect than the external capital markets. He makes the assumption that the capital markets existing external from a firm are somewhat inefficient due to uncertainty, differentially distributed information, opportunism, etc. It is quite possible, therefore, that a diversified firm can allocate its resources more efficiently internally than it could in the external, capital markets.

The Boston Consulting Group (1971) describes conceptually a strategy for managing a multi-product firm's portfolio in order to take advantage of the diversification effect and thereby increase the organization's performance relative to its level of risk. First, in order to deal with diversity, the organization is divided into strategic business units (SBU's) rather than into profit centers. Each SBU represents one product-market relationship. Roles are then assigned on the basis of cash flow potential and market position relative to competitors. The SBU's that requires cash but offer the promise of future profits are called "stars." "Cash cows" are those that can generate surplus cash. The proper portfolio strategy is to find a balance between "stars" and "cows" based on cash flow requirements. "Dogs" are SBU's with low market share and low growth potential. They represent "cash traps" to the firm because they require more cash than they will ever return. The firm should divest itself of "dogs."

A second diversification economy associated with merger is the risk-reduction economy. This economy is based on an application of modern portfolio theory (Markowitz, 1959) and implies that the best possible diversification is achieved by portfolios consisting of

assets that are negatively correlated with respect to earnings; i.e., if earnings from one asset goes down, earnings from another asset will go up. It is not likely to find assets with such a relationship. However, combining two moderately correlated cash flows, the dispersion of the probability distribution of possible cash flows relative to the mean of the distribution, i.e., the riskiness of the firm, is reduced. The stockholders of that firm therefore may benefit.

Theodore Levitt (1975) studied firms whose cash flows from their operations were strongly correlated. These firms, which followed strategies of vertical integration, were penalized by the investment community with P/E ratios that are lower than firms that diversify into related areas. Levitt attributes this occurrence to the fact that the vertically integrated firms are perceived to have greater risk. He observed that in cases where these firms divested their vertical holdings, the market's assessment of the value of the firm increased. Levitt concludes that the benefits that are associated with vertical integration are at best exaggerated.

The main criticism with the management literature on the risk-reduction effect is that it fails to consider what Lewellen (1971) and others refer to as "homemade diversification." Therefore, the diversification strategy as described in the previous examples does not necessarily create value for the stockholders that the stockholders could not create by himself. Homemade diversification refers to the diversification acts that the individual stockholder can make by adjusting his own portfolio by investments. "Unless management has good reason to believe that the transaction can produce a market

value higher than the investor could obtain himself by diversifying his own portfolio, the company should not make the acquisition" (Levy and Sarnat, 1970). Most of the benefits derived from a reduction in unsystematic risk are equally available to the individual investor, and the investor can achieve diversification more cheaply since his transaction costs are considerably lower.

Finance literature on the risk-reduction effect does, however, describe two ways in which the stockholder's wealth can be increased. The two ways are a reduction in expected bankruptcy costs and a greater use of cheaper debt due to the tax structure. Both sources of gains are the result of market imperfections (Van Horne, 1977, p. 221).

Lewellen argues that by combining two relatively uncorrelated cash flows, the probability of default on principal and interest payments on the debt will be reduced. Higgins and Schall (75) have shown that as the riskiness of possible cash flows is reduced, important bankruptcy costs become less important. Lenders perceive this occurrence favorably and will be more willing to lend more and at better terms to the combined firm than they would be willing to lend to the two firms separately (Lewellen, 71, Levy and Sarnat, 1970). If, in a world of taxes, debt funds are "cheaper" than equity funds, borrowing will increase the value of the equity.

It is important to note that the benefits from the risk-reduction effect described above cannot be accomplished by the individual investor through homemade diversification. Only through an actual,

formal merger can the cash flows of the two independent firms be fused and the relative dispersions reduced.¹⁴

The Content of Effective Merger Strategies

The previous section reviewed the three motives cited in the literature that attempt to explain why firms participate in acquisitions. Stockholders' wealth is presumed to increase from the synergistic benefits derived from technical, pecuniary and diversification economies.

Two authors in the field of strategic management rank mergers by type according to the amount of synergy each type is hypothesized to achieve. Kitching (1967) classified mergers into five types. These types are as follows:

1. Horizontal--Same industry as buying company, with approximately the same customers and suppliers.
2. Vertical integration--Major supplier or customer of the buying company and in the same industry.
3. Concentric Marketing--Same customer types as buying company but different technology.
4. Concentric technology--Same technology as buying company but different customer types.
5. Conglomerate--Customers and technology different from those of buying company.

He hypothesized that synergy in mergers should be greatest for horizontal mergers where production facilities are combined. "This is

¹⁴Langetieg, Haugen, Wichern (1980) dispute this claim.

because of the economies of scale that can be achieved as a consequence of longer runs, the increased purchasing power made possible (quantity discounts), the justification of more expensive, more efficient machinery, and the opportunity to close down inefficient lines and transfer production to other factories (p. 921).

Concentric technology should be the next most profitable area for mergers because of the possibilities of sharing R & D know-how. Concentric marketing mergers, where the opportunity to sell two complementary product lines through one distribution channel and with one sales force, should offer the third greatest synergistic potential. Lowest in the ranking are conglomerate mergers. These mergers offer the possibilities of achieving financial synergy.

Kitching's results were based on discussions with top executives of twenty companies which acquired and managed a combined total of 69 companies in the period 1960-1965. The field research was divided into two parts. The first part dealt with top manager's qualitative assessment of the success or failure of the acquisition program, measured against the original strategy. The second part of the interview focused on the financial results actually obtained, compared with the forecasts made before the merger, and on the ease and dollar payoff of the synergy achieved.

The research findings indicate an almost complete reversal in the order of types of mergers in terms of their synergistic potential. Financial synergy seemed to produce the biggest dollar payoff after acquisition. Marketing synergy had the second largest payoff. Production and technological synergy had the least dollar payoff.

The explanation given by management in explaining the surprising order is that although the latter merger types theoretically offer the highest synergistic possibilities, these synergies are often the most difficult to be realized. This is because before these synergies can be released, a considerable amount of consolidation must occur between the acquired and acquiring firms. This consolidation tends to be resisted by the existing managerial hierarchies. Only the firms with superior management, i.e., management that plan out ahead of time how to implement the changes necessary to consolidate successfully, enjoy the larger payoffs that come with realizing technological and concentric mergers.

There are a number of methodological problems with Kitching's study. It is based primarily on a survey of executive opinion rather than on actual performance data. Possible changes in risk as a result of merger were not considered. The sample size of twenty-two firms may be too small to generalize the results. Because almost 50 percent of the mergers observed were classified as conglomerate, the analysis on the remaining categories may lack the necessary statistical power. Kitching's ranking is based almost entirely on the synergistic benefits derived from technical economies. Diversification economies were alluded to but not well elaborated. Pecuniary economies were not at all considered. Finally, as Kitching admits, the time period studied may be too short to evaluate the merger types that were hypothesized as offering the highest synergistic benefits. The sample deals with companies acquired two to seven years ago. "It probably takes longer to effect production economies than any other type" (p. 94).

Howell (1970) also developed a classification scheme for mergers. He identifies three types of mergers, generated from functional business dimensions. They are as follows:

1. Financial--Neither the market served nor the manufacturing of products by the acquiring company relate to those of parent company.
2. Marketing--The market served by the acquired company does relate to those of the parent company but the manufacturing of products does not relate.
3. Manufacturing--The manufacturing of the products between the acquired and acquiring company does relate, and the market served may or may not relate.

Howell developed this scheme partly because he was dissatisfied with the FTC classification. He felt that there is little distinction between horizontal and market extension acquisitions, given the ever increasing ease of expanding one's market limits beyond existing boundaries. He also felt that there is much difference between product extension acquisitions based on distribution similarities and those based on production similarities. Finally, classifying mergers from functional business dimensions provides a conceptual scheme that aids management in integrating two firms.

Of interest also to the current study is Howell's observation that "the benefits derived from a given acquisition appear to be cumulative." Financial mergers produce only financial synergies which are derived by integrating two independent financial systems. Marketing mergers theoretically produce both the synergies derived from

integrating two marketing organizations as well as financial synergies. Manufacturing mergers are capable of producing all three types of synergies.

The fact that these benefits are cumulative does not guarantee that, say, a manufacturing merger will reap the highest rewards. Howell observes that "the benefits that offer the greatest potential are usually the ones least likely to be implemented" (p. 176). This is because the greatest barrier to integrating two organizations is the flexibility of the management. Significant administrative changes are necessary to realize the operating benefits of marketing and manufacturing mergers. This is why these benefits are slow in coming and why the most commonly achieved benefits are those coming from financial mergers where the least amount of administrative changes are required to integrate the two organizations.

Howell's functional classification of mergers and his hypothesis that merger benefits are cumulative by type are strong conceptual contributions to the literature on mergers. They are, however, based only on observation and not on empirical evidence and thus remain untested. Similar to Kitching's ranking, Howell's ranking of merger types are based almost exclusively on technical economies.

C. An Attempt at Integrating the Empirical and Conceptual Merger Studies

Do mergers benefit the stockholders of the acquiring firm? The empirical and conceptual literature reviewed up to this point support opposite points of view. In an attempt to reconcile the differences

between these two opinions, two cases are presented and explained.

Case One: Mergers Do Not Provide Real Benefits

Perhaps the stockholders of the acquiring firm will, on average, derive returns from mergers that are commensurate with other investment-production activities of similar risk. This may be due to the fact that the market for acquisitions is perfect. Alternatively, it may be due to the fact of antitrust. Antitrust is the generic name for laws, agencies, and actions to promote competition. In 1950, the Celler-Kefauver Act amended Section 7 of the 1914 Clayton Act to prevent anti-competitive mergers. Reaching its present strict limits in 1968, this act is likely to challenge mergers which combine over 10 percent of the market either horizontally or vertically.¹⁵ It is possible, therefore, that antitrust prevents the very merger that could increase stockholders wealth, leaving acquisition minded firms with a less desirable sample of candidates to select from.

If the above scenario is true, why does merger continue to be a popular alternative to internal change? Two possible explanations are as follows.

1. Managers make mistakes. Selecting the proper merger candidate and the proper price may be more an art than a science. The management of the acquiring firm must consider the potential contribution of each entity in the merger to the rate of future

¹⁵ During 1982, the "10 percent rule" was once again amended.

earnings growth of the surviving firm after accounting for risk. To arrive at this figure, quantitative factors such as past earning trends, risk, and the amount of liquidity being purchased must be considered as well as qualitative factors such as the degree to which the capabilities of the merging firm complement each other. Various capital budgeting methods can then be applied to these factors. These can include average-rate-return, payback and discounted cash-flow methods. Van Horne (1980) states, "the capital budgeting methods can only approximate the true value of investment proposal to a firm. The meaningfulness of the values calculated are only as good as the cash flow estimates and the required rate of return employed." Clearly, there appears to be ample opportunity for management to make mistakes.

2. Managers may seek to maximize their own wealth at the expense of stockholders' wealth. In large, publicly held firms a conflict of interest may exist between the stockholders who own the firm and the managers who run it.¹⁶ Mueller (1969) suggested that:

Management salaries, bonuses, stock options, and promotions all tend to be more closely related to the size of the changes in size of the firm than to its profits. Similarly, the prestige and power which managers derive from their occupations are directly related to the size and growth of the company and not to its profitability (p. 644).

Though the management welfare goal has been used by Mandelker (1973, 1974), Langetieg, Haugen, and Wichern (1980), Choi (1980) and

¹⁶This conflict of interest was first identified by Berle and Means (1932), and later further detailed by Gordon (1945), Baumol (1962), Penrose (1959), Reid (1968), and Elliot (1972).

others to explain the apparent discrepancy between low merger returns and high merger activity, there remains a lack of general agreement regarding what goals are actually pursued by large, publicly held corporations. Studies by Lewellen (1971) and Mason (1979) have found that stock dividends, capital gains, and bonuses which top executives receive are, on the average, three times as large as their straight salary rewards. Thus, a manager's own personal condition may be more closely aligned with ownership than it might seem.

Case Two: Mergers Do Provide Real Benefits

Perhaps the stockholders of the acquiring firm do derive real benefits from merger, as the conceptual literature suggests. There are three possible reasons why these benefits have not been detected by the empirically based studies. They are as follows:

1. There are administrative problems that may accompany merger and cancel out the benefits of merger. Many administrative problems may occur when two firms merge. The differences in managerial styles and control systems, the ever present threat of layoffs that comes with consolidation of departments, the initial inequities in compensation, the authority superimposed on the acquired company, the increase in size and perhaps market power of the acquiring company--all these administrative factors and more may bring about inefficiencies that greatly lessen the possible benefits of merger. In some cases, the performance of the new, merged firm may be even less than what it was in pre-merger times.

There is no practical method for measuring these inefficiencies. To measure "inefficient," "efficient" must first be measured and there is no commonly acceptable measure for "efficient."¹⁷ However, these inefficiencies appear to be a common problem, though some firms apparently are able to avoid them.¹⁸

2. Methodological problems have prevented the empirically based studies from detecting the benefits. The studies using accounting based performance measures to evaluate the benefits of merger and the studies that use market based performance measures both suffer from a possible methodological problems. The problems for each were discussed earlier.

3. Only certain types of merger strategies benefit the stockholders of the acquiring firm. This is the focus of the current research; to categorize mergers in terms of the strategies that they represent and then empirically determine if the market place rewards differently the stockholders of acquiring firms by the merger strategy employed. An assumption is made that because of differences in acquiring firms' capabilities, merger candidates should be more valuable to some firms than to others. Yet, in previous empirically based merger

¹⁷One definition is "average" possible costs under normal conditions of human effort. Another is strict minimum costs under the severest levels of effort. Still another is the level of cost under "superior" management and effort. Each definition gives widely different cost levels and none of the three can be defined precisely.

¹⁸Kitching (1967), Howell (1970), and Pitts (1976) discuss administration problems that result from merger and suggest ways to avoid them.

studies, no attempt was made to stratify the sample in terms of the strategies employed in acquiring firms. Rather, those studies viewed merger as a homogeneous phenomenon.

CHAPTER III

HYPOTHESES AND METHODOLOGY

A. Hypotheses

The main purpose of this study is to discover if certain types of merger strategies consistently lead to higher rates of return for stockholders of acquiring firms than do other types of merger strategies. The research reviewed in the fields of finance, strategic management, and industrial organizations provides the justification for subaggregating mergers by the strategies of the acquiring firm. Two taxonomies of merger strategies will be developed; one pertaining to the type of diversification strategy pursued by the acquiring firm in merging as is defined by the strategic fit of the acquiring and acquired firms, and one defined by the activity level of the acquiring firm in the acquisition market. The hypotheses to be tested are as follows:

Hypothesis I--A relationship is predicted between the strategic fit of the acquiring and acquired firms and the performance of the acquiring firms.

Hypothesis II--A relationship is predicted between the administrative experience of the acquiring firm in consolidating firms and the performance of the acquiring firms.

Related to hypothesis I is a sub-hypothesis Ia which predicts a rank ordering of merger strategies as defined by strategic fit by the acquiring firm's performance. The theoretical development of hypothesis I and its related sub-hypothesis and the theoretical development of

Hypothesis II are described in the following two sections.

Hypothesis I and Hypothesis Ia: Type Analysis

For the purpose of this study, merger strategies will first be classified into four basic strategic fits. These are as follows:

1. Financial-Constrained (FC)--neither a buyer-seller relationship nor a functional relationship in distribution or manufacturing exists between the acquiring and the acquired firms (i.e., a "pure" conglomerate merger according to the FTC).

2. Product/Market-Constrained (PAC)--either the combining companies have products that are identical and in the same markets (i.e., the FTC's horizontal mergers) or the companies have identical products but sell them in different markets (i.e., the FTC's market extension mergers).¹

3. Product/Market-Related (PMR)--the combining companies have products which are not identical nor do the products sell to the same markets. However, the products are functionally related in terms of production technologies and/or are functionally related in terms of distribution technologies (i.e., the FTC's product extension mergers).

4. Vertical-Constrained (VC)--combining companies which could, or did have, a buyer-seller relationship.

¹ Borrowed from Howell (1970) is the rationale for combining the FTC categories of horizontal and market extension merger types into a single category called market constrained. As stated earlier, there is little distinction between the two, given the ever increasing ease of expanding one's market limits beyond existing boundaries.

Using the above taxonomy of mergers, it is hypothesized that product/market-related mergers will, on the average, provide the stockholders of the acquiring firms with returns higher than the other three merger types. Product/market-constrained mergers will, on the average, outperform financial-constrained mergers. Vertically-constrained mergers will lead to lower performance results than that achieved by the other three. The explanation given that explains how the ranking of merger types was arrived at borrows heavily from the discussion of technical economies, pecuniary economies, and diversification economies as well as from the ideas presented by Rumelt, Kitching, Howell, and others, all of which were discussed in Chapter II.

Looking first at financial-constrained mergers, synergies are possible from the following sources:

1. Technical Economies

- A. Banking economies--obtained by consolidating the number of banking relationships and the outstanding cash requirements that go with them.
- B. Compensation economies--savings realized for group life insurance, pension plans, and other fringe benefits when a larger number of employees are covered.

2. Pecuniary Economies

No pecuniary economies are possible.

3. Diversification Economies

- A. Portfolio management economies--based on cash flow requirements related to resources allocations, each business has a role assigned to it so that the overall

organizational performance can exceed the performance of the sum of its business units if each operated independently.

- B. Risk reduction economies---due to combining uncorrelated cash flows, the risk of the firm, relative to its returns, may be reduced, thereby lowering the importance of bankruptcy costs and allowing for the opportunity to borrow greater amounts at lower costs.

Product/market-constrained mergers may enjoy all the synergies that are possible from financial-constrained mergers with the exception of diversification economies. By definition, PMC mergers involve business units sharing the same roles. In addition, the cash flows merged by market constrained mergers will be relatively correlated because they share the same fundamental risk. However, product/market-constrained mergers are able to enjoy other synergies that come from the following new sources:

- 1. Technical Economies

- A. Experience economies---the abilities and experience of management in one firm may transfer to the requirements and skills needed by the other firms, thereby lowering the costs of processing a unit of output.
- B. Marketing and production economies---consolidation of facilities, distribution networks, and staff may lead to redundancies; thus savings can result by their elimination.

2. Pecuniary Economies

- A. Price setters--if a firm, through market-constrained merger becomes a dominant firm or a firm in an oligopoly, it may be able to set its prices above a "competitive rate" for its output, while below a competitive rate for its input. Since 1968, however, it is unlikely that the firms can become large enough through merging to achieve these gains due to the more stringent enforcement of antitrust. Firms that attempt to grow large through this type of merger may face costly court battle when challenged by the FTC.

Product/market-related mergers may enjoy all the synergies that are possible from product/market-constrained mergers plus take advantage of some diversification economies. This is because the cash flows of a PMR merger are likely, by definition, to be less correlated than those of product/market-constrained mergers, though more correlated than those of financial-constrained mergers. Roles may also be assigned to each business to maximize organizational performance.

In addition, product/market-related mergers are less likely to be regulated than are product/market-constrained mergers. Firms that follow product/market related merger strategies, therefore, are more able to achieve the size necessary to enjoy pecuniary economies of price setting as well as the size necessary to enjoy higher amounts of technical economies. Product/market-related mergers may enjoy additional synergies not present in the previous two merger types that come from the following new sources:

1. Technical Economies

- A. Marketing economies--a distribution channel can often be better utilized when more than one product is delivered through it. This is true also for the sales function and the advertising function.
- B. Production economies--full capacity is likely to be attained and maintained when a number of products, all technologically similar, can be produced at the same facility.

Vertical-constrained mergers are predicted to provide fewer potential synergies than the other three types of mergers. It was suggested the vertical-constrained mergers may enjoy certain technical economies if, through combining stages, costs can be reduced through more efficient scheduling and coordination of the stages involved as well as through a reduction in shipping costs and redundant inventory costs. The other technical economies enjoyed by product/market-constrained and related mergers are not likely to be achieved. Pecuniary economies might also be possible if barriers of entry are raised or if the availability of inputs on the open market are reduced. However, such gains are not likely to be achievable since 1968 and the more stringent enforcement of antitrust.

Furthermore, vertical-constrained mergers combine cash flows that are closely correlated. Being highly vulnerable to the same, unsystematic influences, this merger type is not able to enjoy the diversification economies associated with risk reduction. To the

contrary, firms who participate in vertical-constrained mergers should have a high risk-return characteristic compared to firms that participate in the other merger types.

Table II summarizes the synergistic possibilities of the four types of mergers.

Hypothesis II: Experience Analysis

As was stated in Chapter I, the ranking of merger strategies by the predicted returns accruing to the stockholders of the acquiring firm is based on the assumption that potential synergies from each strategic fit are realized. Consolidation of functions between the merging firms are necessary to release these synergies yet the acts of consolidation may lead to administrative problems that can have a negative impact on the merged firm's performance. Borrowing from the ideas of Chandler (1962) and Kitching (1967), the assumption is made that these administrative problems can be minimized as management becomes more familiar with the act of merging. Hypothesis II predicts, therefore, that the returns resulting from merger will increase as a firm follows a strategy of merging frequently enough to allow its management the necessary experience to learn how to effectively consolidate the merging firms. Due to methodological problems and a lack of theoretical justifications, the relationship between merger effectiveness and the activity level of the acquiring firm in the acquisitions market has not been studied in the field of finance. A modification in the CAPM to apply it to more frequently merging firms is described in the methodology section of this chapter.

TABLE II
SUMMARY OF PREDICTED SYNERGISTIC EFFECTS OF THE
FOUR TYPES OF MERGERS

	VC	FC	PMC	PMR
A. Technical Economies				
1. Marketing Economies (A)	1	0	3	4
2. Production Economies (A)	1	0	3	4
3. Experience Economies (B)	1	1	4	4
4. Scheduling Economies (C)	4	0	2	2
5. Banking Economies (D)	4	4	4	4
6. Compensation Economies (E)	4	4	4	4
B. Pecuniary Economies				
Price Setting (C)	2	0	2	4
C. Diversification Economies				
1. Portfolio Management Economies (F)	-1	4	0	3
2. Risk Reduction Economies (G)	-2	4	0	2
Total Score	16	17	22	31

where

- 4 = strong possibility
- 2 = weak possibility
- 0 = not applicable
- 2 = negative possibility.

Selected references: (A) Kitching, 1967; Shepherd, 1979; (B) Boston Consulting Group, 1968; (C) Shepherd, 1979; (D) Howell, 1970; (E) Howell, 1970; (F) Boston Consulting Group, 1971; Williamson, 1975; (G) Lewellen, 1971; Levitt, 1975.

B. Methodology and Data Selection

The Market Model

The capital asset pricing model is based on the premise that expected returns on common stocks of firms of similar risk are equalized. Stocks are priced, and their one period expected return determined by the attempts of investors to hold efficient portfolios.²

In order to evaluate the influence a merger has on the performance of stocks, it is necessary to abstract from general market conditions that which affects stock returns and isolate any specific effects that the merger might have had on those returns. Since returns on common stocks are assumed to be caused by both random, market wide effects (including a changing risk-free rate of return) and unrelated random, security specific effects (including merger specific effects), the proposed examination would be performed on the returns after adjusting for the risk and market-wide effects. The underlying return generating process is described in the following form of the market model:

$$(r_{it} - r_t) = \alpha_i + \beta_i (r_{mt} - r_t) + \epsilon_{it}, \text{ where } t = 1, \dots, T, \\ \text{and } i = 1, \dots, N. \quad (1)$$

where

r_{it} = the return for firm i in period t . The rate of return is based upon the stocks monthly closing prices adjusted for stock splits and dividends.

² A portfolio is efficient if no other portfolio with the same or higher expected return has a lower standard deviation of return.

r_t = either the risk free rate (if the Sharp-Lintner model is used), or the zero beta rate (if the Black zero beta model is used).

$(r_{it} - r_t)$ = the excess returns for firm i in month t .

r_{mt} = the market return. A proxy for this measure that will be used in this study is Fisher's Equally Weighted Arithmetic Link Index (1966). This index is broadly based and has been used in most major studies of the 1970's.

$(r_{mt} - r_t)$ = the market risk premium, or the excess returns for the market in month t .

α_i = alpha of firm i ; alpha is the measure of the average level of superior or inferior market based performance over the T time periods. Known as the Jensen Performance Index (11), ex ante, $E(\alpha_i) = 0$ for firm i , where "E" represents the expectation operator.

β_i = beta of firm i ; beta represents the risk of an asset i relative to the total risk of the market portfolio m , and is proportional to the risk contribution of an asset i to the total risk of the market portfolio. Beta is computed as follows:

$$\beta_i = \text{cov}(\tilde{r}_i, \tilde{r}_m) / 2(\tilde{r}_m) \quad (2)$$

The tilde ($\sim$) signifies a random variable.

ϵ_{it} = the residual return of firm i which is due to the occurrence of firm-unique or industry-unique events or random

price fluctuations. A stochastic disturbance term, it is assumed to have a zero mean, to be independent of β_i , uncorrelated with $(r_{mt} - r_t)$, and have a constant variance.

t = is the time measured to the critical date.

The return generating process of the CAPM for the purpose of studying mergers proceeds as follows: For each acquiring (or acquired) firm, that firm's excess returns or $(r_{it} - r_t)$ are calculated and then regressed over time (usually for sixty months prior to the merger and where applicable, regressed a second time for sixty months following the merger) to the sixty corresponding calendar months of computed excess market returns or $(r_{mt} - r_t)$. This procedure yields a least squares line referred to as a "characteristic line" that has some slope (beta) and some intercept (alpha). This estimating procedure nets out the influence of general market effects and the individual security's risks. The residuals represent the excess performance of the firm each month that is not explained by the market portfolio. Figure 3-1 depicts the return generating process during the pre-merger period.

Selecting the Critical Date

In this and similar studies, we look for abnormal market behavior in months surrounding the critical event. For this study, the critical event is the merger itself.³ The month that the merger takes place is

³In a study by Dodd and Ruback (1976), the first public announcement of the tender offer was selected as the critical date. By isolating on the market reaction to the acquisition announcement, it can be determined whether the gains observed before the acquisition date reflect the reaction of the market to the announcement of the acquisition or to the prior good performance of the acquired firm which is independent of the merger. The results of the study replicated Mandelker's findings (1973, 1974).

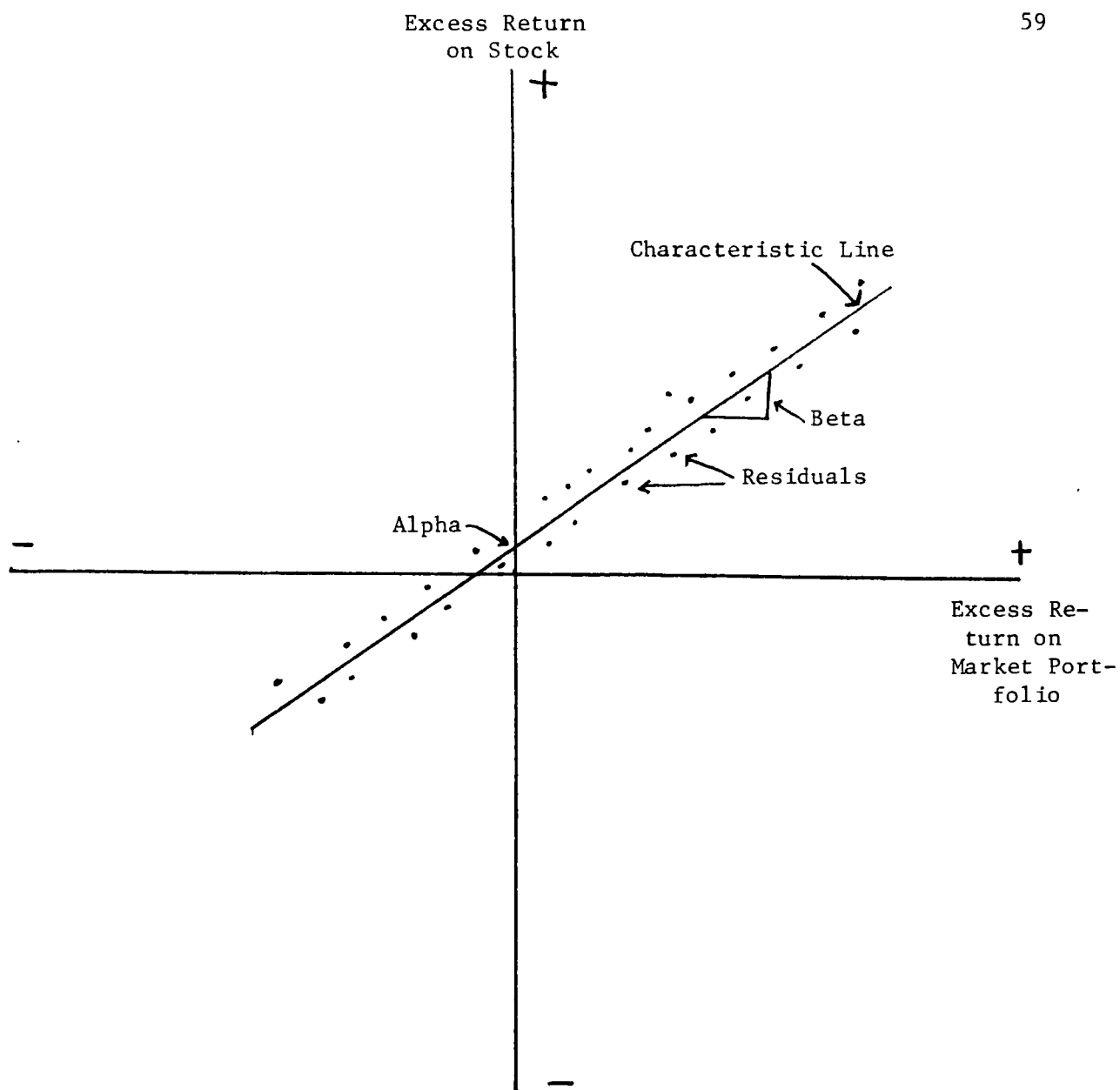


Figure 3.1. CAPM's Return Generating Process

defined as $t = 0$; $t = +1$ is then the month immediately following the event, and $t = -1$ is the month immediately preceding it.

If a merger, being an extra-market effect, has no impact on the performance of the acquiring firm, then the firm's residuals placed in relative time order prior to the merger should vary randomly above and below the expected returns as determined by the returns of the market portfolio. This deviation in the performance of the firm's security to that of the market during this market equilibrium period is referred to as a "random walk." If, however, the merger has a positive impact on the performance of the acquiring firm, then its residuals will exhibit for some period prior to the merger a positive tendency that cannot be attributed to chance. By construction, the residuals calculated by regression must sum to zero. Therefore, the residuals prior to the merger induced disequilibrium period will exhibit a negative tendency. The residual pattern that results if a merger has a positive influence on the firm's performance is depicted in Figure 3-2.

A fundamental assumption to the CAPM is that the market acts efficiently; i.e., fully anticipates all future benefits of a merger before the merger is actually consummated. This pre-event recognition of an event does imply a sense of presence, but not one that comes from all-knowing individuals in the investment community. Clearly no investor is omniscient nor is it expected that there will be full agreement and certainty associated with investors evaluation of an impending event. Collectively, however, the force of common judgement appears to be sufficient in large samples to produce and detect an orderly adjustment of prices to new information.

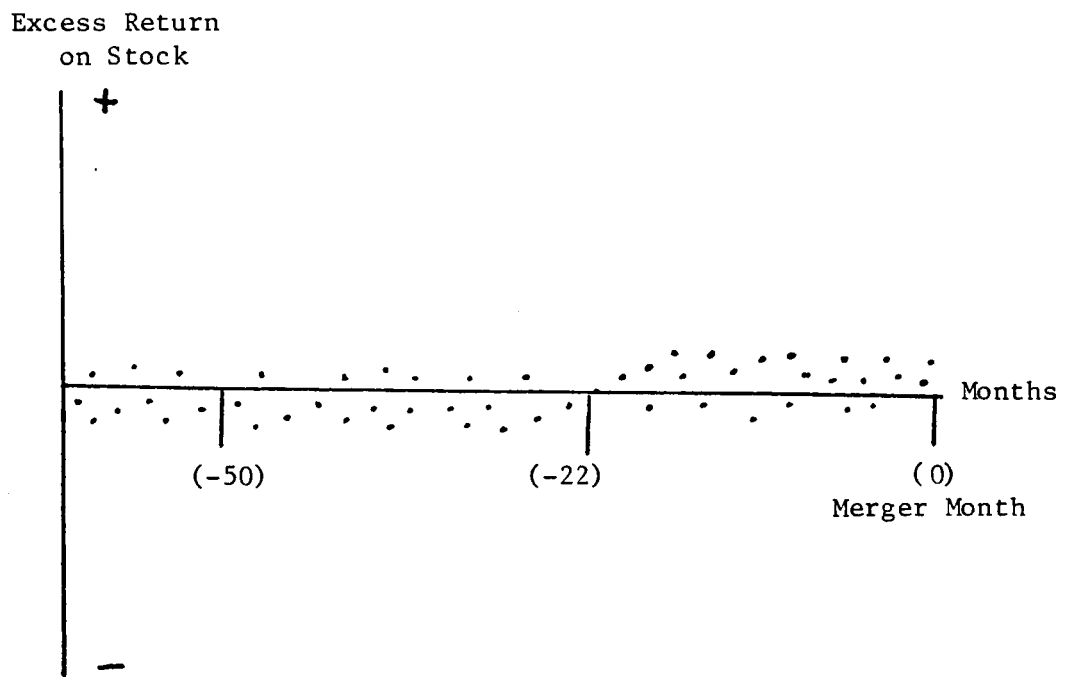


Figure 3.2. Security's Residual Pattern over Time

Estimating Abnormal Returns

The abnormal return for firm i for any period t is estimated to be:

$$(r_{it} - r_t) - \hat{\beta}_i (r_{mt} - r_t) = \hat{\alpha}_i + \hat{\varepsilon}_{it}^4 \quad (4)$$

where $(\hat{})$ denotes estimate.

These abnormal returns for each firm are then averaged across merger portfolios in the sample to compute the "Average Abnormal Return" or AR for each relative month (Fama, Fisher, Jensen, and Roll, 1969). The rationale for averaging across firms with large samples is to net out the influences of all other extra-market events. By construction, these events will be unsystematic and therefore due to the central limits theorem, only the influence of the merger event will be systematically captured. AR across sample members is thus defined as:

$$AR_t = \frac{1}{N} \sum_{i=1}^N \hat{\varepsilon}_{it} + \hat{\alpha}_i \quad (5)^5$$

where:

N = the number of firms having a computed residual for month t .

$\hat{\varepsilon}_{it} + \hat{\alpha}_i$ = the abnormal return for each firm i for relative month t .

⁴Over T time periods, the total excess return is equal to α_i because the least squares estimate of ε_{it} add up to zero by construction.

⁵A positive AR_t indicates that, on average, investors receive an abnormal increase in wealth t months relative to the critical date.

AR_t = the average residual across firms for month t .

Cumulative Abnormal Returns

It is useful to examine the cumulative efforts of AR in the months surrounding the merger. Here, the average abnormal returns are summed to yield the CAR using the following procedure:

$$CAR_t = \sum_{s=t-K}^t AR_s$$

where CAR_t or the cumulative average residual is computed from month $t-K$ through month t .

A comparison of the average residual pattern (excluding the alpha constant) and the cumulative average residual pattern (again excluding the alpha constant) is shown in Figure 3-3.

It can be observed from the above patterns that, by construction, the trend in the residual pattern is easier to observe when the residuals for each month are cumulated. The turning point in the CAR plot where the residuals begin to show a very definite positive trend represents the point in time when the extra-market influence of the impending merger begins.

It is important to note that the residual plots of the individual acquiring firms should not be inferred from the plots of the residuals calculated by averaging residuals across firms. Typical firm residual patterns are likely to differ from the average residual patterns due to differences in the market's anticipation of impending mergers for each firm as well as due to the existence of other extra-market events experienced by that firm during the time period under observation. As was stated, these other extra-market events which

Excess Return on
Merger Portfolio

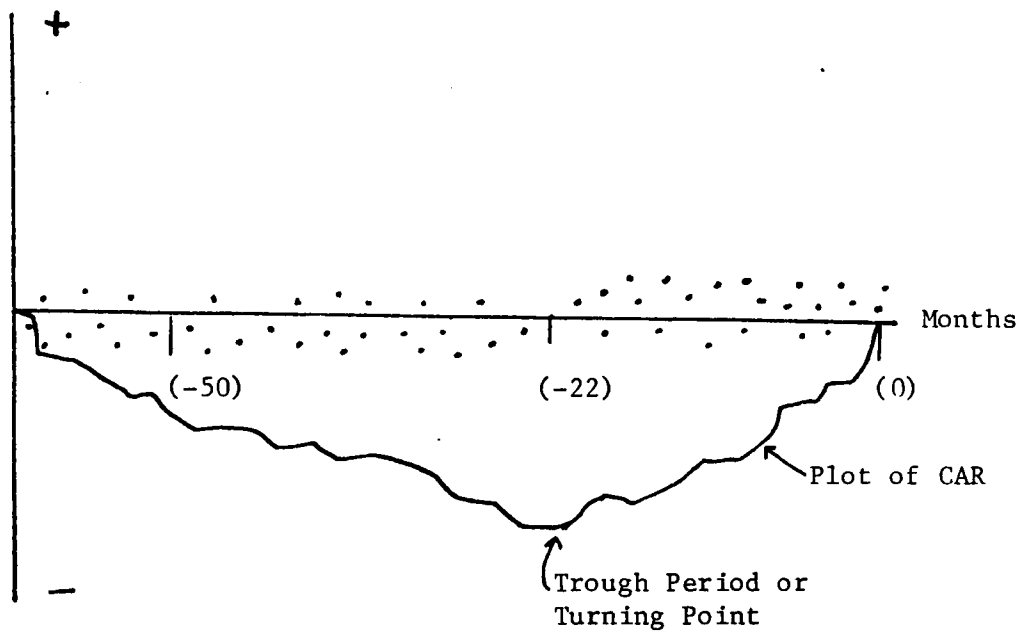


Figure 3.3. Plot of AR's and CAR for Merger Portfolio

influence the firm's residuals are expected to be unsystematic to the merger event, and therefore their influences will be averaged out in large samples.

It should be noted that AR's and CAR's require adjustments before statistical tests can be applied to them (Choi, 1980; Langetieg, 1978; Mandelker, 1974; and others). Due to the possibility that the residuals do not have the same distribution across the mergers, and that they might not represent independent drawings from a normal distribution for each month, it is not appropriate to use parametric tests on them without first adjusting the AR's to be independent and identically distributed.⁶

The Two Basic Models

Derived from capital asset pricing theory are two basic models: (1) Jensen's performance index based on the Sharp-Lintner (S-L) model, which requires the existence of a riskless asset, and (2) an alternative performance index based on Black's zero-beta model, which requires the estimation of zero-beta rate. Both models share the same underlying generating process of the form described in Equation (1). Both make certain simplifying assumptions about the real world, and these assumptions are to some extent unrealistic. For example, in the S-L model, the market equilibrium position assumes unrestricted borrowing and lending at a common risk-free rate, but it does not assume that positive variance securities can be sold short. In the

⁶ These procedures are described in Appendix II.

Black model, however, the risk-free securities are not assumed to exist, but the short-selling of positive variance securities is unrestricted. (In the real world, it is impossible for an investor to borrow unlimited amounts at a risk free rate just as there are restrictions preventing investors from short selling positive variance securities such as common stock.) Fama and MacBeth (1973) argue that the Black model does a better job explaining real-world data on average returns and risk; i.e., the coefficients and residuals of the risk-return regressions are more consistent with an efficient capital market where prices of securities fully reflect all available information.⁷ However, Langetieg (1978) brings out the fact that the zero-beta asset as estimated by Black's model has a surprisingly high correlation with the Fisher arithmetic index (1966). Theoretically, the zero-beta asset has a zero covariance with the market. Both models, therefore, are subject to criticisms. Tested using the same data set, little difference is found between cumulative excess return estimates. Langetieg (1978) concludes that until a better theoretically-based performance index is developed, we must tolerate what is available. As for choosing between the two models, no meaningful test has yet been developed to select one over the other. For the purpose of this study, therefore, the Sharp-Lintner model will be selected.

⁷ In such a market, the equilibrium requires that the market portfolio of positive variance securities be a minimum variance portfolio of positive variance securities. Prices, therefore, must be set in such a way that the expected returns for each security holds for every positive variance.

One, Two, and Three Factor Models

The Sharp-Lintner model and Black's model both are able to net out the influence of the market factor from the security return. The residual (i.e., gains net of market influence) represents the influence of firm-unique events such as mergers, divestitures, law suits, etc. However, the residual also represents the influence of extra-market factors (e.g., industry factors), statistical biases (e.g., measurement errors, model misspecification, non-stationarity, etc.), and other unidentified influences. Ideally, all of the non-merger influence is "diversified" away. However, Langetieg explains that full diversification of this effect is unlikely since there may be a heavy concentration of mergers in a few industries during the time frame from which the same number of mergers were drawn. He therefore suggests adding a second factor to the one depicted by Equation (1). The two factor model appears as follows:

$$(r_{it} - r_t) = \alpha'_i + \beta_i (r_{mt} - r_t) + C_i (\epsilon_{it} + \hat{U}_{it}) \quad (6)$$

where:

α'_i = the Jensen index adjusted for industry influence.

$\hat{U}_{it}$ = the industry residual, which is uncorrelated with the market-risk premium and is calculated by:

$$(r_{it} - r_t) = \alpha_i + \beta_i (r_{mt} - r_t) + \epsilon_{it} \quad t=1, \dots, T,$$

where r_{it} = the continuous return on industry average for each merging firm i , constructed by forming an equally weighted industrial index using two digit SIC code.⁸

⁸ Langetieg felt that three and four digit SIC classifications to form the industry index would have been preferable, but the C.R.S.P.

$$C_i (\epsilon_{it} + \alpha_i) = \text{the industry factor.}$$

Testing the two factor model with the one factor model used by Mandelker (1973, 1974), Langetieg concludes that the industry factor usually contributes a significant level of additional explanatory power leading to more precision (i.e., tighter confidence intervals) in estimating excess returns. More precisely, he found that the industry factor provided significant (at the 5 percent level) additional explanatory power for 85 percent of the acquired firms, 88 percent of the acquiring firms, but only 52 percent of the consolidated firms. Since an industry factor was assigned to each merging firm, he concluded that there are probably several cases where the increase in explanatory power was not sufficient to offset the loss of one degree of freedom that came from including the second factor.

In general, economists from the field of industrial organizations would find fault with the industry factor as used by Langetieg. The Standard Industrial Classification, or SIC code, is a system developed for categorizing by industry the output of a business establishment. It has a number of limitations, however, that can have a significant impact on results of any statistical study.

First is the problem of how to adequately define the industry categories so that firms can be sorted in a meaningful and consistent manner. Ideally, an industry should be defined so that all firms which are competitors, and only those firms are included. The outer

tapes are simply not large enough to form such indices for most of the merging firms in his sample.

boundaries of an industry, however, are determined by the degree of substitution possibilities, and this line tends to be somewhat arbitrarily determined. The four digit categories are either defined too narrowly or too broadly depending on the particular category.⁹ The second problem with the categorizations is that the elements of market structure change over time as the participating firms move into new and different lines. "About half of the four-digit industries are likely to be redefined during any fifteen year period" (Shepherd, 1980, p. 216). This makes it difficult to maintain continuity in analyzing industries and trends. Exacerbating this problem is that diversification is apparently increasing in amount and rate since World War II.¹⁰

Scherer (1980) perhaps sums up the problems with using SIC data when he wrote, "It is hardly an exaggeration to say that any study using subsequent financial data classified by primary industry method without elaborate quality controls is virtually worthless" (p. 270). Rumelt (1974) verified this point. It was only through his new scheme for categorizing firms by discrete businesses and not by product as done by the SIC, that he could find a relationship between strategy and performance. He found that the two and three digit SIC code categories did not approximate his categories because the SIC gives undue weight to minor activities.

⁹For a good discussion of industry offenders, including examples, see Scherer (1980), pp. 61-63.

¹⁰See Gort's study of III companies from 1929 through 1954 (Gort, 1962), the FTC's study of 200 firms 1950-1968 (FTC, 1972), and Rumelt (1974).

Pettway (1978, 1980) suggests an alternative way to account for the industry effect that avoids using SIC information. If the bulk of mergers taking place during the time period under study are concentrated in a few industries, then the error term may include a variance that was not netted out by the general market index employed.¹¹ This non-random variance in the error term will bias the subsequent test results and conclusions. The presence of this bias, known as autocorrelation, can be tested using Durbin-Watson statistics.¹² The source of the bias in the distributions of the expected values of the parameters of the model can be eliminated using the Cochrane-Orcutt (1949) iterative technique on the original data.

The iterative approach does not always work properly. It may underestimate the autocorrelated parameter. This bias, when serious, may prevent the detection of significance for the estimated regression coefficient. Neter and Wasserman (1974) suggest an alternative

¹¹Pettway's sample of twenty-two firms were all selected from the same industry (i.e., the Public Utility Industry, 1971-1979).

¹²The problem of autocorrelation is common in business and economic regression applications involving time series data. For such data, the assumption of basic regression that the error term is an uncorrelated random variable or an independent normal random variable is often not appropriate. Error terms in these applications that are correlated over time are said to be autocorrelated or serially correlated. The major cause of positively correlated error terms is the omission of one or more key variables in the model (for example, Langetieg's industry factor). When time-ordered effects of such "missing" key variables are positively correlated, the error term in the regression model will tend to be positively autocorrelated since the error term includes the effects of the missing variable. If this should occur, regular least squares method will tend to yield large variances in the estimation of the regression coefficients. Therefore, the confidence intervals and tests using Student's t and F distributions are no longer applicable.

approach known as the "first difference approach." This approach has been found to be effective in a variety of applications in reducing the autocorrelation of the error term, and is much simpler than the iterative approach.

Choi (1980) fitted the transformed AR's and residuals derived from pre- and post-merger time series to a first-order autoregressive equation. Autocorrelation functions for the residual were calculated. None of the autocorrelation coefficients with lags one through five were found to be statistically significant at the 5 percent level. He concludes that, "This suggests that the transferred AR's in both the pre-merger and the post-merger periods are found to follow a random walk process" (p. 38). Because the time period under study (1950 through 1973) overlaps with the time frame studied by Langetieg (1920-1969), it might be inferred that the significance of the industry effect found by Langetieg represents a statistical artifact introduced by the noise level of the two digit SIC code and/or the methodology employed by Langetieg in developing this factor.

A third factor is suggested in the literature by Langetieg (1978). He calls this factor "the well-matched non-merging control." Rather than include this factor in the general model, he argues that a better use for it would be as a control to test whether the measured excess returns are due to the merger or, alternatively, some influence other than the market and industry influence. To the extent that a merging firm and its non-merging control¹³ are affected in a similar

¹³ The control firm is selected for each merging firm by the process of finding a firm in the merging firm's two-digit industry

way by extra market and extra industry factors as well as by experimental design, introduction of a control group serves as a way to improve the reliability of the measures.

Choi (1980) questions the need of employing a control group. "In a market where the Sharp-Lintner or the Black's CAPM are viable proxies of behavior, the control group paired-comparison is, at best, redundant; i.e., the market portfolio represents the best control firm" (p. 24).

Langetieg (1978) compared Mandelker's one-factor model with four alternative two-factor models (the S-L and Black model, each employing first an equally-weighted industry index and then a correlations-weighted industry index) and his three-factor model. The results of the four two-factor models were found to be essentially the same. The one-factor model estimates reveal a general agreement in sign, but only a rough agreement in magnitude. He concludes that the one-factor model will not necessarily yield the same results as the two-factor model. Interestingly, using the two-factor model with no control, the efficient market hypothesis is rejected. When the control firm is introduced, the efficient market hypothesis is once again accepted. Hence, it appears that the one-factor model yields results similar to the more cumbersome three-factor model. For this reason and the fact that the second and third factors may have methodological and theoretical problems associated with them, this study will use the one-factor model.

having the highest residual (i.e., returns net of market influences) correlations to the merging firm.

Estimation of the Coefficients of Determination

A problem not yet resolved in the literature is how to obtain good estimates of the true α_i and β_i which are unobservable and represent ex ante expectations of market participants. To be useful, the CAPM assumes that the parameters of the model are reasonably stable or stationary.¹⁴ Because α_i and β_i are estimated using ex-post analysis historical data, however, the reliability of these two terms may be affected by problems in their estimation caused by historically induced non-stationarity. Blume (1968) shows that the constant assumption is reasonable at least for large portfolios. Schick and Jen (1976), however, suggest that for individual stocks, the problems of non-stationarity are more complex. There are a number of ways suggested to deal with non-stationarity problems. Empirical tests of the CAPM have assumed independence between beta and the planning period or horizon (Fama 1972; Jensen 1969). In Roll's (1971) study of Treasury bills, he argues that the planning period "be estimated empirically, not just selected conveniently" and suggests that the betas will differ for different planning periods. Baesel (1974) found that the stability

¹⁴The CAPM implies a linear relationship between the expected return on a stock and its risk in the market portfolio. If the betas are continually changing over time, an estimate of beta as provided by a simple regression must be interpreted with considerable caution. This is true because the error term of any month where the beta is not stable may come from a distribution that is different from the distribution observed for the error term estimated for other months. If the true beta followed some linear trend, however, the estimate of it would not be biased. A reason for averaging the abnormal returns for each relative month across sample member firms is that hopefully any systematic error that may occur when an unstable beta of an individual firm is estimated will be netted out. AR, therefore, should be relatively unbiased.

of beta increased substantially as the horizon used in estimating it increased. Similarly, Euhari and Levy (1977) write that "the investment horizon for which data are collected plays a crucial role and has a great impact on both the regression coefficients and the performance indexes." Mandelker (1972, 1974) estimated beta for each of two horizons. Though the beta of the two horizons differed from each other, he concluded that there is no theoretical reason to justify one procedure over the other. Langetieg, Haugen, and Wichern (1980) recognize "the possible trade-off that exists between the horizon chosen to estimate the coefficients and the problems of non-stationarity." They used five years of monthly data to calculate the coefficients, as did Mandelker (1973, 1974) and Choi (1980). To summarize, there is no final opinion on the required horizon length, though it appears evident that the horizon length chosen will influence the parameters of the model and hence the results.

Related to horizon length is the length of the interval used. Jensen (1969) concluded that the expected value of the estimate of beta will be independent of the length of the subintervals over which the sample returns are calculated, be they daily, monthly, quarterly, etc. Miller and Scholes (1972), however, found that the shorter intervals lead to reduced skewness in the distribution of the parameters. Smith (1978) concludes that there is as yet no answer as to the best interval to use. If data availability is no problem, there is no reason not to use the shortest interval available. However, results must be interpreted with caution because the estimates of parameters and the return

distributions are not unaffected by the intervaling aspect of research design (p. 329).

Mandelker (1973, 1964) used a moving beta series as a precaution against non-stationarity. This approach estimates by first stage least squares regression beta for each stock and for each time period by using the last sixty monthly rates of return up to month t (i.e., $t-59$ to t).¹⁵ The moving beta series does not explicitly eliminate non-stationarity caused by the merger itself, explaining why recently it has received less attention than the methodologies that do.

Surrounding the merger date, the possible presence of temporary non-stationarity in the coefficients may be induced by preliminary negotiations of the merger, its announcement, and by the subsequent preliminary assessment of the merger's results. This type of non-stationarity can be removed by eliminating data around the date of the merger when estimating the coefficient. For example, Langetieg (1978) and Langetieg, Haugen, and Wischern (1980) eliminate data within one year of the merger. Choi (1980) excluded only one year of data, seven months before the merger and four months following it. His justification of this apparent break in the accepted convention to eliminate two years was (1) past studies suggest that abnormality of returns does not appear until approximately seven months prior to the merger month, e.g., Mandelker's (2) lack of data availability necessitated the need

¹⁵ Mandelker decided to use a horizon of five years, hence the mention of sixty months.

to shorten the horizon;¹⁶ and (3) the selection of the period for exclusion is quite arbitrary.

Hong, Kaplan, and Mandelker (1978) argue that since a merger may lead to important changes in the riskiness of the firm, it is reasonable to allow for different risk parameters in pre- and post-merger periods. This source of merger-induced non-stationarities was dealt with in a similar manner by Langetieg (1978) and Choi (1978). Langetieg, Haugen, and Wischern, in addition to computing pre- and post-merger betas, corrected for the tendency of betas to "regress toward the mean." Blume (1975) reported that non-stationarity in beta is systematic because, in general, firms exhibit a propensity to regress toward their cross-sectional mean value of one. This bias can be eliminated, to the extent that Blume's correction formula applies to post-merger beta.

Choi (1980) suggested another source of bias. The inclusion of the return observation of the month for which the market model coefficients as well as the residual are estimated can introduce bias if the error term in the month t does not come from the same distribution as the error terms in other months. The assumption here is that the month in which the abnormal performance is measured may be biased by firm specific events such as rumors about merger activities for that company. To address this problem, the current observation was excluded, and the coefficients along with the residual for the month were re-estimated every month.

¹⁶ The horizon is generally extended by the number of periods excluded.

Choi (1980) compared his method of market model estimation with one very similar to the method used by Langetieg. Using the one-factor market model and using the returns of the period (-67, -8) and (+5, +64) instead of (-72, -13) and (+13, +72), estimates were made of the two sets of the market model coefficients. Choi found that the level of beta as well as the pattern and the magnitude of the residuals for the two methods were identical. He then compared these results with a moving beta series similar to that used by Mandelker. This time, only a slight difference between the two methods was found. His findings imply that the researcher is justified in selecting any of the three methods of estimating the parameters.

Another conclusion that can be inferred from Choi's comparison of the three methods is that the non-stationarity of beta does not bias the results as much as was predicted by the methods that explicitly tried to control for this problem. Langetieg (1978) states that "while it is difficult to determine the impact of different samples, the impact of non-stationarity is arguably small" (p. 378). He estimates that the upper limit to non-stationarity in the average beta is only 0.05, which translates into an infinitesimally small influence on the computed abnormal returns. Langetieg found this to be true for both pre-merger and post-merger periods. Choi (1980) also found that "non-stationarity in the beta coefficients would not change the results materially" (p. 12).

Two Approaches to Examine Frequently Merging Firms

As discussed earlier, a major limitation of the CAPM methodology, from the perspective of this study, is that it suggests that the sample

of mergers studied have clean data for a minimum of three years preceding the date of the merger and three years following the merger date. This criterion was considered necessary because each merger within the prescribed six-year time period may influence the parameters of the model. If this occurs, a linear regression model fitted over two or more closely occurring mergers may not be suitable for providing unbiased results.

Because a purpose of this study is to examine the relationship between frequency of merger activity and stockholders' wealth, it will be necessary to modify the conventional techniques of the CAPM, yet still attempt to insure against any bias being introduced into the results through improper estimation of the parameters of the model. Two such approaches are suggested.

One approach for examining frequently merging firms is to progressively relax the clean data requirements from the accepted conversion of thirty-six months prior to and following the merger date to twenty-four months, twelve months, and finally zero months. The latter case implies no requirements for clean data. The main drawback of this approach, as was discussed earlier, is that bias may be introduced into the results if the parameters estimated for a single merger become influenced by other mergers consummated by the same acquiring firm during the relaxed clean data interval surrounding the merger of interest. Just how much bias is introduced, if any, as the clean data requirement is relaxed is not known, however, for no study has attempted to systematically investigate this issue. To the extent that bias is introduced, less confidence can be placed on the evaluation of the

performance of frequently merging firms. However, the gap in the current understanding of the performance of the acquiring firm is wide enough to justify compromising somewhat the accepted methodologies. For example, in the attempt to study the performance of frequently merging firms, insights will be gained in terms of (1) the degree of perfection of the perfect acquisition market as it pertains to the differences in experience that management of acquiring firms have in consolidating firms; and (2) the generalizability of the previous CAPM studies that have systematically excluded frequently merging firms.

A second approach to study frequently merging firms and one which can be used in combination with the first approach is to accept the hypothesis that the market is relatively efficient. This assumption is well based in the literature. For example, Langetieg (1978) and Choi (1980) have found in their respective studies that post-merger residuals do not differ significantly from zero. They concluded that at the time of the merger the market had already accounted for the benefits that would accrue to the acquiring firms as a result of the merger. By accepting the efficient market hypothesis, therefore, only the pre-merger residuals need be examined. For example, using the conventional seventy-two month clean data screen, the data need be clean for thirty-six months preceding the merger. As a result, firms that merge every three years rather than every six years can be studied. Once again, the risk of biased results may be introduced. For example, if mergers are associated with positive abnormal performance, then the influence of later mergers may add a positive bias to the performance results observed for a merger when the post-merger

clean data screen is relaxed. However, as will be described in Chapter IV, a procedure called "marginal analysis" will be used to approximate the severity of any bias that may occur from adopting the various clean data screens in the first approach and the efficient market assumptions of the second approach. In this way, the relevance of the clean data restriction can be systematically studied. Furthermore, by understanding the severity of the bias associated with the multiple mergers, the validity of the conclusions about the performance of frequently merging firms can be approximated.

The Data

The main sources of data are the Federal Trade Commission's listing of mergers during the period 1948-1978 and the CRSP file.¹⁷ All the firms used in this sample had to meet the following criteria:

1. In each case a purchase of stock, or other ownership of interest, leads to a more than 50 percent ownership of the acquired company.
2. Each firm has records on the CRSP file; i.e., is listed on the New York Stock Exchange.
3. Each firm has complete data; i.e., sufficient security returns data to enable the required statistical calculations for pre-merger analysis (sixty-seven months of returns data) and when applicable, post-merger analysis (sixty-four months of returns data).

¹⁷Center for Research in Security Prices file. For a description of the CRSP file, see Fisher and Lorie (1964).

4. Only mergers listed on the Federal Trade Commission's major merger series for the period 1948-1979 were included. This limited the data to acquisitions of \$10 million or more, and was adopted to avoid admitting the very large number of small and insignificant acquisitions whose inclusion in the sample would tend to dilute the impact, if any, of merger events on the average residuals.
5. Various clean data screens were used. The samples which will subsequently be referred to as "macro-samples" that resulted from each are as follows:
 - (a) (+/-36) Sample--a conventional sample where the merger is an isolated event, neither preceded nor followed by another major merger by the same firm over a seventy-two month period (N=315).
 - (b) (+/-24)--A sample where the merger is an isolated event, neither preceded nor followed by another major merger by the same firm over a forty-eight month period (N=383).
 - (c) (+/-12)--A sample where the merger is an isolated event, neither preceded nor followed by another major merger by the same firm over a twenty-four month period (N=521).
 - (d) (+/-0) Sample--Data on both pre- and post-merger is of interest. No clean data screen is applied (N=768).
 - (e) (-0) Sample--an "efficient market" sample with no clean data screens.

Because only those mergers that remain through the screening procedure are included in the sample, the results of this study may not be generalized to all mergers. However, for those mergers that are similar to the ones remaining in our sample, the results should provide strong inferences.

Procedure

Using a variety of samples, mergers included in each sample will be grouped in a number of ways. First, as Chapter IV will describe, all mergers in each sample will be grouped together, as has been customarily done in past empirical studies on mergers. This macro-analysis of mergers will facilitate comparisons with previous empirical research on mergers. In addition, the importance of the clean data restriction will be examined, using a procedure called "marginal analysis." Chapter V will group mergers into types of merger strategies and then investigate the relationship of the type of merger strategy and the performance of the acquiring firm. Chapter VI will examine the impact that management's experience in consolidating firms may have on the performance of the acquiring firm. Finally, Chapter VII will summarize the findings of this study and make suggestions for future merger studies.

CHAPTER IV

MACRO-SAMPLE ANALYSIS

A. Purpose of the Chapter

The purposes of this chapter are as follows:

1. to compare results with previous merger studies;
2. to introduce two new techniques for estimating the abnormal returns associated with merger;
3. to introduce a new adjustment procedure known as the firm-adjusted procedure, and compare its performance in correcting for residual dependencies with that of the unadjusted and time-adjusted procedures; and
4. to critically evaluate the importance of the clean-data screen.

Comparison with Other Merger Studies

The unstandardized CAR's identified in this study were calculated over certain commonly specified time periods for each of the macro-samples and also compared with CAR's obtained for the same periods in other merger studies. In addition, two statistical tests, common to these other studies, are used to facilitate the comparisons. The two tests are known as the "standardized CAR test" and the "percent positive test."

In the standardized CAR test, or ZCAR test, the abnormal monthly returns for each acquiring firm in the sample are standardized as

described in Appendix III. Standardized AR's are then computed for each relative month prior to, and following, each merger. Finally, the standardized AR's are summed over a specified number of months to yield standardized cumulative average residuals, or ZCAR's. The ZCAR's, by construction are distributed approximately normally with large sample sizes and have a mean of zero and a standard deviation of $\sqrt{M/N}$, where N is the sample size and M is the number of months summed for the respective ZCAR measure. The above formulation assumes that abnormal returns are independent across time and across mergers; an assumption that is consistent with the null hypothesis that merger has no impact on the wealth of the acquiring firm's stockholders. A two-tailed t-test is used to assess significance. The basic research question addressed by this procedure is "Does the performance of the acquiring firms on average differ significantly from normal returns?" This question assumes that the market portfolio is the best control group.

The percent positive test is constructed by acquiring firms rather than by months. Define P as the percent of firms over specified periods with positive unstandardized cumulative returns, or CR's. Assuming that merger has no impact on stockholder wealth, there should be an even split of mergers with negative and positive CR's. The null hypothesis, therefore, implies that $P=0.5$. Again assuming independence of CR's across mergers, P will have a variance of $P(1 - P)/N$ and is approximately normally distributed. A two-tailed t-test is used to assess significance. The rationale for using the percent positive test in addition to the standardized ZCAR test is that the latter may be misleading since a departure from the null hypothesis could be caused by a

few mergers with very large or very small abnormal returns. The percent positive test, however, is a non-parametric test and therefore is not subject to such difficulties.

These two tests are used to test if the acquisition market is relatively perfect for acquiring firms (i.e., the perfectly competitive acquisition market hypothesis) and if the market acts relatively efficiently (i.e., fully capitalizes in the stock prices of the constituent firms all anticipated gains or losses associated with the merger). Significant abnormal returns in the pre-merger period suggests that the acquisition market is not perfectly competitive, while significant abnormal returns in the post-merger period suggests that the market is not efficient.

Two New Performance Measure Techniques

Two techniques suggested by this study for estimating the abnormal returns associated with merger are referred to as the trough technique and the paired-difference test.

The trough technique is suggested as the recommended procedure for selecting the interval of time over which the impact of the merger is evaluated. Though it is not possible to identify for each merger the precise time period over which the merger information is reflected in stockprices, the consensus among most merger studies is that on average, any change in CAR as a result of merger does not manifest itself until approximately eighteen months before the merger (Choi, 1980; Langetieg, 1978, and others). This determination of when the merger begins to influence returns has been determined visually by an

examination of the plot of CAR's as was done by Langetieg (1978), or statistically by utilizing conventional probability test on CAR's over some relevant periods as was done by Choi (1980). A potential problem with accepting the (-18, -1) period for all samples as representative of the period of returns disequilibrium caused by the merger is that the specification of this period may be influenced by sampling differences that could lead to an understatement or overstatement of the performance attributed to merger. This trough technique proposed uses the plot of the CAR's to determine the relevant period for each of the macro-samples observed in Chapter IV and each of the sub-samples defined in Chapter V and VI, rather than select arbitrarily the (-18, -1) period as representative of the relevant period. This trough refers to the period of time where the plot of the CAR's for any sample or sub-sample begins to indicate abnormal performance. However, the performance results for the (-18, -1) period will be, in all instances, reported for comparison purposes either in the text of each chapter or in the appendices. In addition, the CAR plots for each sample or sub-sample discussed in each chapter will also appear in the appendices.

The paired-difference test is suggested as being a superior test to the tests described in part one of this section for evaluating the performance related to merger. The basic research question addressed by the paired-difference test is "Does the anticipated merger induce on average a significant change in the performance of the acquiring firm?" This question is different and perhaps more relevant for studying mergers as an act of strategy than the one which has been traditionally asked; i.e., "Does the performance of the acquiring firm

on average differ significantly from normal returns?" The former question is interested in the variance within firms and not between firms. If the premise is accepted that the informational impact of the merger extends to some point in time prior to the merger and that the performance of the firm preceding that point is non-merger related, a matched paired-difference test can be constructed. Here, the control period is represented by the performance measured during the non-merger, or "equilibrium" period, while the treatment period is represented by the performance measure during the merger related, "or "disequilibrium" period. Whereas past CAPM merger studies with the exception of Langetieg (1978) assume that the market portfolio is the best control group, this paired-difference procedure asserts that the firm's own unique performance as evaluated by the market prior to the informational impact of the merger may be the better control.

The paired-difference test is constructed in the following manner. For each firm, an average monthly performance is computed for the control and treatment period by dividing the CR by the number of months in the respective period. The trough technique is used to determine the two periods; $(-67, -(trough + 1))$ represents the control period and $(-trough, -1)$ represents the treatment period. A difference score is computed by subtracting the results for the control period from that of the treatment period. A difference score for each firm is then averaged with difference scores of other firms in the respective sample. A standardized difference score is computed in the same manner, only here standardized monthly abnormal returns are used. A two-tailed t-test is then applied to the standardized difference score to determine

if the change in performance is significant. The null hypothesis predicts that the change in performance is equal to zero. In all cases, the results of the paired-difference test will report, for comparison purposes with the conventional tests, the unstandardized difference score as the monthly difference times the number of months in the treatment period. In addition, the results of the paired-difference test will be reported with unadjusted, time-adjusted and/or firm-adjusted alterations where appropriate.

Comparison of the Adjustment Procedures

As was stated in Appendix II, the intent of the adjustment procedures is to correct for any possible dependencies that might exist between the residual returns of different portfolios of acquiring firms due to the presence of non-market factors such as industry factors, temporal influences and firm specific effects. Such dependencies may cause the t-values obtained for significance tests to be understated. No study to date has ascertained the actual importance of the adjustment procedures. For example, if the problem of dependency is trivial, then the degrees of freedom lost through the adjustment procedure may lead to an overall negative net effect on the t-values as a result of the procedure. Furthermore, no study to date has employed an adjustment procedure which accounts for dependencies related to firm specific effects. It may be that greater residual dependencies exist due to the firm specific effects than due to temporal influences for certain samples. To properly compare the adjustment procedures in order to draw inferences of their respective importance for use in Chapters V and VI, the results of all macro-sample analyses will be reported for

the proposed firm-adjusted procedure as well as the unadjusted and the commonly used time-adjusted procedures.

Evaluation of the Clean-Data Screen

As was stated in Chapters II and III, a common sampling convention used by CAPM merger studies is to include only acquiring firms that are relatively inactive in the acquisition market; i.e., the acquiring firm cannot be involved in another large merger for a period of three years surrounding the date of the merger being studied. This six-year period of "clean data" is required to insure that the parameters estimated for the model reflect only the influence of a single merger on the performance of an acquiring firm and not be contaminated by the influence of multiple mergers. No study to date has evaluated the bias associated with the influence of multiple mergers. To the extent that this bias is trivial, the clean data screen serves no useful function. In addition, to the extent that a relationship exists between the activity level of a firm in the acquisition market (i.e., experience and the benefits it derives from the merger) as hypothesis two predicts, the clean data screening procedure may have inadvertently introduced a sampling bias by systematically excluding mergers consummated by more experienced acquiring firms.

In this chapter, two procedures will be followed to evaluate the relevance of the clean-data screen. The first procedure will compare the performance results and the coefficients of four samples [i.e., (+/-36), (+/-24), (+/-12), and (+/-0)] formed by varying the clean-data screen from its traditional, strict restrictions to a zero clean-data restriction. This procedure is presented for descriptive purposes

only because the samples share common variances. The second procedure, referred to as the "marginal analysis," forms four samples of mergers determined by the level of the clean data restriction applied. In the latter case, the samples are statistically independent and therefore any differences in their performance means and coefficient means can be statistically verified. The inferences obtained from these two procedures will have particular relevance to Chapter VI where the relationship between the experience of the acquiring firms and their respective performance is examined, since in order to study the performance of frequently merging firms, the clean-data screen will have to be relaxed.

B. Results

Table III presents the unstandardized unadjusted, time-adjusted, and firm-adjusted CAR and percent positive results for various pre-merger and post-merger periods selected and the corresponding paired-difference scores for the pre-merger period for each of the four samples described in Chapter III. A "U" following the sample name will signify unadjusted scores. Similarly, a "T" and "F" following the sample name signifies time-adjusted and firm-adjusted scores, respectively. For comparison purposes with the traditional measures, the paired-difference scores reported represent the total change in performance for the portfolio of acquiring firms as a result of merger and is calculated by multiplying the average monthly gain in performance during the merger related period over the non-merger related period by the number of months determined by the trough, or "T," to be the merger related period; i.e., the number of months in the period

TABLE III
MACRO-SAMPLE CAR'S AND PERCENT-POSITIVE RESULTS^a

Time	Sample										N = 280 % Pos.
	+/-36U CAR	N = 315 % Pos.	+/-36T CAR	N = 177 % Pos.	+/-36F CAR	N = 257 % Pos.	+/-24U CAR	N = 383 % Pos.	+/-24T CAR	N = 202 % Pos.	+/-24F CAR
-67, -19	-.0012	51	-.0081	48	-.0163	51	.0382	53	.0504	54	.0073
-67, -BT	-.0141	50	-.0068	47	-.0300*	48	.0253	53	.0356	54	.0054
-18, -1	.0774***	60***	.0756***	60***	.0801***	61***	.0748***	60***	.0676**	62***	.0812***
-T, -1	.0903***	59***	.0904***	60***	.0939***	59***	.0877***	60***	.0825***	62***	.0939***
+1, +18	-.0158	47	-.0087	45	-.0131	45	-.0156	47	-.0069	47	-.0131
+19, +37	-.0270	48	-.0207	44	-.0317	46	-.0223	48	-.0127	47	-.0254
+38, +64	.0058	50	-.0178	46	.0072	52	-.0076	47	-.0195	46	-.0034
PD	.0972***		.0937***		.1086***		.075***		.0651***		.0965***
Time	Sample										N = 339 % Pos.
	+/-12U CAR	N = 521 % Pos.	+/-12T CAR	N = 228 % Pos.	+/-12F CAR	N = 316 % Pos.	+/-0U CAR	N = 768 % Pos.	+/-0T CAR	N = 247 % Pos.	+/-0F CAR
-67, -19	.0504	55**	.0597	57*	.0058	52	.0790	58***	.0726	60***	.0293
-67, -BT	.0358	55**	.0469	56*	-.0075	49	.0616*	58***	.0610	56*	.0147*
-18, -1	.0840***	61***	.0839***	70***	.0844***	63***	.0854***	61***	.0982***	71***	.0887***
-T, -1	.0986***	60***	.0966***	70***	.098***	61***	.1028***	61***	.0865***	72***	.1033***
+1, +18	-.0069	48	.0061	50	-.0108	46	-.0243	46*	-.0105	47	-.0217
+19, +37	-.0218	49	-.0123	46	-.0333	48	-.0338	46**	-.0313	42**	-.0487
+38, +64	-.0163	46	-.0241	45	-.0111	49	-.0369	43**	-.0440	42**	-.0176
PD	.0811***		.0737***		.1013***		.0727***		.0684***		.0961***

^aOne, two, or three asterisks denote that the null hypothesis tested using standardized residuals at the 10 percent, 5 percent, or 1 percent levels, respectively. "U," "T," or "F" labels following the samples' names denote that the residuals were unadjusted, time-adjusted, or firm-adjusted, respectively. The symbols "I" and "BT" associated with Time denote Trough and Before Trough, respectively.

(-T, -1). (In the table, "BT" signifies "before trough," or one month preceding "T"). In addition, each performance measure reported includes the results of statistical tests performed on their respective standardized scores. The standardized scores are not given, but in all cases, one, two, or three asterisks (next to the unstandardized scores) signify that the null hypothesis is rejected at the 10 percent, 5 percent, or 1 percent levels, respectively.¹ Table IV presents the t-values obtained from the ZCAR test for each subperiod for each sample.

In all cases for the macro-samples, the month identified by the plot of the CAR's to represent the trough month is month -22. The plots of the CAR's for the unadjusted samples appear in Appendix IV.²

For the regression runs on the (+/-36) and (+/-0) unadjusted samples, Durbin-Watson statistics were calculated to detect for possible problems of auto-correlation in the residuals and none was found. The Durbin-Watson statistic as well as other relevant regression statistics for the two samples are present in Table V.

Table VI presents the alpha and beta coefficient terms for each of the four adjusted and unadjusted samples. In all instances, the

¹Appendix III presents the findings of Table III where r_{ij} is defined by ϵ_{ij} . The elimination of the α_j term from the calculation of r_{ij} is suggested by Roll (1979) because of the difficulty involved in identifying a suitable proxy for the market portfolio.

²These plots of the residual pattern for the individual acquiring firms should not be inferred from the plots of the CAR's of the portfolio of firms depicted in each sample. Typical firm patterns will differ from firm to firm. It is the cumulation across firms that produces the trend in the CAR plots.

TABLE IV
T-VALUES FOR ZCAR TEST^a

Time	Sample					
	+/-36U T-Values	+/-36T T-Values	+/-36F T-Values	+/-24U T-Values	+/-24T T-Values	+/-24F T-Values
-67, -19	-1.16	-0.78	-1.27	-0.95	-0.44	-1.18
-67, -BT	-1.59	-1.13	-1.74	-1.33	-0.79	-1.59
-18, -1	4.16	3.01	4.10	3.88	2.38	4.06
-T, -1	4.29	3.18	4.28	3.99	2.61	4.16
+1, +18	-0.23	0.40	-0.00	0.18	0.62	0.19
+19, +37	-0.54	-0.01	-0.56	-0.11	0.26	-0.11
+38, +64	0.63	-0.17	0.67	0.25	-0.22	0.31
PD	4.28	3.95	4.60	3.90	3.08	4.55

	+/-12U	+/-12T	+/-12F	+/-OU	+/-OT	+/-OF
-67, -19	-1.02	-0.54	-1.37	-1.37	-0.70	-1.11
-67, -BT	-1.51	-0.81	-1.77	-1.74	-0.89	-1.67
-18, -1	4.68	3.28	4.24	4.44	3.25	5.12
-T, -1	4.86	3.31	4.32	4.45	3.15	5.34
+1, +18	0.69	1.01	0.52	0.68	0.99	0.74
+19, +37	-0.15	0.11	-0.36	-0.86	-0.05	-0.09
+38, +64	-0.18	-0.54	0.18	0.35	-0.55	-0.42
PD	4.56	4.07	4.88	5.12	4.16	5.00

^a"U," "T," or "F" associated with the samples' denote that the residuals are unadjusted, time-adjusted, or firm-adjusted, respectively. The symbols "T" and "BT" associated with Time denouge Trough and Before Trough, respectively.

TABLE V
SAMPLE REGRESSION STATISTICS: AVERAGES OVER THE
RESPECTIVE SAMPLES

	(+/-36) Pre.	(+/-36) Post	(+/-0) Pre.	(+/-0) Post
Mean ($R_{mt} - R_{Ft}$) ^a	0.0094	0.0053	0.0093	0.0047
Mean ($R_{it} - R_{Ft}$) ^b	0.0106	0.0044	0.0121	0.0030
Explan./Model ^c	31.548	33.874	32.703	36.360
Durbin-Watson ^d	2.169	2.171	2.134	2.173
N	316	316	769	769

^aDenotes the average market return.

^bDenotes the average acquiring firm's return.

^cDenotes the average explanation of each regression model.

^dDenotes the test-statistic for possible auto-correlation.

TABLE VI
REGRESSION COEFFICIENT STATISTICS

Sample	Pre-Alpha	Post-Alpha	Pre-Beta	Post-Beta
+/-36U	0.0007	-0.0007	1.0193	0.9578
+/-36T	0.0009	-0.0009	1.0127	0.9577
+/-36F	0.0006	-0.0008	1.0294	0.9643
+/-24U	0.0014	-0.0009	1.0139	0.9600
+/-24T	0.0015	-0.0008	1.0105	0.9621
+/-24F	0.0009	-0.0009	1.0285	0.9680
+/-12U	0.0016	-0.0008	1.0143	0.9563
+/-12T	0.0017	-0.0006	1.0112	0.9580
+/-12F	0.0010	-0.0010	1.0342	0.9678
+/-0U	0.0022	-0.0016	1.0432	0.9855
+/-0T	0.0020	-0.0015	1.0260	0.9845
+/-0F	0.0014	-0.0015	1.0440	0.9852

average alpha is small, implying that the NYSE market portfolio may represent a suitable proxy for the market portfolio. In addition, the beta values approach the theoretically predicted value of one and the difference between the average pre-merger beta and post-merger beta is approximately .05. This finding is consistent with those of Mandelker (1974) and Choi (1980) and suggests that non-stationarity in the beta coefficient would not change the results significantly.

Comparison with Other Merger Studies

Of particular interest in merger studies is the performance of the acquiring firm during the (-18, -1) period. This is asserted to be a period of disequilibrium caused by the impending merger. If the decision to merge is associated with a positive net present value, the stock price of the acquiring firms and, therefore, the CAR's are expected to rise. Table VII presents the findings of the major CAPM studies of mergers that measure the returns to the stockholders of acquiring firms. Included in this table is the average CAR obtained across adjustment procedures for each of the four samples used in this study and the average CAR obtained across samples for each of the three adjustment procedures used in this study. As is shown, the results of this study are comparable to Elgers and Clark (1980), Langetieg (1980) (with control group), and Ellert (1976).³ Consistent with these three

³The differences between the results found for each study may be attributed to: (1) the time period sampled, (2) the minimum size allowed for the acquired firm to be accepted in the sample, (3) the inclusion or exclusion of non-NYSE acquired firms, (4) the clean-data screen applied, (5) the market-model methodology used, or (6) a combination of points one through five.

TABLE VII
COMPARISON OF RESULTS OF MAJOR CAPM MERGER STUDIES ON ACQUIRING FIRMS
DURING (-18, -1) PERIOD

Author/Sample ^a	CAR	N	Clean Data Requirement	Model	Time Period
Ave. (+/-0)	.0908	451	None applied	Risk-free rate	1948-1979
Ave. (+/-12)	.0841	355	2 years	Risk-free rate	1948-1979
Ave. Firm-Adj.	.0836	298	6 years to none	Risk-free rate	1948-1979
Ave. Time-Adj.	.0813	213	6 years to none	Risk-free rate	1948-1979
Ave. Unadj.	.0814	497	6 years to none	Risk-free rate	1948-1979
Elgers and Clark	.0790	337	2 years	Risk-free rate	1957-1975
Ave. (+/-36)	.0777	250	6 years	Risk-free rate	1948-1979
Ave. (+/-24)	.0745	288	4 years	Risk-free rate	1948-1979
Ellert ^b	.0650	772	None applied	Zero-beta	1926-1972
Langestieg (with control)	.0611	149	6 years	Risk-free rate	1929-1969
Mandelker	.0390	241	6 years	Zero-beta	1935-1968
Langestieg (without control)	.0215	149	6 years	Risk-free rate	1929-1969

^aSample refers to average samples computed in current study.

^b(-18, -1) figure calculated by interpolating between (-24, -1) and (-12, -1) figures reported.

studies, the performance of the acquiring firm as a result of merger is found to be significantly greater than the returns expected for other investment activities with commensurate levels of risk. Both the ZCAR and percent positive tests verify this point, rejecting the null hypothesis at the .01 level.

The performance of the acquiring firm during the (-67, -19) non-merger period, as indicated in Table III, page 91, is also found to be generally consistent with prior merger studies. The ZCAR test, as expected, suggests non-significantly positive abnormal returns while the percent positive tests suggests positive returns at various levels of significance for the (+/-12) and (+/-0) samples. The difference in the findings of the two tests may indicate the existence of a few "outliers" with very low abnormal returns during this period.

Finally, the post-merger findings are consistent with prior merger studies that found the market to act in a relatively "fair game" manner as required if the markets are efficient. The three post-merger periods selected by this study, though somewhat arbitrary, are intended to represent the immediate, intermediate, and long-run periods following the merger. It is during these three periods that any reassessment by the market place to unanticipated merger related information concerning capital and asset structure rearrangements are likely to show up. In all cases, the ZCAR test indicates that although investors appear to generally revise their expectations downward during these three post-merger periods, the low t-values suggests that this observed pattern may be due to chance.

The Trough and Paired-Difference Measures

As is depicted from Table III, page 91, determining where the merger related activity begins for each sample appears to better capture all of the gains associated with the merger. In all cases, the CAR is greater for the merger disequilibrium period defined by $(-T, -1)$ than it is for the more conventionally defined $(-18, -1)$ period. This observation is reinforced by the ZCAR test where somewhat higher t -values were consistently obtained for the $(-t, -1)$ period. This finding suggests that the prior merger studies that did rely on the $(-18, -1)$ period preceding the merger may have understated the benefits accruing to the acquiring firm.

The paired-difference test in all instances agrees with the findings of the ZCAR tests run on both the $(-18, -1)$ and $(-T, -1)$ periods. The null hypothesis is rejected at the .01 level implying that, on average, the anticipated merger induces a significant change in the performance of the acquiring firms. Particularly appealing about the paired-difference test is the generally high t -values that are associated with the performance scores.

Evaluation of the Adjustment Procedures

A difference is noticed in the results depending on the adjustment procedure used. As depicted in Tables III and IV, pages 91 and 93, the firm-adjusted procedure yields higher paired-difference scores with tighter confidence intervals than do the unadjusted and time-adjusted procedures for each respective sample observed. Additionally, the firm-adjusted performance scores and the related coefficient

measures of alpha and beta (see Table VI, page 95) appear to be more stable across samples than are similar measures arrived at using the other two procedures. These findings have implications to the evaluation of the clean-data screen, and therefore will be discussed at further length in the section pertaining to the clean-data screen.

Support for the time-adjusted procedure is not found. The CAR's and paired-difference findings calculated after the residuals are adjusted for temporal effects are generally marginally lower than the unadjusted CAR's for all samples and all time periods. More important, the t-values obtained using the time-adjusted procedure are also generally lower than those obtained using the unadjusted procedure. As was stated earlier, the justification for applying the time-adjusted procedure is to correct for possible temporal dependencies that could cause the t-values obtained in the unadjusted procedure to be understated. Suggested by the evidence presented in Tables II, IV, and VI, pages 55, 93, and 95, respectively, however, is that any temporally-induced biases are small and that the added complexity involved in adjusting a sample by time as well as the loss of degrees of freedom that results from this adjustment may not be worth the protection against this bias. It is important to note that this conclusion is based on samples of mergers that were selected from a broad range of time periods. For samples that are weighted more heavily with mergers drawn from a concentrated time period, the time adjustment procedure may take on added importance.

Evaluation of the Clean-Data Screen

Common practice in CAPM merger studies is to establish a screen which eliminates from the sample all mergers where one other large merger by the same acquiring firm occurs within a six-year period surrounding the merger of interest. This three-year period before and after the merger is then assumed to be clean of extraneous influences. There may be, however, problems with this assumption. First, "large" is defined by the researcher somewhat arbitrarily, measured, for example, by membership of the acquired firm on the NYSE, or a minimum asset size requirement for the acquired firm of \$10 million book value. A screen using the former definition of large overlooks the possible bias introduced by mergers involving large non-NYSE acquired firms. The latter definition is subject to weaknesses associated with evaluating the size of a firm based on the book value of its asset size, rather than on its future income streams or market value. Defining large by book value, therefore, may allow the introduction of bias through the clean data screen by not considering the possible influence of other large mergers where large is defined by market value. Overlooked entirely by the screen are "non-large" mergers. These minor mergers, however, are far more common than major mergers, favored roughly twenty to one according to the FTC's major and minor merging listings, 1948 to 1979. Finally, events other than mergers may bias the parameters estimated for a merger. These events are likely to include internal diversification moves, a change in top management, and even an advertising slogan. (For example, the re-positioning of Miller Beer by Phillip Morris away from its prior market consisting

of mainly female and upper income consumers, toward instead the blue-collar worker who represents the mainstream of beer drinkers in the U. S. (Business Week, April 2, 1979). To assume, therefore, that the returns calculated for mergers are bias free as a result of the clean data screen is to make a heroic assumption.

Fortunately, the statistical procedures of the CAPM are designed to control for bias related to extraneous events. These procedures assume that the extraneous events are not systematically related to the event of interest, and therefore, due to the central limit theorem, their influences in large samples are averaged out. By aggregating the residuals cross-sectionally and over time relative to an event such as a major merger, the event may be systematically captured while holding constant the influences of all extraneous events.

The existence of frequently merging firms in the sample, however, could theoretically influence the residuals measured for their mergers. For example, in the instances where two mergers by the same acquiring firm in close time proximity to each other, the market-based performance measures observed in the market place for one merger may reflect the market's simultaneous appraisal of both mergers. The purpose of the firm-adjustment procedure proposed in this study is to account for this bias.

Observing the returns calculated for the merger related period across samples as the clean-data screen is relaxed (see Table III, page 91), it appears that the screen has little impact. Any CAR and percent positive differences that are noticed between the samples are small and does not appear to be systematically related to the relaxation of the

screen. For the non-merger related period, however, a very different pattern is indicated. Here, as the clean-data restriction is relaxed, the CAR's show a very definite and constant increase for all but the firm-adjusted samples. This pattern, though possibly due to chance, is also apparent with the percent positive test and adds further questions to the yet unexplained existence of positive abnormal performance during this period. These returns are not considered to be directly related to merger. Langetieg (1978) stated that positive excess returns occurring long before the merger might be interpreted as a motivating factor for the merger. Perhaps as acquiring firms become more active; i.e., merge more frequently and therefore appear only in the samples with less restrictive clean-data screens, the market place offers greater rewards in anticipation of future mergers. This possibility will be explored further in Chapter VI where the relationship of merger experience and performance is addressed directly. Ellert (1976) provided an alternative hypothesis for explaining the existence of positive excess returns during this "non-merger" period. He hypothesized that acquiring firms are successful in managing assets developed both internally and externally.

The current study offers a third explanation for this commonly observed phenomena. The positive abnormal returns observed during the non-merger period may simply be the result of a firm-effect bias. When the residuals in each sample are adjusted to account for any firm-effect dependencies, the CAR's and percent positive scores are more stable across samples and do not suggest any real positive performance, regardless of the clean-data screen used. The firm-adjusted results,

therefore, are consistent with the assumptions of the CAPM that during a period of equilibrium, the abnormal performance of a firm will approach zero. The firm-adjustment procedure, therefore, is recommended and appears to be especially important as the clean-data screen is relaxed.

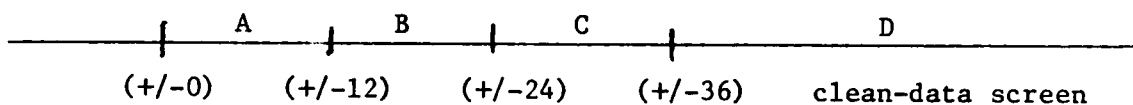
Further support for the firm-adjustment procedure is found in Table VI, page 95. As the screen is relaxed, the alpha coefficient terms associated with the market model, particularly alpha, monotonically increases during the pre-merger period. Alpha, considered to represent a performance measure, is simply the intercept of the characteristics line on the vertical axis and is calculated as the average of the alphas for the individual stocks making up the merger portfolio. In theory, the alpha for an individual stock should be zero. Alphas that differ from zero might be observed if the market were in disequilibrium, if there were market imperfections, or if there were statistical problems (Van Horne, 1980). As was explained earlier, the purpose of the clean-data screen is to protect against the latter problem which is theoretically possible when the parameters of the CAPM estimated for a single merger become influenced by other mergers completed by the same acquiring firm. Similar to the performance trends observed in Table III, page 91, the increase in alpha is not nearly as dramatic for the firm-adjusted samples as it is for the other sets of samples.

The increase in alpha observed in all cases may represent systematic differences in the samples. For example, the samples with the more relaxed clean-data screens by construction are weighted more

heavily with frequently merging firms. As suggested by hypothesis II, these firms may consistently outperform the market and therefore may be associated with higher alphas. Alternatively, the increase in alpha may be the result of bias, measurement error, and/or market imperfections. To what extent, then, are the differences observed as the screen is relaxed related to systematic differences in the samples selected, and to what extent are the differences related to bias measurement error and market imperfections?

This question cannot be properly addressed using the prior four samples because the samples are not statistically independent. The (+/-36) sample is actually a subset of the (+/-24) sample, the (+/-24) sample a subset of the (+/-12) sample, and so on, thus the problem of shared variance occurs.

To statistically compare the samples and therefore systematically judge the importance of the clean-data screen and the bias associated with the relaxation of the screen, a marginal test is developed. The procedure involves dividing the full sample of mergers, represented by the (+/-0) sample, into four distinct samples defined by the clean-data screen as follows:



The mergers that are unique to region A will make up marginal sample (+/-0M). Similarly, the mergers unique to regions B, C, and D will make up marginal samples (+/-12M), (+/-24M), and (+/-36M), respectively. Each marginal sample, by construction, systematically groups mergers in terms of the likelihood that their performance measures will be

biased by the influence of multiple mergers. Stated otherwise, if the performance results of two marginal samples are compared, where one sample contains mergers truly uncontaminated by extraneous merger influences, and the second sample truly contaminated by extraneous merger influences, the second sample is expected to show overall higher positive performance measures than the first. The theoretical justification for this prediction is that all CAPM merger studies have shown that merger does have a positive impact on the residuals of the acquiring firm. Therefore, in a situation where two mergers occur in close time proximity to each other, their combined influence, if left unadjusted, should be somewhat cumulative and positive.

Table VIII presents the unadjusted and firm-adjusted CAR, percent-positive, and paired-difference results and their respective probability tests for the four marginal samples. Due to the fact that differences are detected in the location of the time period when the market reaction to merger begins, the table also identifies for comparison purposes the trough point, the average monthly CAR's for periods $(-T, -1)$ and the average monthly paired-difference score. The three appear in the table as T , $\overline{CAR}$, and $\overline{PD}$, respectively. Finally, the table includes the results of the multiple comparison test used on the paired-difference results for each unadjusted and firm-adjusted marginal sample to test for possible significant differences between their performance means.⁴

⁴ Appendix III contains a similar table, only alpha is excluded from the performance results.

TABLE VIII
MARGINAL SAMPLE PERFORMANCE RESULTS

Time	Sample					
	+/-36MU CAR	N = 315 % Pos.	+/-24MU CAR	N = 68 % Pos.	+/-12MU CAR	N = 138 % Pos.
-67, -19	-.0012	51	.2207	66**	.0844	62***
-67, -BT	-.0141	50	.2247	65**	.0650	60***
-18, -1	.0774***	60***	.0632	62*	.1044***	62***
-T, -1	.0903***	59***	.0591	61**	.1287***	60***
+1, +18	-.0158	47	-.0148	46	.0172	52
+19, +37	-.0270	48	-.0007	50	-.0202	49
+38, +64	.0058	50	-.0694	34**	-.0404	42*
PD/T	.0972***/-22		.0050/-13		.0969**/-22	
PD/CAR	.0044/.0041		.0004/.0045		.0044/.0059	
					.0922**/-28	
					.0033/.0053	
Time	Sample					
	+/-36MF	N = 257	+/-24MF	N = 39	+/-12MF	N = 73
-67, -19	-.0163	51	.2038	74**	.0601	56
-67, -BT	-.0300*	48	.2013	69**	.0810	59
-18, -1	.0801***	61***	.0626	64	.1067*	60*
-T, -1	.0939***	59***	.0652	67*	.0850	60*
+1, +18	-.0131	45	.0042	49	.0157	51
+19, +37	-.0317	46	.0192	49	-.0335*	44
+38, +64	.0072	52	-.0601	31*	-.0616	38*
PD/T	.1086***/-22		.0120/-14		.0523/-14	
PD/CAR	.0049/.0042		.0009/.0047		.0037/.0061	
					.2370*/-45	
					.0052/.0047	

Multiple Range Tests on unadjusted PD: Overall F Ratio: 0.526
F Prob.: 0.665

Multiple Range Tests on firm-adjusted PD: Overall F Ratio: 0.319
F Prob.: 0.811

No pattern is observed between the performance results obtained for the unadjusted or firm-adjusted marginal samples. Rather than show an increasing trend as predicted would occur as the clean-data screen is relaxed, all performance measures move in a seemingly random direction as the screen is relaxed. The (+/-24) marginal samples appear to be the outlier. The merger activity for these two portfolios of mergers are detected considerably later than the other marginal samples and out of character with the Trough detected for the macro-samples. Additionally, the CAR and paired-difference scores for the (+/-24M) samples indicate small gains as a result of merger. According to the low F-scores obtained from the multiple range tests, all performance differences between marginal samples may be due to chance. Alternatively, the observations for the (+/-24M) samples and low F-scores may be the result of the small sample sizes associated with the (+/-24M) samples.

Table IX presents the average coefficient terms associated with each unadjusted and firm-adjusted marginal sample. Once again, the multiple comparisons test is used to test for possible significant differences between the mean alphas and betas for each set of marginal samples.

For the unadjusted marginal samples, F-ratios significant to the .01 level are found for both the pre- and post-merger alphas indicating that differences exist between at least one of the possible comparisons. For the firm-adjusted marginal samples, the ratio is significant at the .07 level for the pre-merger alphas while not significant for the post-merger alphas. In no instances are the betas

TABLE IX
MARGINAL SAMPLE REGRESSION COEFFICIENT STATISTICS

Sample	Pre-Alpha	Post-Alpha	Pre-Beta	Post-Beta
+/-36U	.0007	-.0007	1.0193	0.9578
+/-36F	.0006	-.0008	1.0294	0.9743
+/-24U	.0043	-.0018	0.9886	0.9704
+/-24F	.0038	-.0012	0.9769	0.9737
+/-12U	.0024	-.0008	1.0160	0.9460
+/-12F	.0021	-.0013	1.034	0.9611
+/-OU	.0033	-.0032	1.104	1.0070
+/-OF	.0029	-.0035	1.074	1.0288

Multiple Range Test on unadjusted coefficients:

Pre-Merger Alpha	Overall F Ratio: 5.130
	F Prob.: 0.0016
Post-Merger Alpha	Overall F Ratio: 4.038
	F Prob.: 0.0073
Pre-Merger Beta	Overall F Ratio: 0.175
	F Prob.: 0.9132
Post-Merger Beta	Overall F Ratio: 1.266
	F Prob.: 0.2849

Multiple Range Test on firm-adjusted coefficients:

Pre-Merger Alpha	Overall F Ratio: 2.397
	F Prob.: 0.0676
Post-Merger Alpha	Overall F Ratio: 1.818
	F Prob.: 0.1431
Pre-Merger Beta	Overall F Ratio: 0.627
	F Prob.: 0.5976
Post-Merger Beta	Overall F Ratio: 0.753
	F Prob.: 0.5208

found to be significantly different. These findings confirm what was observed for the coefficients of the macro-samples.

To summarize, differences are observed in the alpha term using the marginal samples as the clean-data screen is relaxed.⁵ If the firm-adjustment procedure is able to account for much of the bias associated with the influence of multiple mergers on the coefficients estimated by the model as this study proposes, then the differences observed between the coefficients of two marginal samples can be broken down into two components: one representing real performance differences associated with systematic differences in the respective samples and, of course, measurement error; the other representing an approximation of bias and market imperfections. The difference between the two firm-adjusted measures represent the former; the difference between the change in the unadjusted measures and the change in the firm-adjusted measures represents the latter.

Table X presents the findings of the above procedure. Included also in the table is an approximation of the percent of bias represented in the coefficients of the marginal samples. With the exception of the (+/-24M) sample which may represent an outlier sample, the bias in all cases appears small; i.e., less than 10 percent for the alpha term and less than 5 percent for the beta term. Interestingly, the approximate real difference between the (+/-36M) and (+/-0M) samples is negative during the pre-merger period indicating that perhaps the

⁵By construction, the paired-difference test will not be subject to any multiple merger bias associated with alpha. Therefore, the paired-difference measure is recommended as the clean-data screen is relaxed.

TABLE X
ANALYSIS OF MARGINAL SAMPLE COEFFICIENTS

Samples	Real Differences		Beta		% Bias	
	Alpha	Beta	Alpha	Beta	Alpha	Beta
<u>Pre-Merger</u>						
(+/-36M) - (+/-24M)	-.0032	.0525	-.0004	-.0218	9.3	2.2
(+/-24M) - (+/-12M)	.0017	-.0571	.0002	.0297	8.3	2.9
(+/-12M) - (+/-0M)	.0008	-.0397	-.0001	.0483	3.3	4.4
(+/-36M) - (+/-0M)	-.0023	.0443	.0003	.0404	9.1	3.7
<u>Post-Merger</u>						
(+/-36M) - (+/-24M)	.0004	-.0094	.0007	-.0032	38.9	3.3
(+/-24M) - (+/-12M)	.0001	.0126	-.0011	.0118	137.5	1.2
(+/-12M) - (+/-0M)	.0022	-.0677	.0002	.0067	6.2	0.7
(+/-36M) - (+/-0M)	.0027	-.0645	.0002	.0153	6.2	1.5

more frequently merging firms, contained in the (+/-OM) sample by construction, outperform the infrequently merging firms. More will be stated on this subject in Chapter VII.

C. Conclusions

The results of this chapter serve both to corroborate and to extend earlier CAPM merger studies concerning the effects of mergers on the acquiring firm's stockholders. The major findings are as follows:

1. The commonly used CAR and percent positive measures calculated over certain specified pre- and post-merger periods were found to be comparable with some prior CAPM merger studies.
2. Two new performance techniques; i.e., the trough and paired-difference, were introduced and were found to be superior (i.e., lead to tighter confidence intervals) to the conventional performance measures. In addition, the paired-difference measure, by construction, is not influenced by any multiple merger bias associated with the alpha term, and therefore is recommended when the clean-data screen is relaxed.
3. Little support was found for the time-adjusted procedure on the macro-sample.
4. The new adjustment procedure (i.e., the firm-adjustment procedure) was introduced and found to be superior to the time-adjustment and unadjusted procedures. In particular, the firm-adjustment procedure (as well as the paired-difference measure) is recommended when the clean-data screen is relaxed.

5. A procedure, termed "marginal analysis," was performed to systematically evaluate the importance of the clean-data screen. Differences were noticed between the alpha scores of the marginal samples. These differences, however, may be mostly real differences; i.e., more frequently merging firms may consistently outperform the market. The results, therefore, suggested that the difference between screened and unscreened samples can be attributed to mostly systematic sampling differences as a result of the screen and not to the multiple-merger bias that the screen was established to protect against.

CHAPTER V

TYPE ANALYSIS

A. Results

As was observed in Chapter IV, the acquiring firms appear to share with the acquired firm in at least some of the gain that is attributed to merger, and therefore the hypothesis that the market for acquisitions is perfect is rejected. The purpose of Chapters V and VI is to discover if certain acquiring firms gain on average more from merging than other acquiring firms. Chapter V will test the hypothesis that a relationship exists between the strategic fit of the acquiring and acquired firms and the performance of the acquiring firm as a result of merger. The null hypothesis is that the marketplace is indifferent between various merger fits and therefore will reward all acquiring firms approximately the same.

Four types of strategic fit were defined in Chapter III. They are as follows: Product/Market Related or PMR; Product/Market Constrained or PMC; Financially Constrained or FC; and Vertically Constrained or VC. It is predicted that acquiring firms will benefit most from PMR mergers, second from PMC mergers, third for FC mergers, and benefit the least from VC mergers. The justification for this prediction appear in Table II, page 55.

Two samples, the (+/-36) sample and the (-0) sample, are selected to test this chapter's hypothesis. The (+/-36) sample is selected because it conforms to the traditional data restrictions

commonly applied in CAPM merger studies. The findings using this sample, therefore, should be generalizable to those past studies. The (-0) samples, an "efficient market sample" described in Chapter III, is selected because it represents 76 percent of the population of NYSE major mergers during 1948-1979. According to the law of large numbers, the larger the sample size, the more probable it is that the sample mean comes arbitrarily close to the population mean. The findings from the (-0) sample may, therefore, approximately describe reality, assuming that measurement error is minimal.

Table XI presents a content analysis of the (+/-36) and (-0) samples by year by merger type. Table XII compares the content by type of these two samples to the population of NYSE acquiring firms involved in major mergers and the full population of acquiring firms involved in major mergers including both NYSE and non-NYSE acquiring firms. Both tables cover the years 1948 through 1979. The (+/-36) sample by construction, however, includes mergers only through 1974.

With respect to Table XI, it appears that temporal dependencies in the residuals may exist that could bias the results. In Chapter IV it was observed that the time-adjustment procedure yielded results for the macro-samples that were very similar, though perhaps inferior, to those obtained using the unadjusted procedure. The influence of temporal effects, however, may be more apparent for type analysis where the overall sample is broken down into four distinct subgroups. As can be observed from the table, each merger type appears to be weighted heavily with observations from a few select time periods and



TABLE XI
CONTENT ANALYSIS OF SAMPLES BY TYPE

Year	Type/Sample							
	PMR		PMC		FC		VC	
	+/-36	-0	+/-36	-0	+/-36	-0	+/-36	-0
1948	2	0	1	1	0	0	0	0
1949	1	2	0	0	0	0	2	2
1950	0	0	1	1	0	0	0	0
1951	2	2	0	0	1	1	0	1
1952	0	1	0	1	1	3	0	0
1953	3	5	3	6	0	1	0	2
1954	6	9	4	6	0	2	1	3
1955	3	13	11	23	2	6	2	4
1956	3	11	5	8	1	2	4	7
1957	5	12	3	7	0	2	1	5
1958	6	14	0	4	0	0	3	7
1959	6	11	3	7	3	7	0	1
1960	5	11	2	5	0	3	1	3
1961	9	15	4	4	2	5	1	2
1962	5	14	6	10	2	7	3	9
1963	4	18	0	3	2	4	0	5
1964	8	22	2	4	2	6	3	7
1965	6	22	4	6	3	6	2	5
1966	8	23	1	2	2	7	1	5
1967	12	34	2	5	2	14	0	5
1968	13	67	1	4	10	24	2	7
1969	9	34	3	6	10	19	0	10
1970	12	24	1	4	3	14	1	2
1971	6	14	2	3	3	10	0	0
1972	3	16	2	3	5	11	3	5
1973	1	7	5	10	5	12	3	4
1974	1	7	5	13	4	10	3	3
1975	NA	13	NA	3	NA	17	NA	2
1976	NA	17	NA	5	NA	14	NA	4
1977	NA	23	NA	12	NA	18	NA	2
1978	NA	17	NA	11	NA	25	NA	7
1979	NA	1	NA	2	NA	2	NA	0
Total	139	481	71	179	63	252	42	119

TABLE XII
 SAMPLE STATISTICS OF MERGERS--COMPARISON
 OF SAMPLES AND POPULATION BY TYPE

Type	Sample			
	+/-36	-0	NYSE	Major Mergers
Absolute Comparison				
PMR	139	481	601	828
PMC	71	179	228	401
FC	63	252	321	498
VC	42	119	143	196
Total	315	1031	1293	1923
Relative Comparison				
PMR	.44	.47	.47	.43
PMC	.23	.17	.17	.21
FC	.20	.24	.25	.26
VC	.13	.12	.11	.10
Total	1.00	1.00	1.00	1.00

these time periods differ from subsample to subsample. For example, approximately 13 percent of the observations of PMR mergers come from the year 1968 for the (-0) sample, while almost 14 percent of the PMC mergers come from the year 1955 for the same sample.

The time-adjusted procedure is also favored for type analysis over the firm-adjustment procedure because of the grouping procedure used. To the extent that the same acquiring firm is involved in more than one merger type, any firm-induced bias related to that firm is partially to fully avoided. However, it is possible that frequently acquiring firms may specialize in one type of merger. To account for this possibility, the results of the type analysis for the (-0) sample will be reported using both the time and firm-adjustment procedures.

The observation from Table XII is that the four merger types are properly represented in the (+/-36) and (-0) samples. The relative frequency for each type in these samples approximates the relative frequency of each type in the NYSE major merger population and the total major merger population.

Table XIII presents the unstandardized, time adjusted CAR's and percent positive results for the various pre-merger and post-merger periods selected and the corresponding paired-difference score for the pre-merger period for the (+/-36) sample by merger type. Similarly, Table XIV presents pre-merger unstandardized, time and firm-adjusted CAR's, percent positive, and paired-difference scores by type for the (-0) sample. In all cases, the paired-difference score is reported in transformed form to represent the total change in the performance of the portfolio of acquiring firms as a result of merger, and in

TABLE XIII
(+/-36) TIME-ADJUSTED TYPE ANALYSIS^a

Time	Type-PMR CAR	N = 102 % Pos.	Type-PMC CAR	N = 56 % Pos.
-67, -19	.0266	52	.0865	55
-67, -BT	-.0145	49	.0316	55
-18, -1	.1053***	67***	.0106	52
-T, -1	.1464***	65***	-.0376	54
+1, +18	-.0172	46	-.0194	48
+19, +37	-.0306	46	-.0316	41
+38, +64	.0133	47	.0124	60
PD/T	.1575***/-29		.0121/-22	
PD/CAR (-T, 01)	.0054/.0050		.0006/-0.0013	
	Type-FC CAR	N = 50 % Pos.	Type-VC CAR	N = 39 % Pos.
-67, -19	-.0582	46	-.0727	41
-67, -BT	-.0834	46	-.0727	41
-18, 01	.0505	58	.1233**	64
-T, -1	.0757	64*	.1233**	64
+1, +18	-.0095	46	-.0350	44
+19, +37	.0275	60	-.0296	41
+38, +64	.0496	56	-.1241	31**
PD/T	.1165*/-22		.1501**/-18	
PD/CAR (-T, -1)	.0053/.0034		.0083/.0069	

Multiple Range test on paired difference:

Overall F Ratio: 1.463
F Prob.: 0.225

^aOne, two, or three asterisks denote that the null hypothesis tested using standardized residuals is rejected at the 10 percent, 5 percent, or 1 percent levels, respectively. The symbols "T" and "BT" associated with Time denote Trough and Before Trough, respectively.

TABLE XIV

(-O) TIME AND FIRM-ADJUSTED TYPE ANALYSIS^a

	Time-Adjusted		Firm-Adjusted	
	Type PMR CAR	N = 225 % Pos.	Type PMR CAR	N = 257 % Pos.
-67, -19	.1192	66***	.0968	59
-67, -BT	.0615	59***	.0331	51
-18, -1	.0731*	65***	.0773**	61***
-T, -1	.1308	66***	.1410**	61***
PD/T	.0635*/-35		.1048**/-35	
PD/CAR	.0018/.0037		.0030/.0040	
	Type PMC	N = 130	Type PMC	N = 125
-67, -19	.0431	55	.0369	57
-67, -BT	.0065	61	.0120	56
-18, -1	.0524	54	.0463	54
-T, -1	.0890	58*	.0633	59**
PD/T	.0846**/-27		.0498/-27	
PD/CAR	.0031/.0033		.0018/.0023	
	Type FC	N = 153	Type FC	N = 172
-67, -19	.0685	52	.0511	53
-67, -BT	.0461	52	.0195	50
-18, -1	.1103***	67***	.0981***	64***
-T, -1	.1327***	72***	.1297***	67***
PD/T	.1101***/-22		.1201***/-22	
PD/CAR	.0050/.0060		.0055/.0059	
	Type VC	N = 107	Type VC	N = 94
-67, -19	.0199	53	.0039	51
-67, -BT	-.0173	48	-.0335	47
-18, -1	.1587***	65***	.1223***	63**
-T, -1	.1215***	66***	.1597***	65***
PD/T	.1711***/-28		.1837***/-28	
PD/CAR	.0061/.0043		.0066/.0057	

Multiple Range Tests on PD

Overall F Ratio: 2.814

F Prob.: .039

Multiple Range Tests on PD

Overall F Range: 2.185

F Prob.: .089

^aOne, two, or three asterisks denote that the null hypothesis tested using standardized residuals is rejected at the 10 percent, 5 percent, or 1 percent levels, respectively. The symbols "T" and "BT" associated with Time denote Trough and Before Trough, respectively.

average monthly form, signified in the tables as $\overline{PD}$. Similarly, the CAR's for the period $(-T, -1)$ are also presented in average monthly form, signified in the tables as $\overline{CAR}$. In addition, each performance measure with the exception of $\overline{PD}$ and $\overline{CAR}$ include the findings of probability tests performed on their respective standardized scores. The null hypothesis in the pre-merger periods is that the merger, regardless of type, has no impact on the wealth of the acquiring firms' stockholders because the acquisition market for that merger type is perfect. The null hypothesis in the post-merger period is that no adjustment will occur in the market's pre-merger assessment of the merger because the market acts efficiently. In all cases, one, two, or three asterisks signify that the null hypothesis is rejected using a two-tailed t-test at the 10 percent, 5 percent, or 1 percent levels, respectively. Finally, a multiple comparison test is used on the respective paired-difference results for each merger type to test for possible significant differences between the performance means of the four merger strategies.¹

Beginning with the pre-merger CAR results for the $(+/-36)$ sample shown in Table XIII, a descriptive difference is observed during the $(-T, -1)$ period between the performance of the various merger strategies. This finding is consistent with strategic management theory which predicts that strategy is related to performance and therefore the acquisition market will not be perfect.

¹Appendix IV contains similar tables to Tables XIII and IV, except alpha is excluded from the performance results. Appendix IV contain the time-adjusted CAR plots for each merger type portfolio for the $(+/-0)$ sample.

What is surprising is how the market place allocates its rewards between the four merger types. The best performing merger strategy, as measured by the paired-difference score, appears to be the VC merger type, although it was predicted to be the lowest performer. Additionally, the PMR and PMC mergers in general seem not to be more effective than the FC mergers. PMC mergers, in fact, appear to provide negative CAR's for their respective acquiring firms. A multiple range test, computed on the $\overline{PD}$ scores, however, yields an overall F probability at the .225 level indicating that the differences observed may be due to chance.

It is interesting to note that when the paired-difference scores were computed using the conventional trough of (-18), the multiple range test yielded an overall F significant at an .05 level, indicating that at least one true comparison value among all those possible was not zero. These results are misleading. The comparison of the two multiple range tests performed using paired-difference scores calculated with the conventional and trough techniques points out added support for the importance of determining in each case the approximate point in time where the market impact of merger activity begins.

The findings of the (-0) sample, using both the time-adjusted and firm-adjusted procedures are similar, as expected, to that of the (+/-36) sample. Once again the CAR and paired-difference scores suggest that VC mergers lead to higher performance for the acquiring firms than do the other merger strategies, while PMC mergers result in the lowest performance. The rank order of the four merger strategies by performance as measured by the paired-difference scores for the time-

adjusted sample leads to results that are totally unexpected and is exactly opposite to the order predicted in Table II, page 55. This finding is further reinforced by an overall F for the multiple range test significant at the .04 level. The overall F computed for the firm-adjusted scores was also found to be significant to the .089 level.² To the extent that the (-0) sample essentially describes the population, the absolute rankings observed between merger types should do a better job of explaining by type the relative performance of acquiring firms involved in major mergers during the period 1948 through 1979 than the significance tests indicate.

The performance of the four merger types during the (-67, -BT) period for all samples suggests that the firms pursuing VC mergers appear to be performing below the market equilibrium rate during this non-merger period, though not significantly below the rate. This may imply that VC mergers may represent "turnaround" or "defensive" strategies for their acquiring firm. Defined by Schendel and Patton (1975) and Weston and Mansinghka (1971), respectively, these two terms refer to strategies that turn underperforming firms into firms which perform at least as well as a control sample.

The performance of the acquiring firms during the post-merger periods regardless of merger type, generally supports the efficient market hypothesis which predicts that the benefits associated with mergers are fully anticipated prior to merger as information becomes

²In both instances, a Scheffe method of multiple comparisons found no two groups to be significantly different at the .05 level.

gradually accessible and that any revision of expectations that may occur during the post-merger period will be negligible. In all instances, performance as measured by CAR's declined slightly and this decline can be attributed to chance. The percent positive test for the (+38, +64) period, however, suggests that possible market inefficiencies occurring for the VC mergers during the (+38, +64) period.

Table XV presents the regression coefficient statistics for the (+/-36) time-adjusted sample and the (-0) time and firm-adjusted samples. A multiple comparison test is used on the respective coefficient means to once again detect for significant differences.

A number of interesting observations can be drawn from Table XV. First, in all cases, the post-merger betas of the consolidated firms are descriptively, at least, lower than their betas prior to merging indicating that on average acquiring firms seek out firms with lower betas. This is consistent with the "risk-reducing motive" used often to explain why firms merge. In addition, the relative changes in betas across merger types suggests a degree of responsiveness on the part of beta to the type of merger although this difference may be attributable to chance. Most notable is the 9 percent decline in beta as a result of merger for the PMR merger. This large change in risk noticed for PMR mergers may have methodological implications to the way in which abnormal returns are measured for acquiring firms during the pre-merger period. In cases where non-stationarity of beta occurs between pre- and post-merger periods, the CAR's for the pre-merger period will be understated when merger decreases systematic risk and positively biased when merger increases systematic risk.



TABLE XV
REGRESSION COEFFICIENT STATISTICS: TYPE ANALYSIS

Sample	Type	Pre-Alpha	Post-Alpha	Pre-Beta	Post-Beta
(+/ -36T)	PMR	.0012	-.0007	1.049	0.9556
	PMC	.0016	-.0005	0.9985	0.9693
	FC	.0004	.0009	1.0562	0.9969
	VC	-.0001	-.0030	0.9514	0.9258
(-OT)	PMR	.0027		1.0315	
	PMC	.0013		1.0049	
	FC	.0023		0.9881	
	VC	.0016		0.9608	
(-OF)	PMR	.0025		1.0332	
	PMC	.0012		0.9992	
	FC	.0019		0.9880	
	VC	.0014		0.9599	

Multiple Range Test on (+/-36T) coefficients by type:

Pre-Merger Alpha	Overall F Ratio: 0.374
	F Prob.: 0.7717
Post-Merger Alpha	Overall F Ratio: 1.486
	F Prob.: 0.2188
Pre-Merger Beta	Overall F Ratio: 0.848
	F Prob.: 0.4689
Post-Merger Beta	Overall F Ratio: 0.336
	F Prob.: 0.7996

Multiple Range Test on (-OT) coefficients by type:

Pre-Merger Alpha	Overall F Ratio: 1.098
	F Prob.: 0.3493
Pre-Merger Beta	Overall F Ratio: 0.064
	F Prob.: 0.9762

Multiple Range Test on (-OF) coefficients by type:

Pre-Merger Alpha	Overall F Ratio: 0.799
	F Prob.: 0.4949
Pre-Merger Beta	Overall F Ratio: 1.183
	F Prob.: 0.3153

Also of interest concerning the coefficients observed in Table XV is that in all cases, VC mergers have the lowest pre-merger systematic risk characteristics and alphas, while the PMR merger have the highest pre-merger systematic risk characteristics and alphas. The multiple range tests on pre-merger betas suggest, however, that the observed ranking may be due to chance. In addition, caution is suggested in interpreting the changes in the coefficients. Langetieg, Haugen, and Wichern (1980) stated that risk changes might be associated with the general instability associated with the risk variable. Roll (1977) discussed the methodological problems associated with estimating alpha.

B. Conclusions

The findings of the pre-merger analysis completed in this chapter suggests that the market for acquisitions is not perfectly competitive. When an overall sample of mergers is broken down into four strategic groups, homogeneous to merger type, differences between the performances of acquiring firms are noticed. This finding is important because it represents the first time any study has found such empirical evidence.

The actual ranking of merger strategies by performance, however, defies current strategic management theory on diversification strategies in general and on mergers in specific. In particular, concentric and horizontal mergers do not on average outperform conglomerate mergers. Additionally, vertical mergers, predicted to perform lower than the other three types, outperformed the other types. Finally, support is

found for forming portfolios of mergers from more homogeneous samples. Discrepancies in the conclusions of prior studies on the issues such as the perfectness of the acquisition market, the efficiency of the market, and the degree of stationarity of beta may be the result of applying the standard CAPM methodology to highly heterogeneous samples.

CHAPTER VI

EXPERIENCE ANALYSIS

A. Results

In the previous chapter, it was shown that the market for acquisitions may not be perfect. The overall sample of mergers was sub-aggregated into four subsamples, homogeneous to the strategy being employed by the acquiring firms as identified by merger type. Chapter VI will now test the hypotheses that predict a positive relationship between the experience of the acquiring firm in consolidating firms and the gain in the performance accruing to that firm as a result of merger. Two measures, referred to as Frequency and Learn, are developed to estimate the acquiring firm's level of experience.

Frequency

Frequency is calculated for each merger by totaling the number of major mergers that the acquiring firm of that merger participated in during the 1948-1979 time period observed for this study. Each merger is then grouped with other mergers that have been identified with the same frequency measure. In developing this measure, all name changes by the acquiring firm have to be accounted for. For example, Automatic Sprinkler Corporation of America later became ATO, Inc., National Cylinder Gas Company became Chemetron Corporation, and so on.

In Chapter IV it was stated that the samples containing strict clean-data screens contain less frequently merging firms than the samples that had more relaxed data screens. This point is illustrated

in Table XVI. Table XVI presents a content analysis of the (+/-36) and (+/-0) samples with the population of NYSE listed acquiring firms involved in major mergers during the period 1948 through 1979. The statistics on the NYSE population was derived by cross referencing the FTC's listing of major mergers with the CRSP tapes, the latter implying NYSE membership. All name changes for the acquiring firms during this time period are accounted for. The (+/-36) and (+/-0) samples, by construction, include mergers through 1973.

It appears that the (+/-36) sample may, as predicted in Chapter II, suffer from a sampling bias. Whereas the median Frequency measure for the relaxed-screen sample during 1948-1979 is between three and four, and for the NYSE population is about three, the median Frequency for the (+/-36) sample is between one and two, with Frequency = 1 dominating this sample. To the extent that experience is related to performance and Frequency acts as a reliable measure of experience, the conclusions of merger studies using the (+/-36) sample may apply only to infrequently merging firms. Therefore, the (+/-0) sample will be selected for analyzing the relationship between Frequency and performance. This sample fairly adequately approximates by Frequency the population of NYSE acquiring firms involved in major mergers. Additionally, the (+/-0) sample represents over 56 percent of the population of NYSE acquiring firms, and therefore it may essentially represent the population.

Table XVII presents the unstandardized, firm-adjusted CAR's and percent positive results for the various pre-merger and post-merger periods selected and the corresponding paired-difference score for the

TABLE XVI
Content Analysis of Samples and Population by Frequency

+/-36 Sample				+/-0 Sample				Population			
Frequency	Freq.	Cum. Freq.	%	Frequency	Freq.	Cum. Freq.	%	Frequency	Freq.	Cum. Freq.	%
1	126	126	40.00	1	126	126	16.41	1	291	291	21.29
2	56	182	17.79	2	104	230	13.54	2	226	517	16.53
3	56	238	17.79	3	113	343	14.71	3	204	721	14.92
4	36	274	11.43	4	109	452	14.19	4	168	889	12.29
5	17	291	5.40	5	71	523	9.25	5	90	979	6.58
6	13	304	4.13	6	63	586	8.20	6	102	1081	7.46
7	7	311	2.22	7	32	618	4.17	7	63	1144	4.61
8	1	312	0.32	8	18	636	2.34	8	32	1176	2.34
9	1	313	0.32	9	21	657	2.73	9	36	1212	2.63
11	1	314	0.32	11	24	681	3.13	11	33	1245	2.41
13	1	315	0.32	12	21	702	2.73	12	24	1269	1.76
				13	17	719	2.21	13	26	1295	1.90
				14	8	727	1.04	14	14	1309	1.02
				17	20	747	2.60	17	34	1343	2.49
				24	21	768	2.70	24	24	1367	1.76
							100.00				100.00

TABLE XVII

(+/-0) FIRM-ADJUSTED FREQUENCY ANALYSIS^a

Time	Freq. = 1 CAR	N = 126 % Pos.	Freq. = 2 CAR	N = 66 % Pos.
-67, -19	-.02447	48	.0456	59
-67, -BT	-.0376	46	.0289	53
-18, -1	.0960***	61**	.1043***	67**
-T, -1	.1091***	54	.1210***	68***
+1, +18	-.0020	48	-.0606	39
+19, +37	-.0731	45	-.0775	33**
+38, +64	-.0170	54	-.0549	36**
PD/T	.1275***/-22		.1088***/-20	
PD/CAR	.0058/.0050		.0054/.0061	
	Freq. = 3	N = 55	Freq. = 4,5	N = 54
-67, -19	.0051	47	.0567	54
-67, -BT	-.0166	44	-.0091	52
-18, -1	.0295	60	.0960	72***
-T, -1	.0512	60	.1618	74***
+1, +18	-.0291	51	-.0530	44
+19, +37	-.0088	49	-.0277	44
+38, +64	.0850	64*	-.0334	46
PD/T	.0758/-40		.1745**/-39	
PD/CAR	.0019/.0013		.0045/.0041	
	Freq. ≥ 6	N = 38		
-67, -19	.1755	75**		
-67, -BT	.0778	71**		
-18, -1	.1127	76***		
-T, -1	.2104	79***		
+1, +18	.0362	55		
+19, +37	-.0054	58		
+38, +64	-.0807	47		
PD/T	.1200/-36			
PD/CAR	.0033/.0058			

^aOne, two, or three asterisks denote that the null hypothesis tested using standardized residuals is rejected at the 10 percent, 5 percent, or 1 percent levels, respectively. The symbols "T" and "BT" associated with Time denote Trough and Before Trough, respectively.

pre-merger period for each Frequency category. Mergers identified with Frequencies of four and five were combined into one category as were all mergers with Frequency scores greater than five. This was done to insure sufficient sample sizes in each merger category. The residuals are firm-adjusted to protect the results against any bias that may be due to possible subjects effects nested in the treatment. This adjustment procedure was found in Chapter IV to be particularly important in samples where the clean-data screen is fully relaxed. In all cases, the paired-difference score is reported in transformed form to represent the total change in the performance of the portfolio of acquiring firms as a result of merger, and in average monthly form, signified by $\overline{PD}$. Similarly, the CAR's for the period $(-T, -1)$ are also presented in average monthly form, signified by $\overline{CAR}$. In addition, each performance measure with the exception of $\overline{PD}$ and $\overline{CAR}$ include the findings of probability tests performed on their respective standardized scores. The null hypothesis in the pre-merger periods is that the merger, regardless of Frequency level, has no impact on the wealth of the acquiring firm's stockholders because the acquisition market for that level of Frequency is perfect. The null hypothesis in the post-merger period is that no adjustment will occur in the market's pre-merger assessment of the merger because the market acts efficiently. In all cases, one, two, or three asterisks signify that the null hypothesis is rejected using a two-tailed t-test at the 10 percent, 5 percent, and 1 percent levels, respectively. Finally, a multiple comparison test is used on the respective paired-difference results for each

Frequency portfolio to test for possible significant differences between the performance means of the five portfolios.¹

Perhaps the most interesting finding from Table XVII comes from observing the trough values across merger Frequency portfolios. It appears that the marketplace anticipates at an earlier date mergers completed by frequently merging firms; i.e., firms that are involved in at least three major mergers during the relevant time period of the (+/-0) sample, than it does for infrequently merging firms. This observation is not meant to imply that the marketplace is omniscient enough to begin to discount the future benefits associated of a particular merger three or more years before that merger actually occurs. Such a conclusion would bestow upon the marketplace supernatural-like powers of foresight. A more reasonable explanation of this occurrence is that the frequently merging firms establish a pattern in the marketplace of completing a major merger within a somewhat predictable time period and the marketplace in turn responds to that pattern.

Had the trough value not been determined individually for each portfolio of mergers, homogeneous to Frequency, the findings of the Frequency analysis would be misleading. A comparison of the CAR's calculated for the traditional (-67, -19) and (-18, -1) periods with the CAR's calculated using the trough technique for the same merger and non-merger periods illustrates this point. The latter approach

¹Appendix V contains a similar table, except alpha is excluded from the performance results. Appendix V also contains the firm-adjusted CAR plots for each merger Frequency portfolio included in Table XVII.

captures more of the abnormal performance in the merger period and less in non-merger period. This observation also adds further clarity to explaining the yet unexplained existence of positive abnormal returns during the non-merger period found in some prior CAPM merger studies, as was already discussed in Chapter IV. The explanation proposed in that chapter by this study was that the positive abnormal returns observed during the non-merger period may simply be the result of a firm-effect bias. A better explanation for this phenomena is that it is likely caused by both a firm-effect bias and sample heterogeneity. (Recall that Chapter IV did not attempt to subaggregate its samples into homogeneous subsamples, but rather analyzed the samples at a macro-level.) This conclusion is consistent with the criticisms expressed in Chapters I and II concerning prior CAPM merger studies; i.e., those studies may suffer from methodological problems because they treat mergers as a homogeneous phenomena.

A second point of interest observed from Table XVII is that contrary to prediction, no clear relationship exists between experience and performance. The merger portfolios containing acquiring firms with Frequency measures of one and two significantly outperform the market and their own pre-merger performance during the merger related period and on a per-monthly basis outperform the more frequently merging firms. The latter portfolios of acquiring firms generally show no significant CAR as a result of merger. However, firms with Frequency measures of four and five, as measured by their paired-difference scores, indicate an average monthly change in performance that is significant to the .05 level and a total change in performance

greater than the less frequently merging firms. This occurs because the marketplace appears to spread out the benefits of the acquiring firms in the Frequency portfolio of four/five on average at least seventeen months longer than it does for the less frequently acquiring firms. As indicated by the low overall F-ratio obtained from the multiple range test, however, the above descriptive findings may be due to chance.

Table XVIII presents the regression coefficient statistics for the (+/-0) firm-adjusted sample. As was done previously, a multiple comparison test is used on the coefficient means to detect for significant differences. In only one instance is a significant difference between pre- and post-merger alphas and betas detected. However, with the exception of Frequency portfolio three, the pre-merger alpha pattern reveals a monotonic increase as merger frequency increases indicating that the more frequently merging firms may consistently outperform the market in general, assuming that the market portfolio is properly measured. This confirms the findings of the marginal analysis in Chapter IV. Frequency portfolio three defies explanation (other than this portfolio may be influenced by outliers). Its pre-merger alpha is unexpectedly low; its post-merger alpha increases while the other four portfolios indicate lower post-merger alphas, and its beta is highly non-stationary between pre- and post-merger periods.

Learn

A second measure to estimate the acquiring firm's level of experience is the "Learn" measure. It is a more dynamic measure than

TABLE XVIII

REGRESSION COEFFICIENT STATISTICS: (+/-OF) SAMPLE BY FREQUENCY

Frequency	Pre-Alpha	Post-Alpha	Pre-Beta	Post-Beta
1	.0006	-.0019	1.0448	1.0110
2	.0017	-.0034	1.0622	1.0224
3	.0004	.0012	1.0768	0.9295
4,5	.0023	-.0018	1.0102	0.9543
<u>>6</u>	.0037	-.0010	1.0100	0.9542

Multiple Range Test on coefficients by frequency:

- | | |
|----------------------|---|
| 1. Pre-Merger Alpha | Overall F Ratio: 1.261
F Prob.: 0.2852 |
| 2. Post-Merger Alpha | Overall F Ratio: 2.235
F Prob.: 0.0650 |
| 3. Pre-Merger Beta | Overall F Ratio: 0.350
F Prob.: 0.8438 |
| 4. Post-Merger Beta | Overall F Ratio: 0.893
F Prob.: 0.4684 |

the Frequency measure because it can account for the impact that a change in experience may have on the performance of the acquiring firm as a result of merger. This measure is determined by counting the number of major mergers completed by an acquiring firm during a 120-month period of time prior to the merger of interest. This merger is then identified with the determined sum. The assumption is made that any experience gained more than ten years or 120 months before a merger will have only marginal impact on the performance of the acquiring firm due to first, a likely turnover in management during that time span, and, second, a diminished recollection by the current management of the insights learned from the now long past event.

The following example will depict how the Learn measure is constructed. Suppose that firm A merges in months 75, 120, 190, and 300 where month one refers to the first month of the time period covered by the sample; i.e., January 1948. These five mergers represent all the mergers completed by firm A of which only the last two were completed under firm A's current name. Merger #1 in this example is discarded from the sample because a Learn measure could not be computed for a full ten years prior to month 75. In other words, the sample of mergers that will be examined using the Learn measure will only include those mergers completed after December 1957, and so will differ somewhat from the sample used in the Frequency test. Merger #2 completed during month 120 is preceded in the past ten years by merger #1. Merger #2 receives, therefore, a Learn measure of one. The experience gained from merger #1 and #2 should influence the performance of firm A as it participates in merger #3. A Learn measure of two is assigned

to merger #3. Similarly, merger #4 receives a Learn measure of three. Merger #5, however, does not receive a Learn Measure of four, though it is preceded by four mergers. Only the mergers completed in months 190 and 200 are counted in the Learn measure for that merger because the other two mergers occurred more than ten years prior to merger #5.

This procedure is applied to all the acquiring firms in the sample until each merger is associated with a Learn measure. The mergers are then grouped together according to their Learn measure. The residuals are left unadjusted. A significant firm-effect bias and the results are not expected, however, because the same firm may appear in all Learn categories; i.e., its effect is likely not to be nested in any single category but rather be diversified into other categories.

As was done for the Frequency measure, Table XIX content analyzes the (+/-36) and (+/-0) samples by Learn. The (+/-36) sample, as expected, is weighted heavily with inexperienced firms, as indicated by the fact that almost 70 percent of mergers in the sample are completed by firms that have had no major mergers during the ten years prior to the mergers in the sample. This compares with 39 percent weighting in the (+/-0) sample. Only 9 percent of the mergers in the (+/-36) sample were completed by acquiring firms with a Learn measure equal to two. In comparison, approximately 15 percent of the mergers in the (+/-0) sample had a Learn measure equal to two, and 15 percent of the sample had Learn measures greater than two. Although Frequency was found in the previous section not to be strongly related to the performance of the acquiring firm, to the extent that Learn represents a more reliable measure of experience and is related to performance, it

would seem that the results of the (+/-36) sample may reflect a sampling bias.

Table XX presents the performance analysis of the Learn measure on the (+/-0) sample in a manner similar to that described for Table XVII, page 131. For the Learn analysis, however, mergers identified with Learn measures of three or greater are collapsed into one category to insure sufficient sample sizes in each merger portfolio.²

Similar patterns are revealed from the Learn analysis as was observed from the Frequency analysis. The market anticipates merger activity at an earlier date for the acquiring firms with higher Learn measures. On a monthly basis, the acquiring firms with little or no experience outperform the acquiring firms with more experience, although as indicated by the paired-difference scores, firms with an experience level of Learn = two show the largest total gain in performance. Once again, the low F ratio on the multiple range tests indicate that all differences observed between Learn portfolios on paired-difference scores may be attributed to chance. Comparing the two experience measures, it seems that Learn is a more reliable proxy for the construct of acquisition experience because in general the standardized statistical procedures revealed tighter confidence intervals when the Learn measure was used.

Table XXI presents the regression coefficient statistics for the (+/-0) sample by the Learn portfolios. Significant differences

²Appendix V contains a similar table, except alpha is excluded from the performance results. Appendix V also contains the CAR plots for each merger Learn portfolio included in Table XX.

TABLE XX
(+/-0) LEARN ANALYSIS^a

Time	LRN = 0 CAR	N = 245 % Pos.	LRN = 1 CAR	N = 149 % Pos.
-67, -19	.0302	52	.1019	58*
-67, -BT	.0053**	48	.0696	56
-18, -1	.1130***	65***	.1009**	62***
-T, -1	.1379***	62***	.1332**	62***
+1, +18	-.0219	49	-.0451	44
+19, +37	-.0525	47	-.0359	44
+38, +64	-.0079	50	-.0143	49
<u>PD/T</u>	.1353***/-22		.0891**/-26	
<u>PD/CAR</u>	.0064/.0063		.0034/.0051	

Time	LRN = 2 CAR	N = 92 % Pos.	LRN ≥ 3 CAR	N = 139 % Pos.
-67, -19	.1026	65***	.1755	67***
-67, -BT	-.0249**	49	.0613	59***
-18, -1	.0692	57	.0578	58*
-T, -1	.1967**	70***	.1720**	63***
+1, +18	.0195	54	-.0421	44
+19, +37	-.0281	45	-.0048	51
+38, +64	-.0662	35***	-.0527	44
<u>PD/T</u>	.2476***/-45		.1049*/-35	
<u>PD/CAR</u>	.0055/.0043		.0030/.0049	

Multiple Range Tests on paired-difference:

Overall F Ratio: 1.481

F Prob.: 0.2186

^aOne, two, or three asterisks denote that the null hypothesis tested using standardized residuals is rejected at the 10 percent, 5 percent, or 1 percent levels, respectively. The symbols "T" and "BT" associated with Time denote Trough and Before Trough, respectively.

TABLE XXI
REGRESSION COEFFICIENT STATISTICS FOR (+/-0) LEARN ANALYSIS

Learn	N	Pre-Alpha	Post-Alpha	Pre-Beta	Post-Beta
0	245	.0016	-.0016	1.0377	.9851
1	149	.0030	-.0015	1.0385	.9690
2	93	.0037	-.0011	.9435	.9080
<u>>3</u>	139	.0032	-.0016	1.0725	.9743

Multiple Range Test on Coefficients by Learn

1. Pre-Merger Alpha	Overall F Ratio: 1.163 F Prob.: 0.3230
2. Pre-Merger Beta	Overall F Ratio: 2.357 F Prob.: 0.0708
3. Post-Merger Alpha	Overall F Ratio: 0.075 F Prob.: 0.9732
4. Post-Merger Beta	Overall F Ratio: 1.130 F Prob.: 0.3362

between the means are tested for using a multiple comparison test. An overall F ratio reveals that a significant difference exists between the pre-merger betas at the .07 level. The acquiring firms included in Learn portfolio two, found in Table XX to reap the largest total gain from merger, is also found to possess the lowest systematic risk characteristics.

B. Conclusions

Two measures for estimating the acquiring firm's level of experience in the administrative task of consolidating firms was developed, but are found to be poor predictors of merger-related performance. This finding contrasts with the current theory about strategy and performance.

Further support is found for forming portfolios of mergers from more homogeneous samples. When portfolios of mergers are formed homogeneous by experience, differences are noticed between the market's ability to anticipate future mergers and between the coefficients estimated for each portfolio.

Finally, strong evidence is found to indicate that the traditional (+/-36) sample does not represent the full population of major mergers but rather is weighted heavily by infrequently merging firms. To the extent that differences exist between the market's response to infrequently and frequently merging firms, the conclusions reached by prior CAPM merger studies using the traditional sample cannot be generalized to the full population of mergers.

CHAPTER VIII

DISCUSSION AND CONCLUSION

A. Summary of Major Findings

The purpose of this study has been to re-investigate empirically the market for acquisitions to determine if mergers provide real benefits to the acquiring firms. This question was investigated from a new perspective--one obtained by integrating the literature on merger from the fields of finance and strategic management. The act of merging was viewed as a heterogeneous phenomena. Two taxonomies were developed. The intent of one taxonomy was to form portfolios of mergers homogeneous to the strategic fit of the acquiring and acquired firm; the intent of the other taxonomy was to form portfolios of mergers homogeneous to the amount of experience the acquiring firms have in the administrative task of consolidating organizations.

Two basic hypotheses were tested using performance measures developed from the capital asset pricing model. The first hypothesis predicted a relationship between the strategic fit of the acquiring and acquired firms and the performance of the acquiring firm as a result of merging. This relationship was found to exist at the .04 level of significance for the (-OT) sample and at the .09 level of significance for the (-OF) sample. This finding is important because it represents the first time any study has found empirical evidence that the market place is not indifferent between various merger strategies. This finding is also consistent

with strategic management theory which predicts that strategy is related to performance. The actual ranking of merger strategies by performance, however, defies strategic management theory on diversification strategies in general and on mergers in specific. In particular, acquiring firms that participate in vertical and conglomerate mergers tend to outperform acquiring firms that participate in horizontal and concentric mergers.

The second hypothesis tested predicted a relationship between the administrative experience level of the acquiring firm in consolidating firms and the performance of the acquiring firm as a result of merger. Two measures, Frequency and Learn, were used as proxies for the construct of administrative experience. Contrary to expectations, both were found to be poor predictors of performance.

Aside from the findings arrived at from testing the two basic hypotheses of this study, other major findings include the following:

(1) Mergers appear to benefit the stockholders of the acquiring firm--When the micro-sample of mergers are broken down into portfolios of mergers, homogeneous to some characteristic, the stockholders of certain acquiring firms appear to earn returns that are comparable, even superior, to the wealth gains generally associated in past merger studies with the acquired firms' stockholders. For example, the stockholders of acquiring firms involved in VC mergers showed a total gain in wealth as measured by CAR's of 12.5 percent and 16 percent depending on the sample selected, the trough, and adjustment procedure used. Similarly, FC mergers led to a stock appreciation of between 7.5 percent and 13.3 percent and when Learn was equal to two,

stock appreciation was almost 20 percent. The paired-difference measures suggest even more substantial benefits. This evidence suggests that contrary to the findings of previous studies, the sole motive of merger may be in many instances the maximization of stockholders' wealth.

(2) Previous merger studies may suffer from faulty assumptions-- First, the marginal analysis has shown that the clean-data screen may inadvertently lead to a sampling bias that could have greater impact on the performance results than the bias associated with multiple mergers. The intent of the screen is to protect against the latter bias. Similarly, the comparison study of adjustment procedures found little, if any, support for the commonly used time-adjustment procedure and instead found that the proposed firm-adjustment procedure is superior, especially when the clean-data screen is relaxed. Third, Experience analysis found strong support for the trough procedure. Suggested from the results of this analysis is that the commonly accepted merger related period of $(-18, -1)$ may understate in certain instances the benefits associated with merger. Fourth, previous merger studies may have understated the results associated with a merger by selecting an inferior performance measure. This study argues that paired-difference measure is the more relevant measure because it controls for across-firm variance and by construction avoids the controversy surrounding alpha.

B. Interpretation of Results: Type Analysis

The findings of Chapter V suggests that the market for acquisitions is not perfectly competitive. When the overall sample of mergers

is broken down into four subsamples, homogeneous to strategic fit, differences across merger types are observed. This indicates, as predicted, that there is a relationship between merger strategy and the performance of the acquiring firm. There were, however, a number of unexpected findings in Chapter IV where the current theory about strategy and performance as it applies to mergers is in conflict with the facts. The following explanations are offered to explain these occurrences:

(1) Traditionally posted synergistic benefits are over-rated--The predicted ranking of the merger strategies by performance was based on anticipated synergistic benefits associated with each merger type. The concept of synergy is appealing, but the actual obtainment of synergistic benefits may be elusive. This is true for four reasons. First, it is easy to assume in evaluating an acquisition candidate that products and markets are related, only to discover after the merger is consummated that the assumptions were incorrect. Second, corporate resources, both physical assets and human capabilities, may not be as transferable between business units as is commonly assumed (Hosmer, 1982). Third, the management of the parent company, feeling it "knows the market backwards" in a related merger may get lulled into a false sense of security and neglect the technical aspects (Kitching, 1967). Fourth, the critical element in the success of a merger may not be directly related to the amount of synergy to be released in combining the two companies; rather, it may be the ability of management to consolidate firms.

To summarize, this research project may have indirectly found the existence of synergy by observing that at least some merger strategies provide returns to the stockholders of the acquiring firm that are significantly greater than normal market returns, but it did not find evidence of the more traditional sources of synergy; namely, the production and marketing economies that have been associated most directly to PMR and PMC mergers because the returns of the PMC and PMR mergers were not generally greater than the FC mergers. In light of this evidence, no support is found for Howell's (1970) contention that economies associated with financial and marketing mergers are cumulative.

The above arguments about the existence and influence of synergy on performance makes the assumption that the benefits of consolidation are reflected in the market's appraisal of the acquiring firm. This assumption may not be correct. The concept of synergy implies that the combined firm is worth more together than the two firms operating independently. The terms of the purchase, however, determine how these anticipated benefits are shared between buyer and seller. In a competitive acquisition market, the firm targeted for an acquisition tries to obtain terms commensurate with its estimation of what its assets are worth to the acquiring firms. To the extent that this occurs, the best test of the existence of synergistic benefits may be to examine not only acquiring firms, but also the market's assessment of a sample of acquired firms by merger type. It may be, for example, that the existence of the synergistic benefits associated with production and marketing economies are more evident in the performance of

the acquired firms involved in PMR and PMC mergers than they are in the acquiring firms' performance.

(2) The FTC's categorizations may be unreliable measures of strategy--A standard convention used by researchers who evaluate merger strategies is to use the FTC's classification of five merger types as a way to define types of merger strategies. There are, however, two potential problems associated with using this classification scheme for merger research. Each problem may lead to spurious results.

The first problem refers to a point raised in the past discussion concerning synergistic benefits. It was stated that managers in evaluating acquisition candidates can falsely assume that the products and markets of the acquired firms are related. Overlooked by managers may be subtle differences in the markets served, the requirements of the distribution channels, the production techniques, and the supplier relationships, to name but a few. It is these differences which may inhibit the transference of production and marketing resources from one business unit to the other and it is this transference of resources that is a necessary condition for obtaining production and marketing economies. Due to the subtleness of the differences in products and markets, it may be wrong to assume that the five global categories of merger types developed by the FTC can be used with confidence as a suitable proxy for assessing the type of merger, based on relatedness, for the purpose of evaluating each merger type. To properly assess the relatedness of two business units for research purposes, therefore, a careful study of both units' products and markets may be required for each merger studied; i.e., a case method approach might be a more reasonable research strategy to follow.

A second problem associated with using the FTC's categorization as a means of assessing merger strategies is that this procedure assumes that the explicit actions taken by the firm represents its strategy. This indirect procedure of inferring strategy from post-hoc observations of a firm's actions, however, many result in measures that are inaccurate. Though this procedure was justified in Chapter I, it may be that a firm's intended strategy could provide a superior measure of a firm's strategy. As was stated earlier, direct measures of intended strategies are not likely to be available. Indirect measures, however, may be available in merger proxy statements published by the acquiring firm for stockholders. These statements generally contain comments citing benefits that are anticipated to be derived from participating in a particular merger. Intended strategy could be inferred from these benefits. It is possible that current strategic theory might be supported if mergers are reclassified by their intended strategy.

(3) Antitrust may inhibit the best mergers--It was stated in Chapter II that antitrust may prevent the mergers that could increase stockholders wealth, leaving acquisition-minded firms with a less desirable sample of candidates from which to select. Though antitrust is most commonly associated with horizontal and vertical mergers, it may influence all related mergers depending on how the courts interpret "industry" and "market." For example, is a pleasure boat manufacturer in the sporting goods industry in the boat manufacturing industry, or in an industry of its own? Is a major dairy distributor in New York within or outside its market if it acquires a dairy distributor in Boston?

(4) Vertical mergers have been underestimated--Williamson (1975) points out that economists have not studied vertical integration very much but are suspicious of it because they assume that the supplier market is operating well. In a frictionless, well-functioning market system, integration should only be done, therefore, when it provides technical economies. However, many of the technical gains that are possible through integration are also theoretically possible through long-term supplier or buyer contracts. Furthermore, as explained in Chapter II, vertical integration offers few, if any, diversification economies. In theory, therefore, vertical mergers are difficult to justify as a viable alternative for resource allocation. Rumelt's (1974) earlier study was consistent with this view but reasoned that firms still select this alternative because of what he terms barriers of diversification; i.e., the firm's skill, knowledge and organizational culture are not perceived as being transferable to other diversification alternatives.

The existing theory about vertical integration makes it difficult to explain the conclusions reached by this study. Perhaps the imperfection of the suppliers market are greatly misunderstood. Perhaps there are net economies that are possible by merging that can not be obtained by long-term contracts. Perhaps the importance of an efficient, capital intensive process has been unfairly downplayed during recent times when the attention has been on consumer marketing, product innovation, science based research, and modern portfolio theory. For example, currently Japanese corporations such as Toyota have been able to lower costs through a vertically oriented scheduling procedure

known as "Just-In-Time" (Monden, 1981). Just-In-Time means to produce the necessary units in the necessary quantities at the necessary time.

(5) The verdict is not yet out on conglomerate mergers--Glueck's (1980) Proposition 5.8 reads, "In general, horizontal and concentric mergers were more effective than conglomerate mergers for their stockholders" (p. 233). The evidence as depicted in Table XIV, page 120, of Chapter V does not support this statement. In fact, conglomerate or FC mergers may perform superior to all but the vertical mergers.

The apparent success of the conglomerate mergers may contradict economic theory more so than any of the previously reported unexpected results. The concept of economies of scale is based on relative size. If the functions are related by common technologies, then the larger the business unit, the greater the potential for specialization of labor and capital and therefore the greater the production efficiencies. Conglomerate mergers, by definition, are unrelated mergers, and so their existence is difficult to justify by economic theory. However, as Leontiades (1982) stated, "The longer the conglomerate form persists, and performs satisfactorily, the more tenuous becomes the assumptions of economic theory" (p. 94).

C. Interpretation of Results: Experience Analysis

Much has been written on the importance of management capabilities in consolidating two firms to insure the success of the merger. Administrative problems are believed to be associated with consolidation. The predicted ranking of mergers by performance based on the experience levels of management of the acquiring firm assumes that

management learns to avoid many of these administrative problems through experience. No strong positive relationship was found, however, in Chapter VI between experience and performance for either of the two proxy measures of merger related administrative experience. As was true with the Type analysis, the findings of Experience analysis appears to be in conflict with current theory about strategy and performance. The following three explanations are provided to explain these occurrences:

(1) Experience is over-rated--Both physical assets and human capabilities are not as transferable between business units as is commonly assumed by the literature on synergy. It may be that the experience gained from one acquisition will not be strongly related to the administrative problems in the next acquisition because each merger represents a unique match between products and markets, management personalities, leadership styles, and control systems. Furthermore, the experience gained from one merger may induce a state of complacency on the part of management so that they underestimate the soon to be acquired firm's requirements. With each ensuing merger, the complexity of the acquiring firm increases leading to greater than less administrative problems. Alternatively, perhaps the benefits from experience are given up to the acquired firm during negotiations. Here the acquiring firm may be more willing to pay a higher price for an acquisition candidate because the acquiring firm anticipates fewer consolidation problems and therefore a greater return on its investment. To pursue this supposition further, a separate study is called for which would compare also the markets' evaluation of acquired firms, grouped by the experience level of their acquiring firms.

(2) The two experience measures may be unreliable--Frequency and Learn are indirect measures of the construct called merger experience. To the extent that the relationship does not exist between the number of mergers a firm participates in and the level of its managers' merger experience, random variation is introduced into the analysis which can weaken the results.

A second source of random variation exists that is related to how the two measures are constructed. Experience was defined by the number of major mergers the acquiring firms participated in. Overlooked were minor mergers and their possible influence on the merger experience of the management of the acquiring firms. To the extent that relevant experience is gained also through participation in minor mergers, the exclusion of the minor mergers will also weaken the relationship.

(3) Experience may interact with Type--It is possible that the relationship between performance and the merger activity level of the acquiring firm may vary across merger types; i.e., the merger types which require a greater amount of consolidation (e.g., PMR and PMC merger) will require a management team that is more experienced in consolidating firms than the merger types which require a lesser amount of consolidation. Alternatively, perhaps experience is type specific and therefore the experience gained from dealing with administrative problems for one type of merger does not transfer well to the administrative problems associated with another type of merger. If true, the argument could be made for acquiring firms to specialize in one particular merger type.

D. Interpretation of Results: For Practitioners

Unlike previous merger studies, the findings of this research suggest that merging, or at least certain kinds of merging, may represent for the acquiring firm a strategic act that is consistent with the goal of maximizing stockholders' wealth. In the attempt of finding empirical support for some commonly accepted principles concerning mergers, however, numerous inconsistencies between fact and theory were observed. In other words, this study may end up asking more questions than it answered. The following section, "Suggestions for Future Research," addresses many of the questions that are logical outgrowths of this study. In the meantime, the message for practitioners is to proceed with caution, for the principles taught in course work and management development seminars on the subject of diversification strategies in general and acquisition strategies in particular may not be necessarily correct.

E. Suggestions for Further Research

Future research might investigate the apparent discrepancies in the performance results obtained in the various merger studies, as is depicted in Table VII, page 97. Those differences may be attributed to sampling differences regarding the size of the acquired firms relative to the size of the acquiring firm. The studies that found lower CAR's for the acquiring firms required that the acquired firms be large enough to be listed on the New York Stock Exchange. The studies that found higher CAR's set a more stringent minimum size restriction on their samples. In the latter case, the book value

of the acquired firms' assets had to be at least \$10 million. Perhaps the larger the acquired firm is relative to the acquiring firm, the greater will be the merger's impact on the acquiring firm's returns. The reasoning here is that a merger is an investment decision for the acquiring firm, just as a decision, for example, to purchase a fork lift truck. Although both investments may have positive net present values, clearly the influence of the former will have a greater impact on the future earnings of the firm and therefore on its CAR's and paired-difference measures than will the latter. It would be worthwhile, therefore, to investigate this relationship further.

Alternatively, the differences depicted in Table VII, page 97, may be attributed to sampling differences regarding the inclusion or exclusion of non-NYSE acquired firms. The merger studies that found higher performance gains included in their sample both NYSE and non-NYSE acquired firms, while the studies that found lower CAR's included only NYSE acquired firms. It is possible, therefore, that differences exist between the NYSE and non-NYSE markets which may make acquisitions from the latter markets more profitable. The fact is that very little is known about the non-NYSE markets because all studies that have examined the issues of efficient and perfect equity markets have used the more accessible data from the NYSE. Future research might compare the relative performance of acquiring firms that acquire NYSE firms with the performance of firms that acquire non-NYSE firms.

Future research might also investigate the issue of antitrust and its impact on the various merger types. Ellert (1976) found that antitrust enforcement had a negligible impact on the performance of

acquiring firms. However, the recent intent of antitrust has been to discriminate against certain types of mergers and therefore Ellert's conclusions may suffer from sample heterogeneity.

More research is needed in the area of vertical and conglomerate diversification strategies to reconcile the differences between fact and theory. For example, a comparison study might be made between the benefits associated with forward integration and backward integration. Similarly, a comparison study might be made between acquiring firms that actively pursue unrelated diversification strategies and acquiring firms that participate in conglomerate mergers only to afford them the opportunity to grow in new industries. The FTC's categorization scheme does not differentiate between the two, yet the implicit strategies are quite different. In both examples, the market may appraise the two respective strategies differently, and that difference may help to resolve the apparent conflict between the results observed in this study and the strategic management theory.

Better attempts need to be made for defining the construct of strategy. The original problem of defining this construct was discussed in Appendix I. However, as was stated in section A-2 of this chapter, the results reached in Chapter V may suffer from a lack of clarity in the definition of this construct. More reliable measures of merger strategy may be available from 14D-1 forms on file at the S.E.C. These statements generally contain comments citing anticipated benefits to be derived from mergers and therefore may better approximate the construct of strategy as it is classically defined.



To deal with a similar problem of reliability for the construct of administrative experience, the Frequency and Learn measures might be recalculated to account for minor mergers. Alternatively, a case method approach might be appropriate. Kitching (1967) and Pitts (1976) both indirectly study this construct through the latter approach.

Finally, comparison studies similar to the ones pursued in this research that would investigate the market's evaluation of acquired firms, grouped by Type and by Experience, may prove interesting. The results of these later studies could then be compared to that of the research just completed to determine the total gain in wealth associated by mergers homogeneous to either Type or Experience. Furthermore, systematic differences may be noticed as to how the total gain is shared between acquiring and acquired firm for each kind of merger. As was stated earlier, the existence of synergistic benefits associated but not found with PMC mergers may be more evident in the performance of the acquired firm. Such findings might explain the unexpected results found in the Type and Experience analyses. In addition, insights might be gained in terms of explaining some variance in the premiums paid for acquisitions.

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APPENDICES

APPENDIX I

THE CONSTRUCT OF MERGER STRATEGY

A "classical" definition of strategy assumes that strategy is a pattern of objectives consciously developed in advance of specific decisions to which it applies (Mintzberg, 1976). This definition emphasizes the perceptual aspects of strategy which Thiel (1978) termed "intended strategy." Fundamental to intended strategy is that a relationship exists among the environment, resources, and performance of the firm. The purpose of strategy is to match its patterns of resource allocations to best relate the organization to its constantly changing environment.

A problem that the reader may have with the term "merger strategy," as it is used in this research, is that strategy is being inferred from a single event and not from a firm's intended strategy. However, this procedure can be justified on a number of accounts. First, the construct of intended strategy does not lend itself well to research evaluating the effectiveness of various strategies. This is true because it is near impossible to obtain a description of a firm's intended strategy that is both reliable and objective. Firms are unlikely to make known their intended actions. Second, strategy is dynamic. Patterns of resource allocations are expected to change in anticipation of changes in the external environment. A firm may merge in any given month not because it had an intended strategy for the external market, but rather because at that period of time the

opportunities in the acquisition market relative to the firm's internally generated opportunities are greater. This dynamic view of strategy, as just presented, supports more an "incremental definition" of strategy (Mintzberg, 1976) than it does a classical one.

The view taken by this study, therefore, is that the best indicator of strategy for any given period of time is actions and not intentions. Merger, though not so much a fundamental strategy in its own right, does represent a distinctive strategic act. As such, strategy can be inferred from it. By inferring strategy from a single event, the decisional behavior exhibited by resource allocations actually made by a firm can be more readily and objectively evaluated. Adopting this view of strategy for the purpose of evaluating its relationship with performance is, in addition, not without precedence. Rumelt (1974), Hatten (1974), Patten (1976), and Thiel (1978), to name but a few, defined the construct of strategy in a like manner.

For the purpose of the current study, the construct of merger strategy is defined in the same context as Rumelt's (1974) "diversification strategy"; that is, it encompassed Chandler's (1962) concept of diversification as a strategy (long term goals of an enterprise are first determined followed by a course of action necessary to accomplish those goals) with the Harvard Business School's view of strategy (balance a firm's strengths with the opportunities in the environment). The essential difference between Rumelt's "diversification strategy" and this study's "merger strategy" is that diversification strategy involves both external and internal growth options.

APPENDIX II

ADJUSTMENT PROCEDURES

A. Insuring Independence

The residual returns of different portfolios may not be independent due to the presence of non-market factors such as industry factors, intemporal influences, and firm specific effects. To the extent that dependence of residuals across mergers occurs, the t-value will be understated due to the non-zero covariance in the non-diagonal elements of the variance-covariance matrix. The result of this statistical dependence may be unreliable inferences.

The problem of statistical dependence due to industry factors was addressed by Langetieg (1978) and a discussion of his industry factor procedure appears on pages 69 through 72 of the text. For the reasons discussed, this source of statistical bias is not considered important to remove.

Intemporal effects may occur when two or more mergers share common merger dates. To the extent that the time intervals do not correspond, the influence of any single period will be washed out in large samples. However, to the extent that certain time intervals are weighted heavily in the results (i.e., many mergers share the same intervals), and that interval introduces a non-market influence into the results, the results may be biased. The procedure to remove this residual dependence is similar to the ones used by Mandelker (1973, 1974) and Choi (1980). If two or more mergers occur in the same

month, the abnormal returns for each corresponding calendar month for these mergers are averaged together, creating an equally weighted average series of abnormal returns. This portfolio of mergers, all sharing the same common merger month is then counted as one observation. The remaining single merger portfolios and the equally weighted portfolios make up a new sample where all the drawings are statistically independent cross-sectionally by time.

Unlike previous studies on mergers, this study will be examining the performance results of groups within the sample, defined either by merger type or experience. In order to examine each group yet deal with the problem of possible residual dependence, the procedure as described above will have to be either altered or compromised depending upon the particular considerations of each grouping method. For example, when grouping by merger type, it may occur that on month i eight mergers occurred, two from each type. Forming an equally weighted portfolio of the eight mergers may wash away any between group differences. To properly test the hypothesis that predicts group differences by merger type, equally weighted portfolios will be created for each group; i.e., in the above example, the abnormal returns for each corresponding calendar months for the two mergers in each group which share common merger dates will be averaged together. All drawings from each merger type group will be statistically independent cross-sectionally by time.

When grouping by merger experience, however, the concern for independence across time will need to be compromised. Because the residuals for any merger cannot be adjusted to be independent across

time and within firm specific effects, a choice between the two non-market factor influences needs to be made. When testing the impact of experience of merger activity by the acquiring firm, the choice is made to adjust for firm specific effects. The justification of this choice is that to the extent that a number of mergers correspond to the same acquiring firm, the residuals of these mergers may be dependent due to firm specific effects. As the clean data requirement is relaxed in order to allow mergers into the sample that share the same frequently merging acquiring firm, the possibility of the results being biased increases. Therefore, to remove this firm specific induced bias, the abnormal returns for each relative event for all mergers in the sample that share the same acquiring firm will be averaged together and counted as one observation. As was done with the temporal adjustment, the remaining single merger portfolios and the equally weighted portfolios will make up a new sample where all drawings are statistically independent by firm specific effects.

B. Insuring Identically Distributed Cross- Sectional Drawings

Parametric tests also require that the distributions of the cross-sectional drawings be identical. To do this, the abnormal returns need to be standardized by variability (Choi, 1980; Mandelker, 1974). Assuming that the abnormal returns are independent over time, they can be standardized to have the same variance in each month by dividing each abnormal return by its time-series standard deviation estimate. This estimate is calculated either from the pre- or post-

merger period, depending upon the period of the abnormal return to be standardized. In this study, the standard deviation is estimated over the full sixty-month pre-merger period or the full sixty month post-period time series. The transformed abnormal returns are then averaged across firms and cumulated over time in the procedure described in the methodology section of Chapter III.

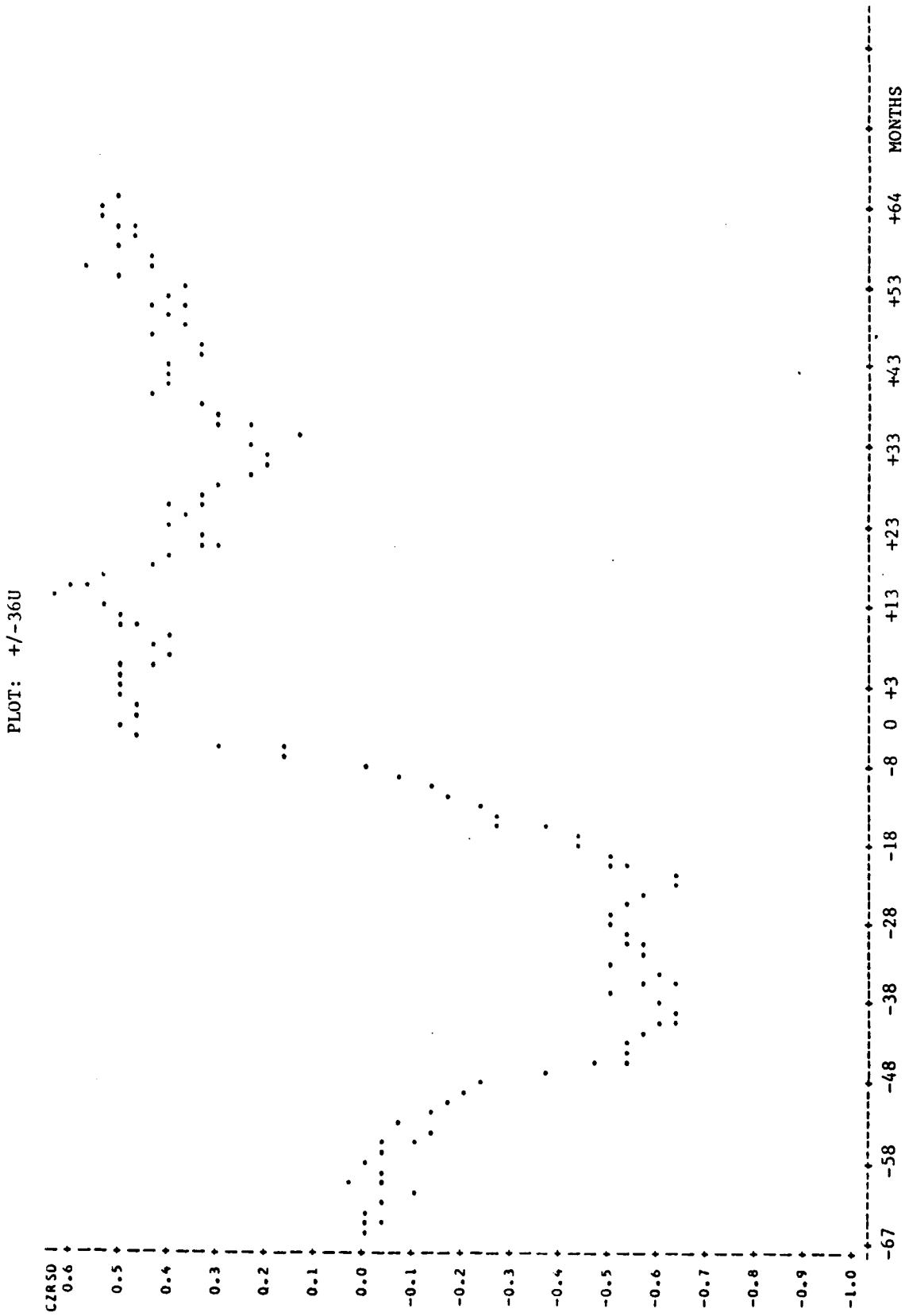
APPENDIX III

TABLE A-1

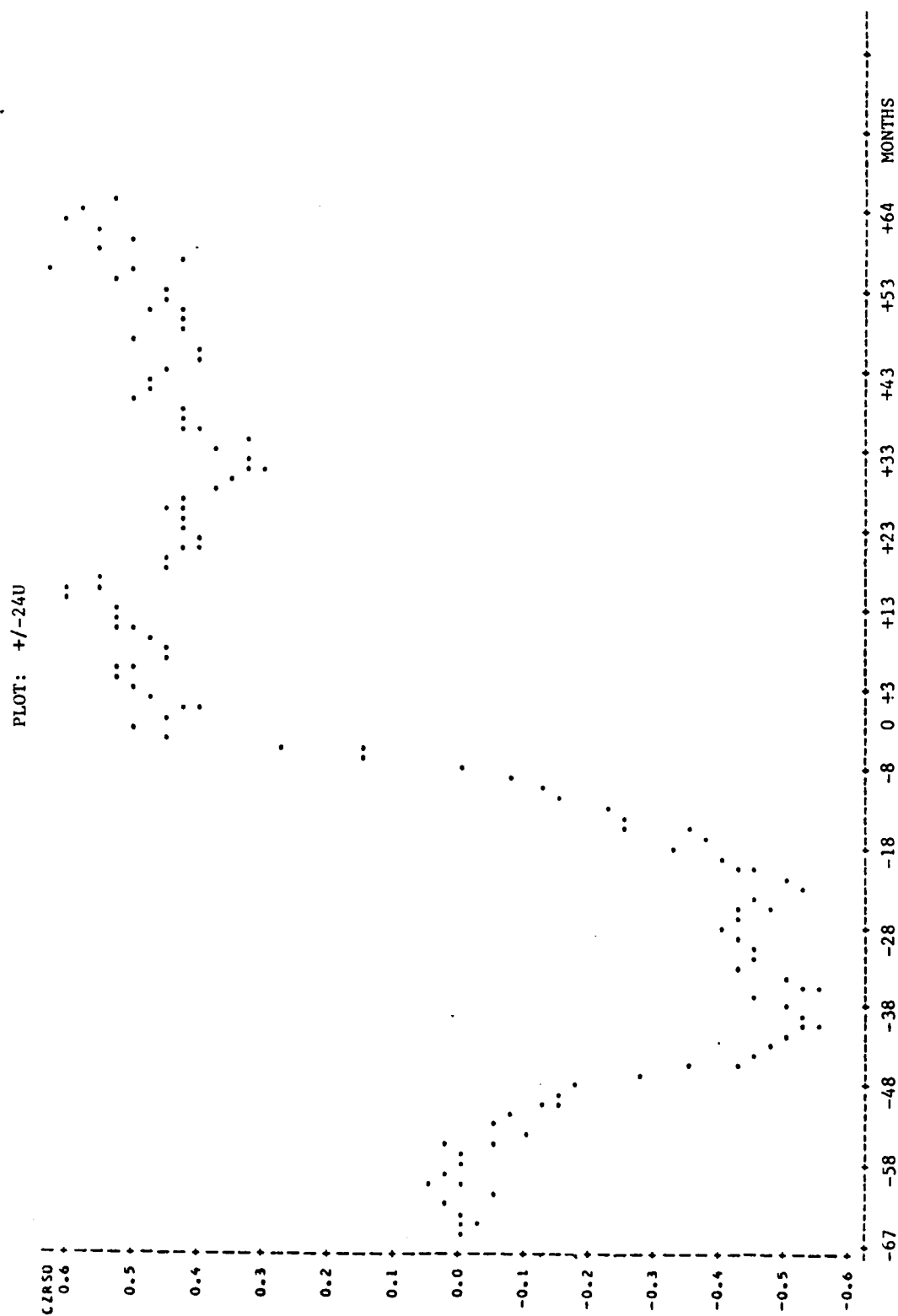
MACRO-SAMPLE RESULTS WITHOUT ALPHA^a

Time	Sample																	
	+/-36U CAR	N = 315 % Pos.	+/-36T CAR	N = 177 % Pos.	+/-36F CAR	N = 257 % Pos.	+/-24U CAR	N = 383 % Pos.	+/-24T CAR	N = 202 % Pos.	+/-24F CAR	N = 280 % Pos.						
-67, -19	-.0379	43**	-.0364	42*	-.0433	42***	-.0287	44***	-.0235	45	-.0383	43**						
-67, -BT	-.0478*	45*	-.0476	41**	-.0549	43**	-.0362	45**	-.0323	44	-.0472*	44*						
-18, -1	.0639***	60***	.0592***	62***	.0702***	60***	.0503***	58***	.0405***	60***	.0645***	58***						
-T, -1	.0738***	58***	.0705***	62***	.0817***	59***	.0577***	57***	.0493**	60***	.0734***	58***						
+1, +18	-.0039	50	.0071	54	.0005	49	-.0001	51	.0081	53	.0024	49						
+19, +37	-.0144	50	-.0040	46	-.0174	52	-.0060	52	.0032	49	-.0091	53						
+38, +64	.0237	56**	.0059	54	.0275	58**	.0157	54	.0031	53	.0199	56**						
	+/-12U CAR	N = 251 % Pos.	+/-12T CAR	N = 228 % Pos.	+/-12F CAR	N = 316 % Pos.	+/-OU CAR	N = 768 % Pos.	+/-OT CAR	N = 247 % Pos.	+/-OF CAR	N = 339 % Pos.						
-67, -19	-.0295	45**	-.0238	43*	-.0426	43**	-.0276	44***	-.0274	41***	-.0410	42***						
-67, -BT	-.0376*	45**	-.0298	44*	-.0519	43**	-.0363**	45***	-.0309	43**	-.0499*	42**						
-18, -1	.0546***	58***	.0532***	63***	.0666***	59***	.0462***	57***	.0497***	63***	.0629***	60***						
-T, -1	.0627***	57***	.0591***	61***	.0759***	59***	.0549***	56***	.0532***	62***	.0717***	58***						
+1, +18	.0081	53	.0174	53	.0081	50	-.0243	46*	.0161	52	.0061	51						
+19, +37	-.0059	52	-.0004	47	.0134	52	-.0033	51	-.0032	50	-.0194	50						
+38, +64	.0063	52	-.0071	51	.0172	55	.0066	52	-.0042	52	.0241	55						

^a One, two, or three asterisks denote that the null hypothesis tested using standardized residuals is rejected at the 10 percent, 5 percent, or 1 percent levels, respectively. "U," "T," or "F" labels associated with the samples' names denote that the residuals are unadjusted, time-adjusted, or firm-adjusted, respectively. The symbols "T" and "BT" associated with Time denote Trough and Before Trough, respectively.

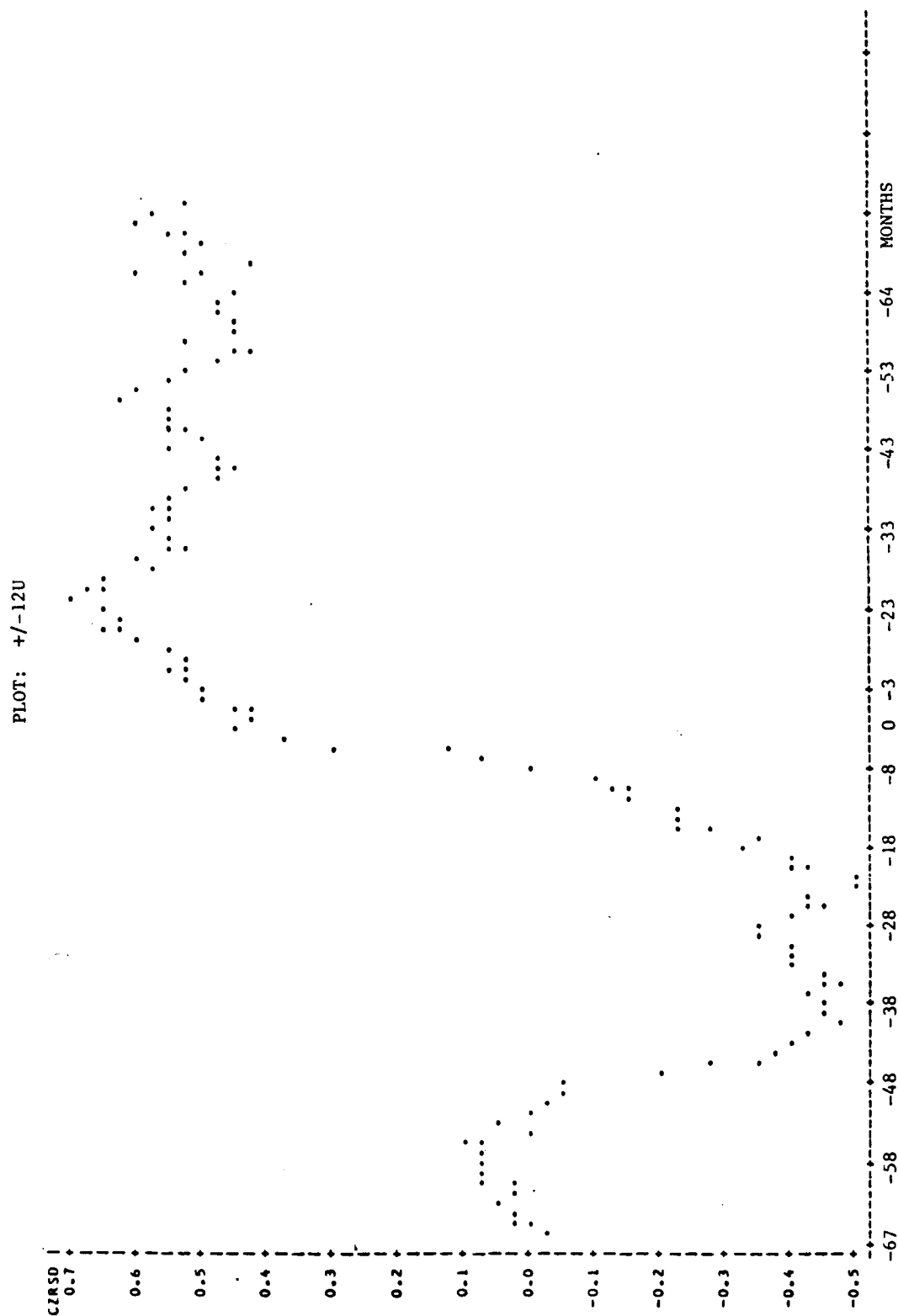


NOTE: 7 OBS HIDDEN
Figure A.1. Macro-Sample Plot of +/-36U



NOTE: 5 OBS HIDDEN

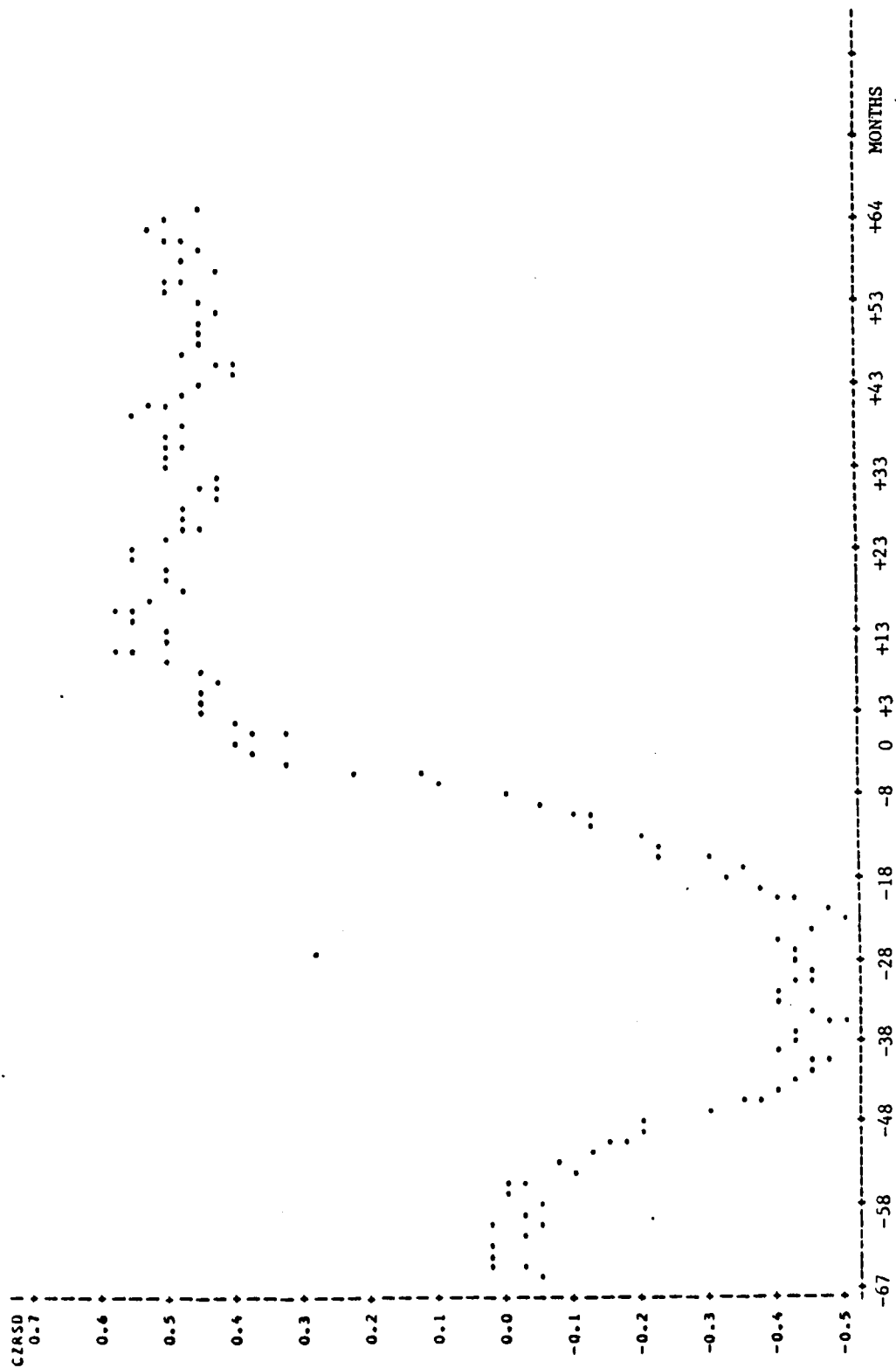
Figure A.2. Macro-Sample Plot of +/-24U



NOTE: 5 OBS HIDDEN

Figure A.3. Macro-Sample Plot of +/-12U

PLOT: +/-OU



NOTE: 4 OBS HIDDEN

Figure A.4. Macro-Sample Plot of +/-OU

TABLE A-2
MARGINAL SAMPLE PERFORMANCE WITHOUT ALPHA

Time	Sample					
	+/-36MU CAR	N = 315 % Pos.	+/-24MU CAR	N = 68 % Pos.	+/-12MU CAR	N = 138 % Pos.
-67, -19	-.0379	43**	.0136	50	-.0318	46
-67, -BT	-.0478*	43*	-.0035	44	-.0416	45
-18, -1	.0639***	60***	-.0129	51	.0667**	55
-T, -1	.0778***	58***	.0042	57	.0766***	57
+1, +18	-.0039	50	.0172	56	.0310	57
+19, +37	-.0144	50	.0331	62*	-.0056	52
+38, +64	-.0237	56**	-.0214	44	-.0198	49
PD/T	.0972***/-22		.0050/-13		.0969**/-22	
PD/CAR	.0044/.0035		.0004/.0003		.0044/.0035	
					.0033/.0020	
Time	Sample					
	+/-36F CAR	N = 257 % Pos.	+/-24MF CAR	N = 39 % Pos.	+/-12MF CAR	N = 73 % Pos.
-67, -19	-.0433	42***	.0168	56	-.0425	38*
-67, -BT	-.0549*	43**	-.0010	51	-.0290	42
-18, -1	.0702***	60***	-.0061	44	.0690	57
-T, -1	.0817***	59***	.0117	56	.0560	55
+1, +18	.0005	49	.0253	54	.0390	60
+19, +37	-.0174	52	.0415	64	-.0087	49
+38, +64	.0275	58*	-.0285	38	-.0263	48
PD/T	.1086***/-22		.0120/-14		.0523/-14	
PD/CAR	.0049/.0037		.0009/.0008		.0037/.0040	
					.0052/.0018	

APPENDIX IV

TABLE A-3

(+/-36) TIME-ADJUSTED TYPE ANALYSIS WITHOUT ALPHA^a

Time	Type PMR CAR	N = 102 % Pos.	Type PMC CAR	N = 56 % Pos.
-67, -19	-.0324	43	.0071	50
-67, -BT	-.0603	38**	-.0101	48
-18, -1	.0837***	68***	.0073	57
-T, -1	.1115***	67***	.0072	48
+1, +18	-.0005	53	-.0103	52
+19, +37	-.0181	43	-.0220	43
+38, +64	.0310	58*	.0260	59
PD/T	.1575***/-29		.0351/-22	
PD/CAR (-T, -1)	.0054/.0038		.0009/.0003	
	Type FC CAR	N = 50 % Pos.	Type VC CAR	N = 39 % Pos.
-67, -19	-.0778	26***	-.0693	41
-67, -BT	-.1014	30**	.0693	41
-18, -1	.0433	54	.1246**	67*
-T, -1	.0669	60	.1246	67*
+1, +18	-.0250	44	.0187	49
+19, +37	.0111	60	.0271	56
+38, +64	.0264	54	-.0436	46
PD/T	.1165**/-22		.1501**/-18	
PD/CAR (-T, -1)	.0053/.0030		.0083/.0069	

^aOne, two, or three asterisks denote that the null hypothesis tested using standardized residuals is rejected at the 10 percent, 5 percent, or 1 percent levels, respectively. The symbols "T" and "BT" associated with Time denote Trough and Before Trough, respectively.

TABLE A-4

(+/ -0) TIME AND FIRM-ADJUSTED TYPE ANALYSIS WITHOUT ALPHA^a

	Time-Adjusted		Firm-Adjusted	
	Type PMR CAR	N = 225 % Pos.	Type PMR CAR	N = 257 % Pos.
-67, -19	-.0140	46	-.0236	47
-67, -BT	-.0254	45	-.0455	45
-18, -1	-.0254	45	.0331**	58**
-T, -1	.0357	56	.0550**	57**
PD/T	.0635*/-35		.1048**/-35	
PD/CAR	.0018/.0010		.0030/.0016	
	Type PMC	N = 130	Type PMC	N = 125
-67, -19	-.0187	46	-.0243	46
-67, -BT	-.0440	43	-.0300	45
-18, -1	.0296	56	.0238	51
-T, -1	.0549*	54	.0295	51
PD/T	.0846**/-27		.0498/-27	
PD/CAR	.0031/.0020		.0018/.0011	
	Type FC	N = 153	Type FC	N = 172
-67, -19	-.0431	36***	-.0427	39**
-67, -BT	-.0564*	31***	-.0666*	38**
-18, -1	.0693***	60**	.0637***	56
-T, -1	.0826***	62***	.0876***	59**
PD/T	.1101***/-22		.1201***/-22	
PD/CAR	.0050/.0038		.0055/.0040	
	Type VC	N = 107	Type VC	N = 94
-67, -19	-.0571	40*	-.0633	41
-67, -BT	-.0786*	40*	-.0870*	39*
-18, -1	.0932	66***	.0976***	64**
-T, -1	.1147***	63**	.1213***	65***
PD/T	.1171***/-28		.1837***/-28	
PD/CAR	.0061/.0041		.0066/.0043	

^aOne, two, or three asterisks denote that the null hypothesis tested using standardized residuals is rejected at the 10 percent, 5 percent, or 1 percent levels respectively. The symbols "T" and "BT" associated with Time denote Trough and Before Trough, respectively.

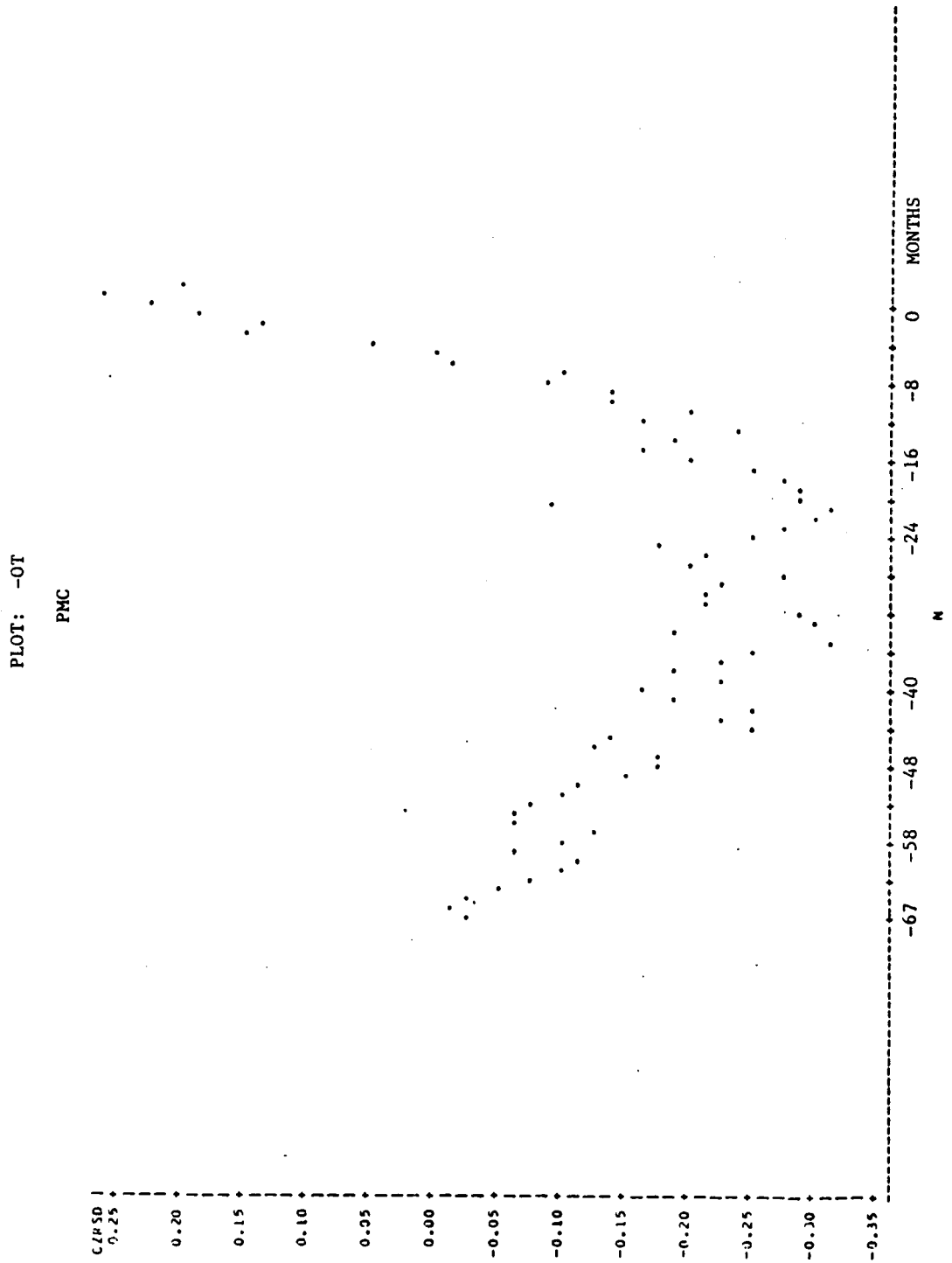


Figure A.5. Sample Plot by Type: -OT PRM

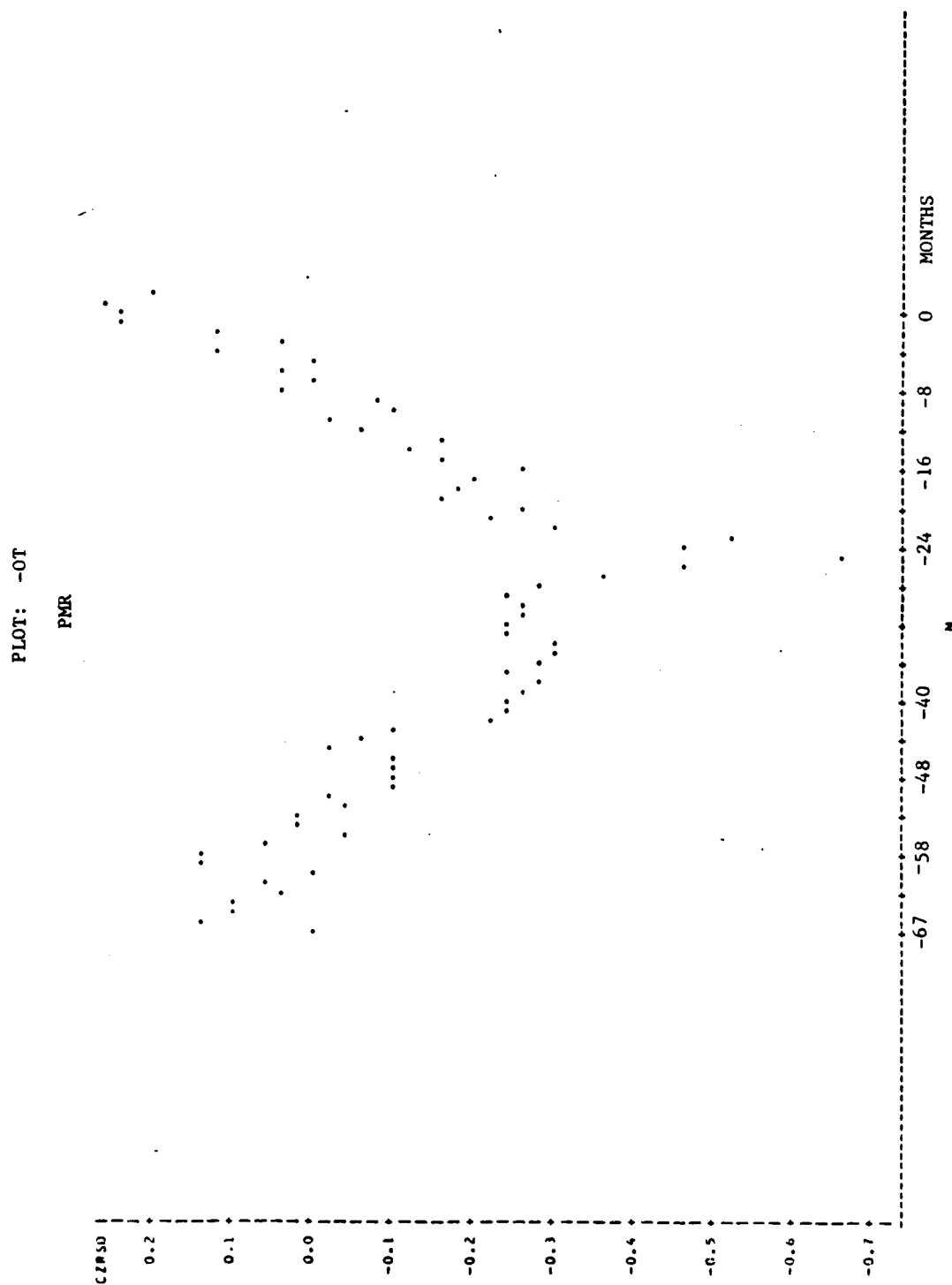


Figure A.6. Sample Plot by Type: -OT PMR

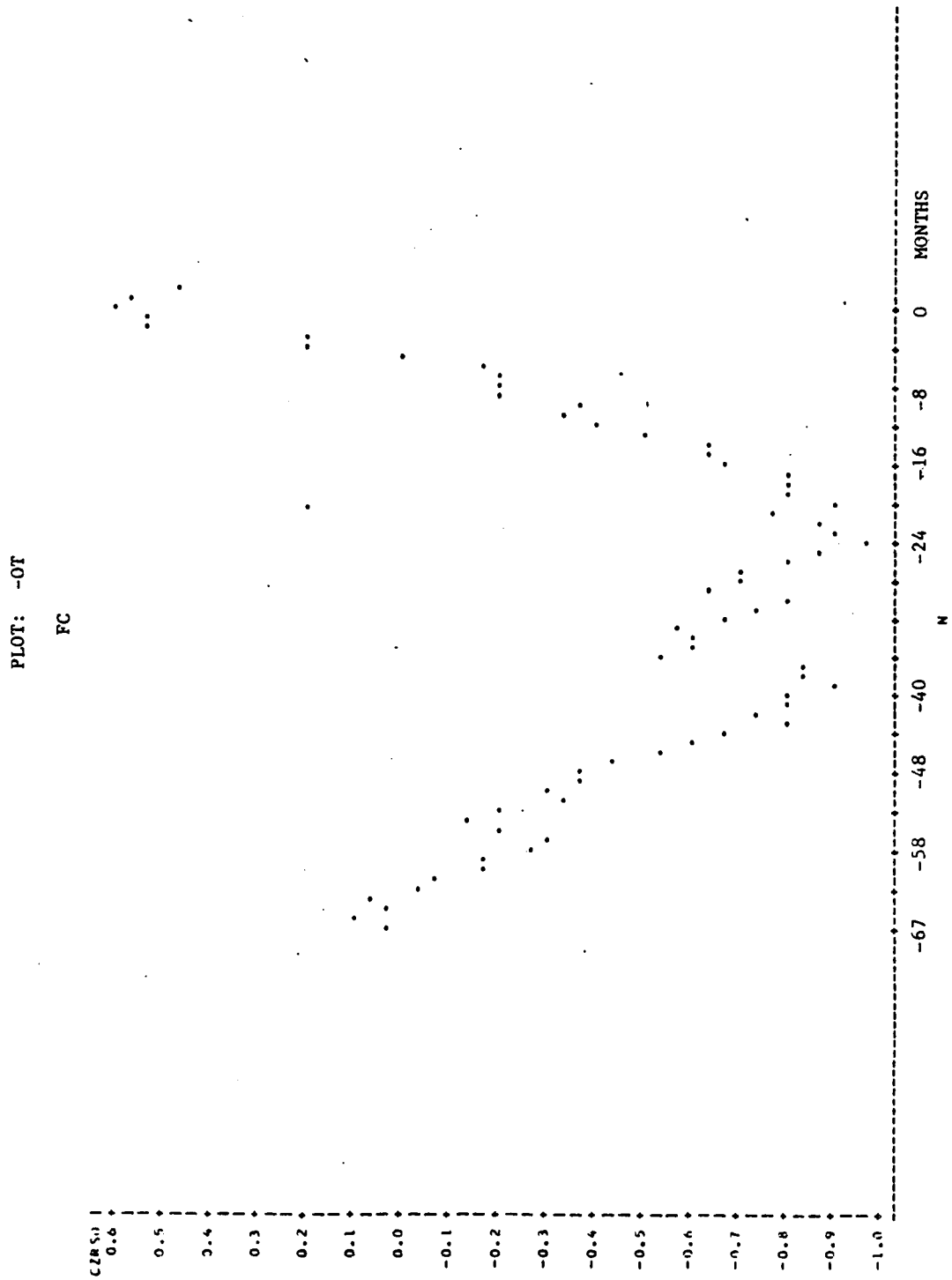
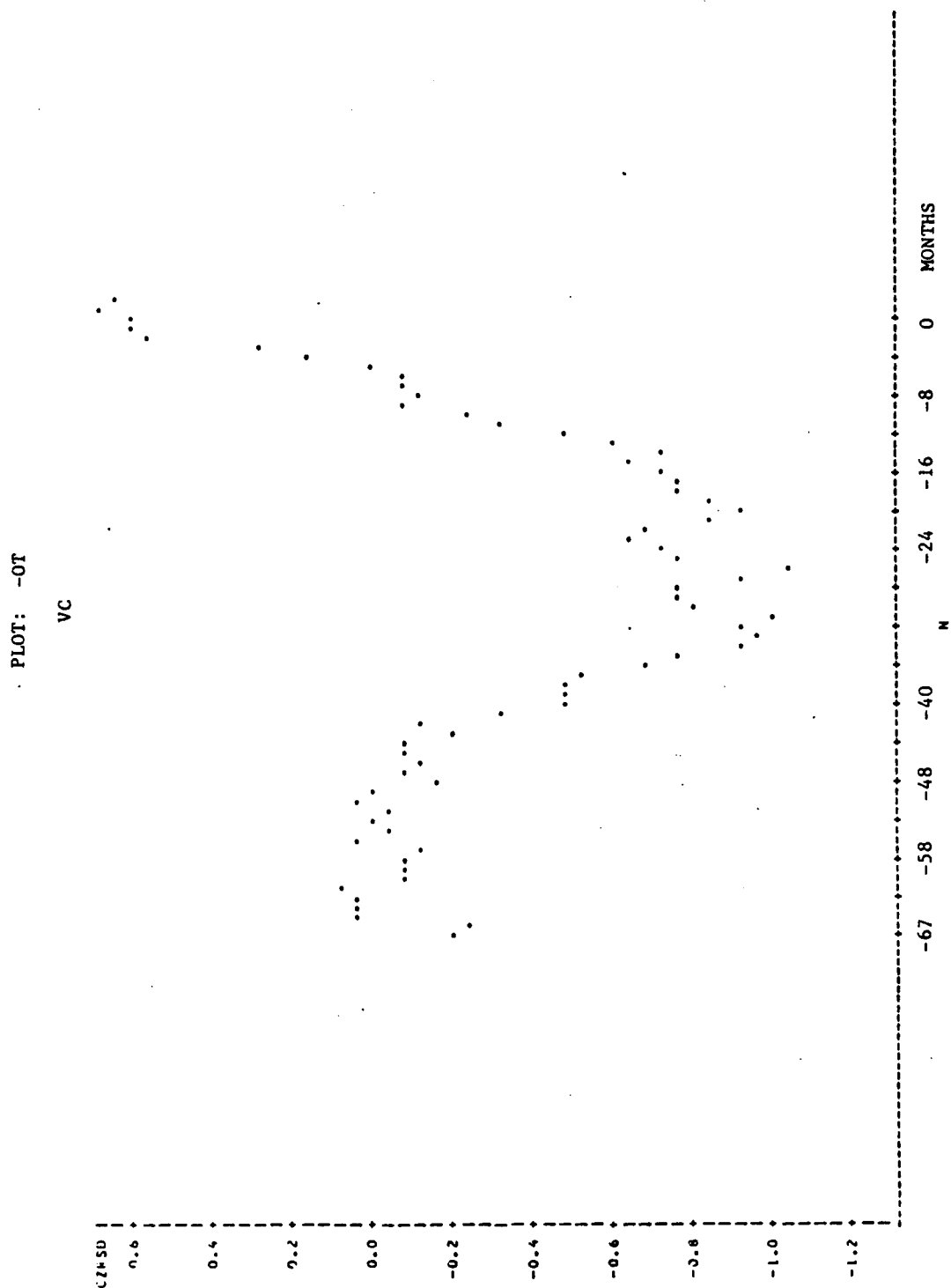


Figure A.7. Sample Plot by Type: -OT FC



APPENDIX V

TABLE A-5

(+/ -0) FIRM-ADJUSTED FREQUENCY ANALYSIS WITHOUT ALPHA^a

Time	Freq. = 1 CAR	N = 126 % Pos.	Freq. = 2 CAR	N = 66 % Pos.
-67, -19	-.0552	38***	-.0399	44
-67, -BT	-.0658	43	-.0531	41
-18, -1	.0847***	60**	.0729***	59
-T, -1	.0953***	56	.0862***	67**
+1, +18	.0314	49	.0002	58
+19, +37	-.0379	50	-.0133	55
+38, +64	.0330	57	.0363	52
PD/T	.1275***/-22		.1088***/-20	
PD/CAR	.0058/.0043		.0054/.0043	
Time	Freq. = 3	N = 55	Freq. = 4,5	N = 54
-67, -19	-.0159	45	-.0571	35*
-67, -BT	-.0282	42	-.0741	35*
-18, -1	.0218	65**	.0542	61
-T, -1	.0341	62	.0712	63*
+1, +18	-.0507	49	-.0212	41
+19, +37	-.0316	47	.0059	52
+38, +64	.0527	62	.0143	54
PD/T	.0758/-40		.1745**/-39	
PD/CAR	.0019/.0008		.0045/.0018	
Time	Freq. ≥ 6	N = 38		
-67, -19	-.0093	55		
-67, -BT	-.0391	55		
-18, -1	.0448	52		
-T, -1	.0746	61		
+1, +18	.0539	63		
+19, +37	.0132	47		
+38, +64	-.0542	42		
PD/T	.1200/-36			
PD/CAR	.0033/.0021			

^a One, two, or three asterisks denote that the null hypothesis tested using standardized residuals is rejected at the 10 percent, 5 percent, or 1 percent levels, respectively. The symbols "T" and "BT" associated with Time denote Trough and Before Trough, respectively.

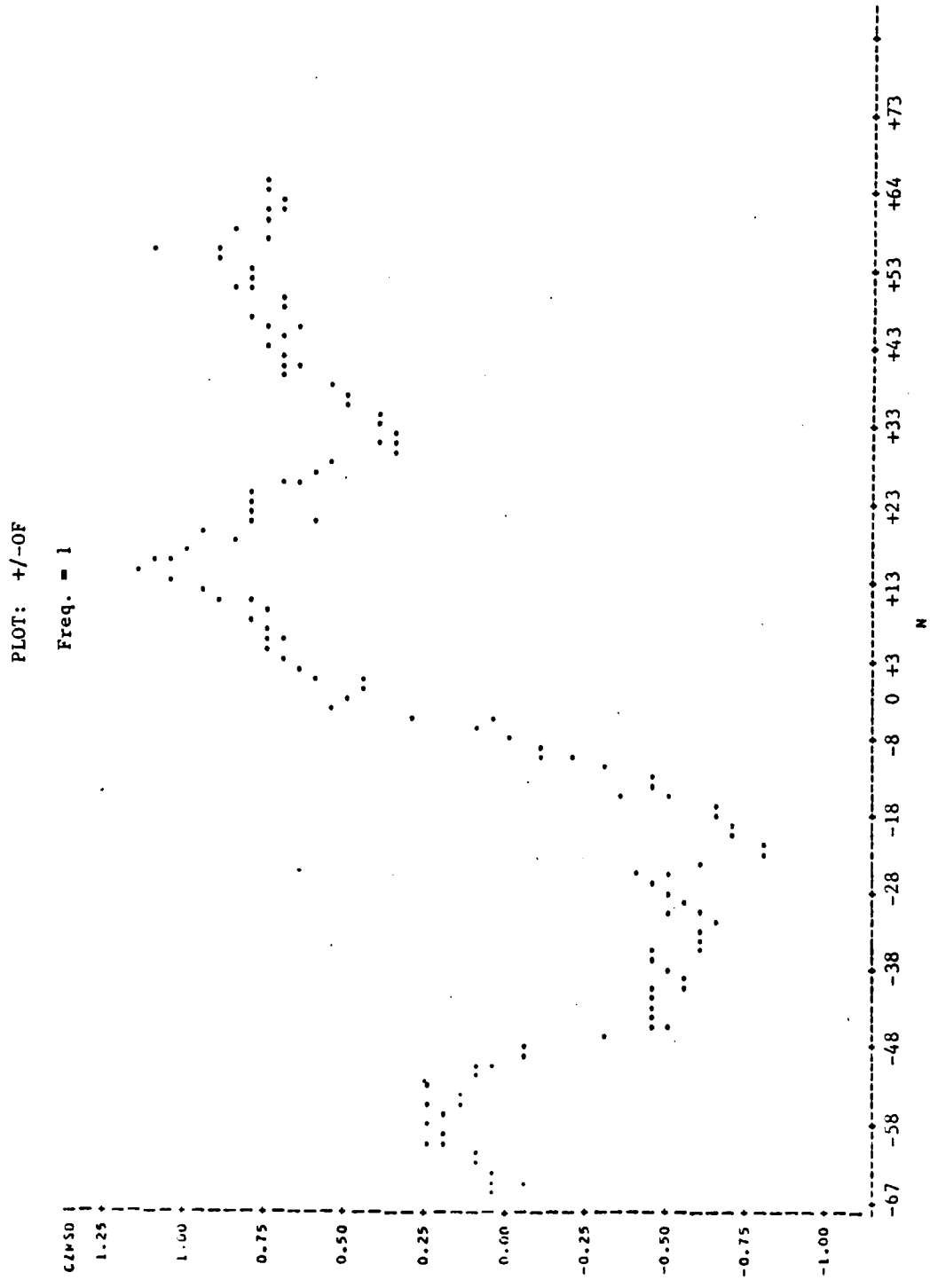
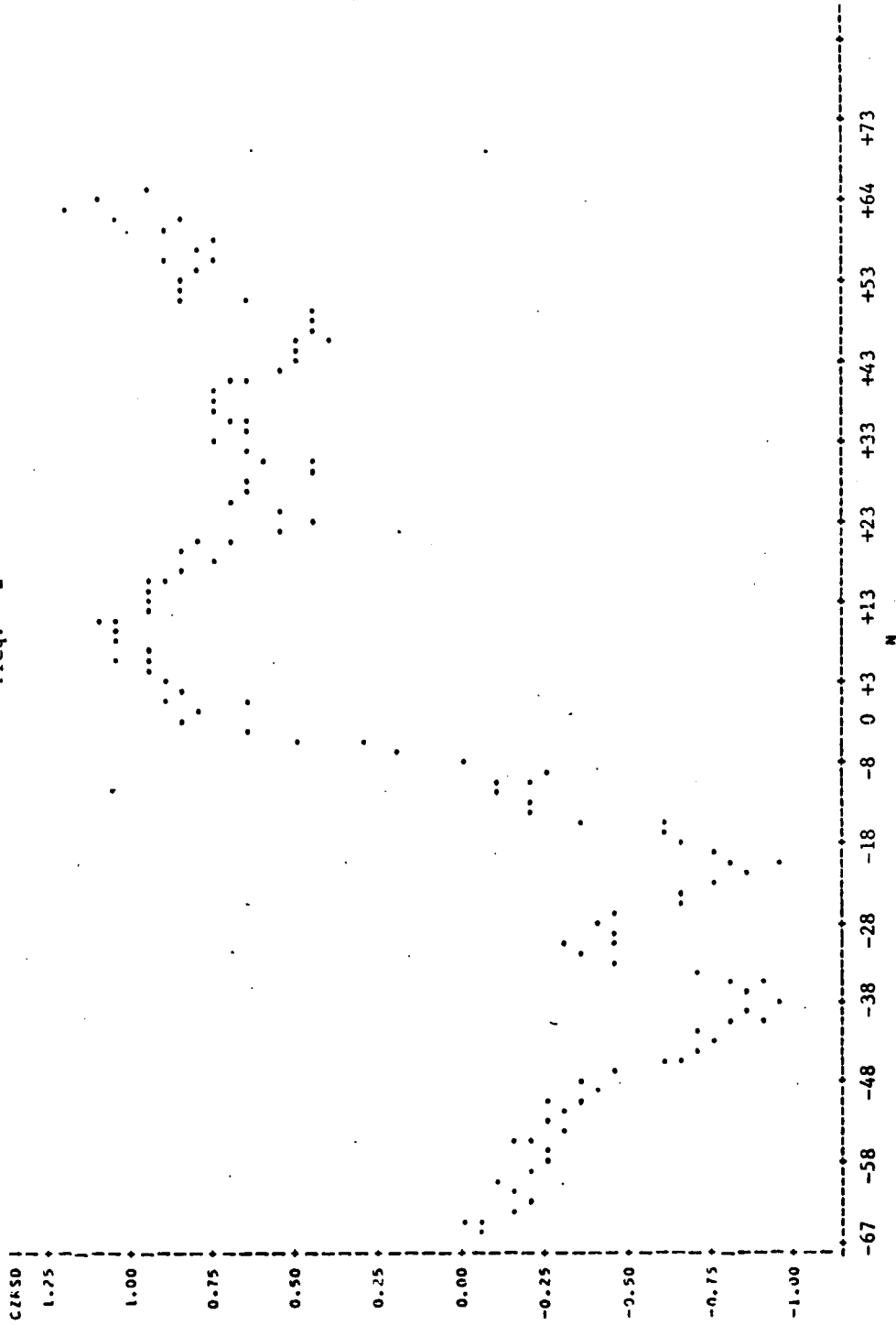


Figure A.9. Sample Plot by Frequency: +/-OF, Frequency = 1

PLOT: +/-OF

Freq. = 2



NOTE: 3 OBS HIDDEN

Figure A.10. Sample Plot by Frequency: +/-OF, Frequency = 2

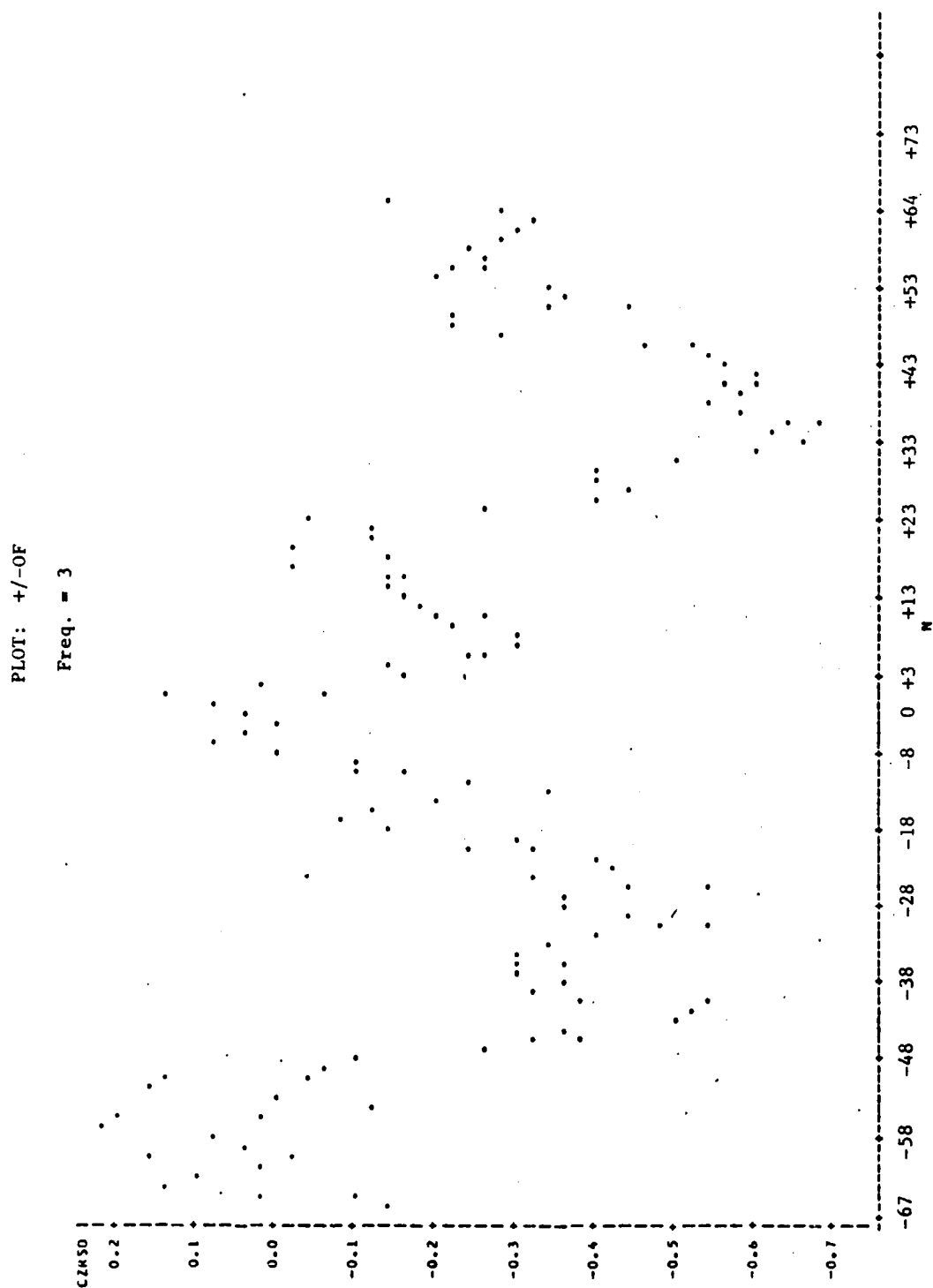
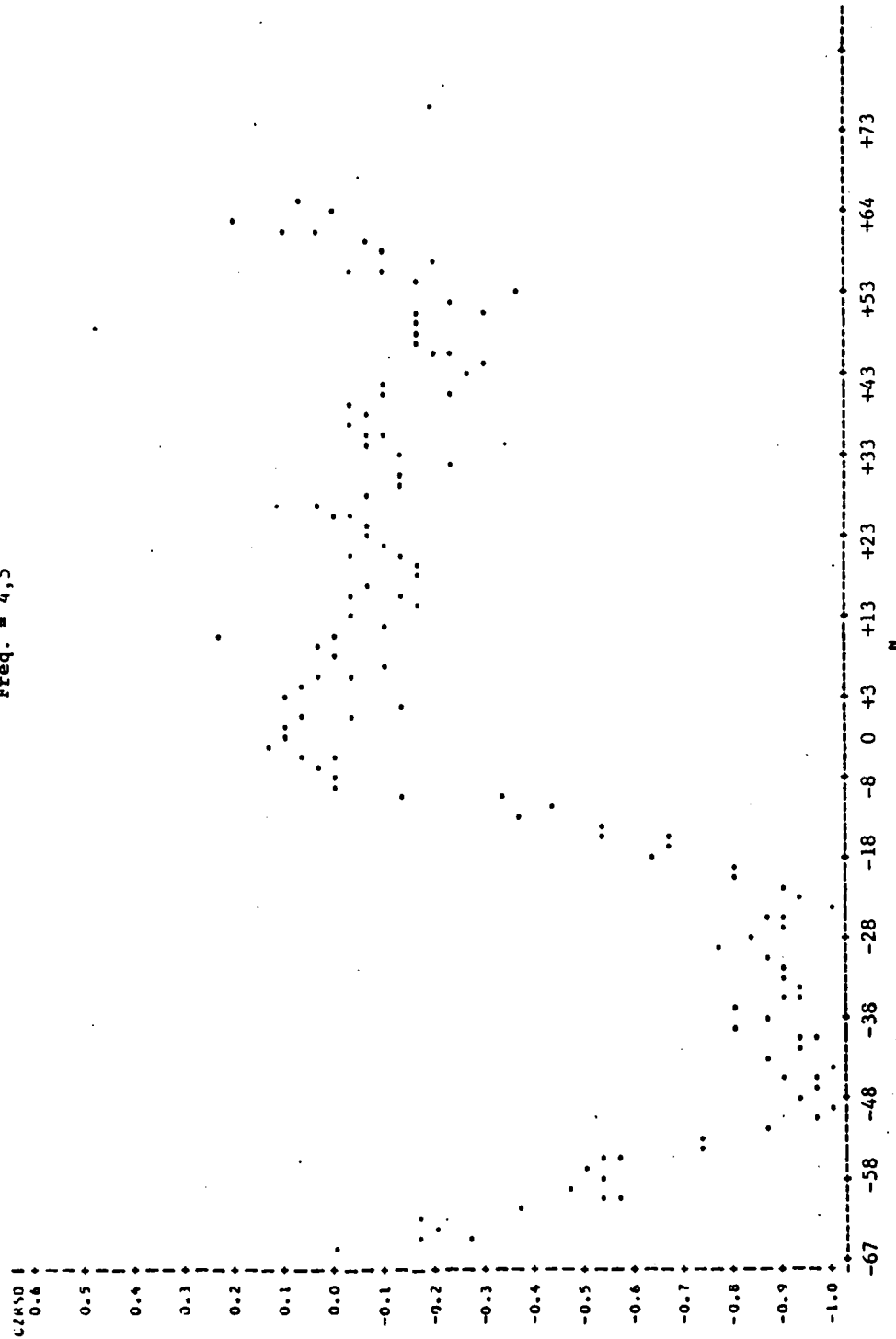


Figure A.11. Sample Plot by Frequency: +/-OF, Frequency = 3

PLOT: +/-OF

Freq. = 4,5



NOTE: 4 OBS HIDDEN

Figure A.12. Sample Plot by Frequency: +/-OF, Frequency = 4, 5

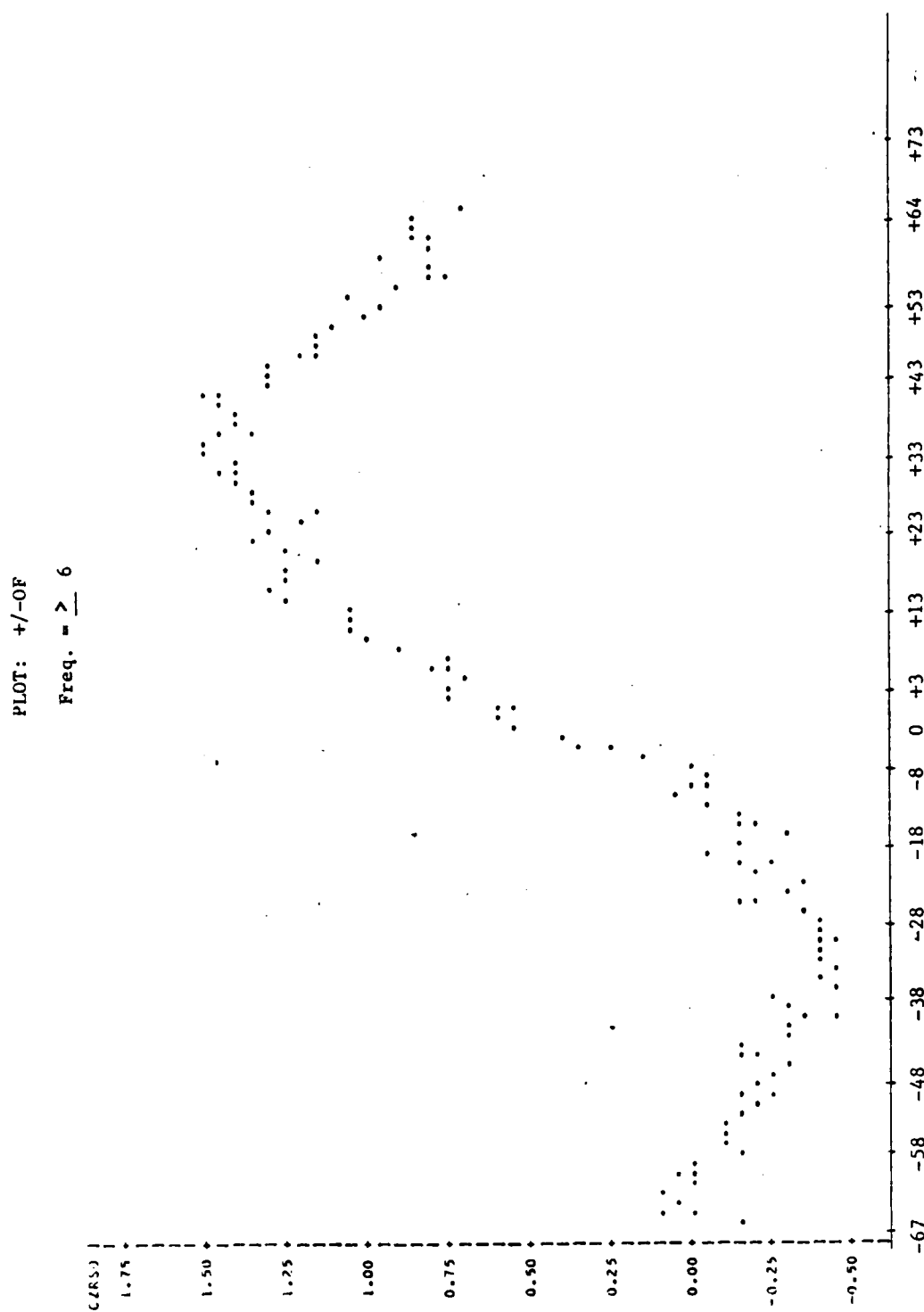


Figure A.13. Sample Plot by Frequency: +/-OF, Frequency = 6

TABLE A-6

(+/0) LEARN ANALYSIS WITHOUT ALPHA^a

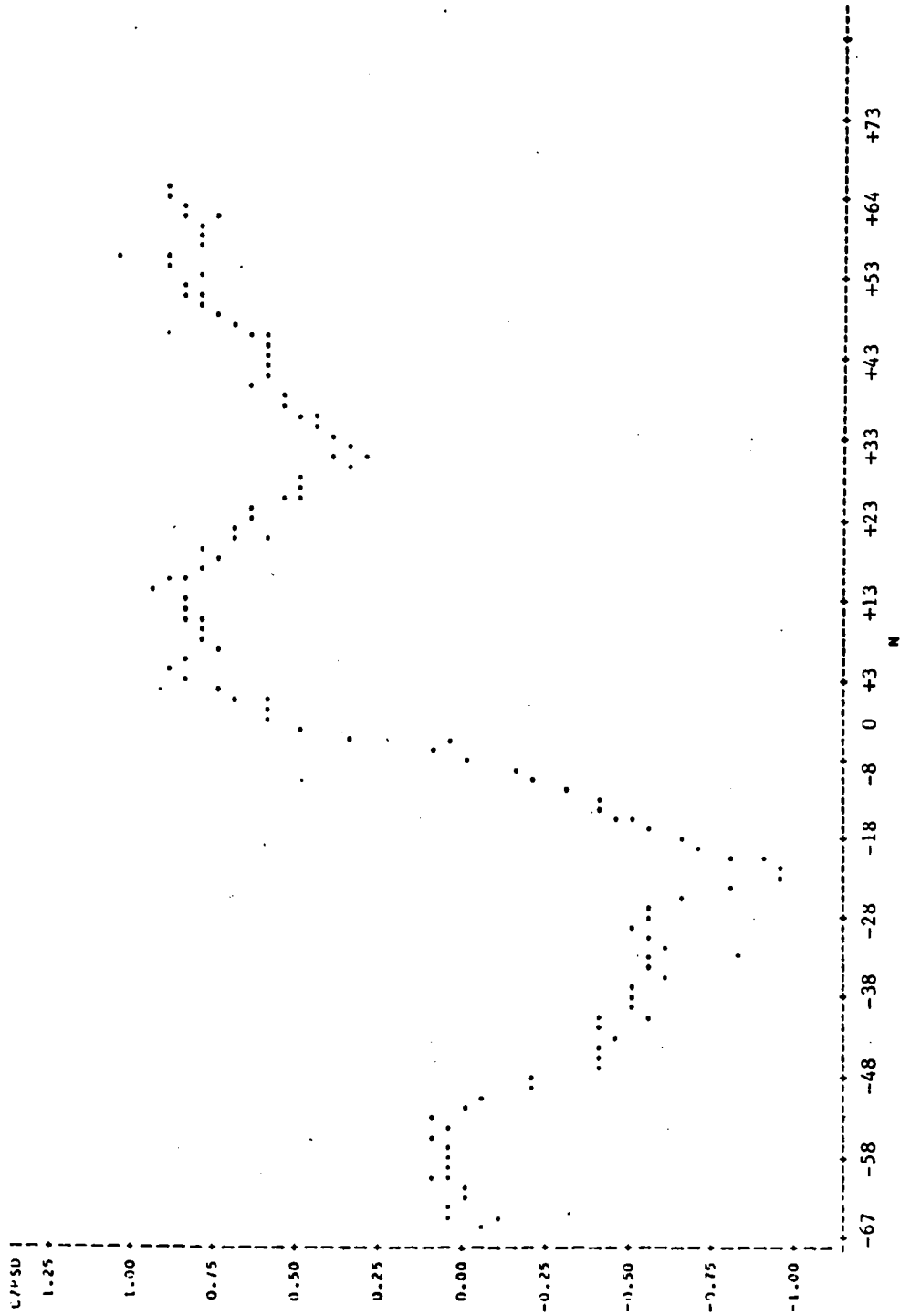
Time	LRN = 0 CAR	N = 245 % Pos.	LRN = 1 CAR	N = 149 % Pos.
-67, -19	-.0462	38***	-.0441	41**
-67, -BT	-.0648**	40***	-.0526	38***
-18, -1	.0849***	63***	.0473**	55
-T, -1	.1036***	62***	.0557**	57*
+1, +18	.0071	51	-.0176	50
+19, +37	-.0219	49	-.0070	46
+38, +64	.0356	60***	.0269	50
PD/T	.1343***/-22		.0891**/-26	
PD/CAR	.0061/.0047		.0034/.0021	

Time	LRN = 2 CAR	N = 93 % Pos.	LRN > 3 CAR	N = 139 % Pos.
-67, -19	-.0287	44	.0184	50
-67, -BT	-.0838***	34***	-.0412	47
-18, -1	.0210	54	.0001	52
-T, -1	.0761*	57	.0598*	58*
+1, +18	.0399	59*	-.0135	47
+19, +37	-.0066	49	.0254	60**
+38, +64	-.0357	46	-.0098	52
PD/T	.2476***/-45		.1049*/-35	
PD/CAR	.0055/.0017		.0030/.0017	

^aOne, two, or three asterisks denote that the null hypothesis tested using standardized residuals is rejected at the 10 percent, 5 percent, or 1 percent levels. The symbols "T" and "BT" associated with Time denote Trough and Before Trough, respectively.

PLOT: +/-0

LRN = 0

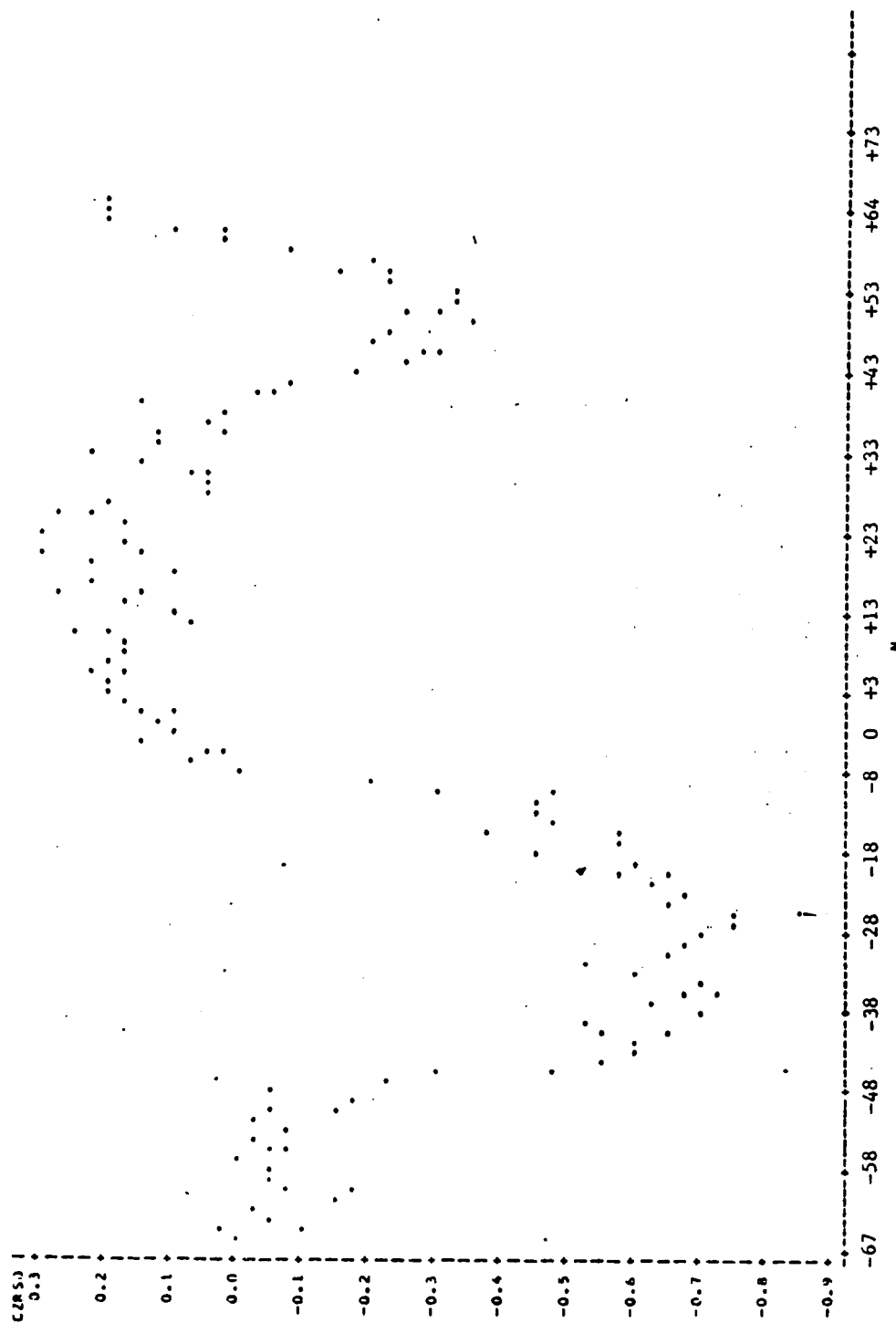


NOTE: 9 OBS HIDDEN

Figure A.14. Sample Plot by Learn: +/-0, LRN = 0

PLOT: +/-0

LRN = 1

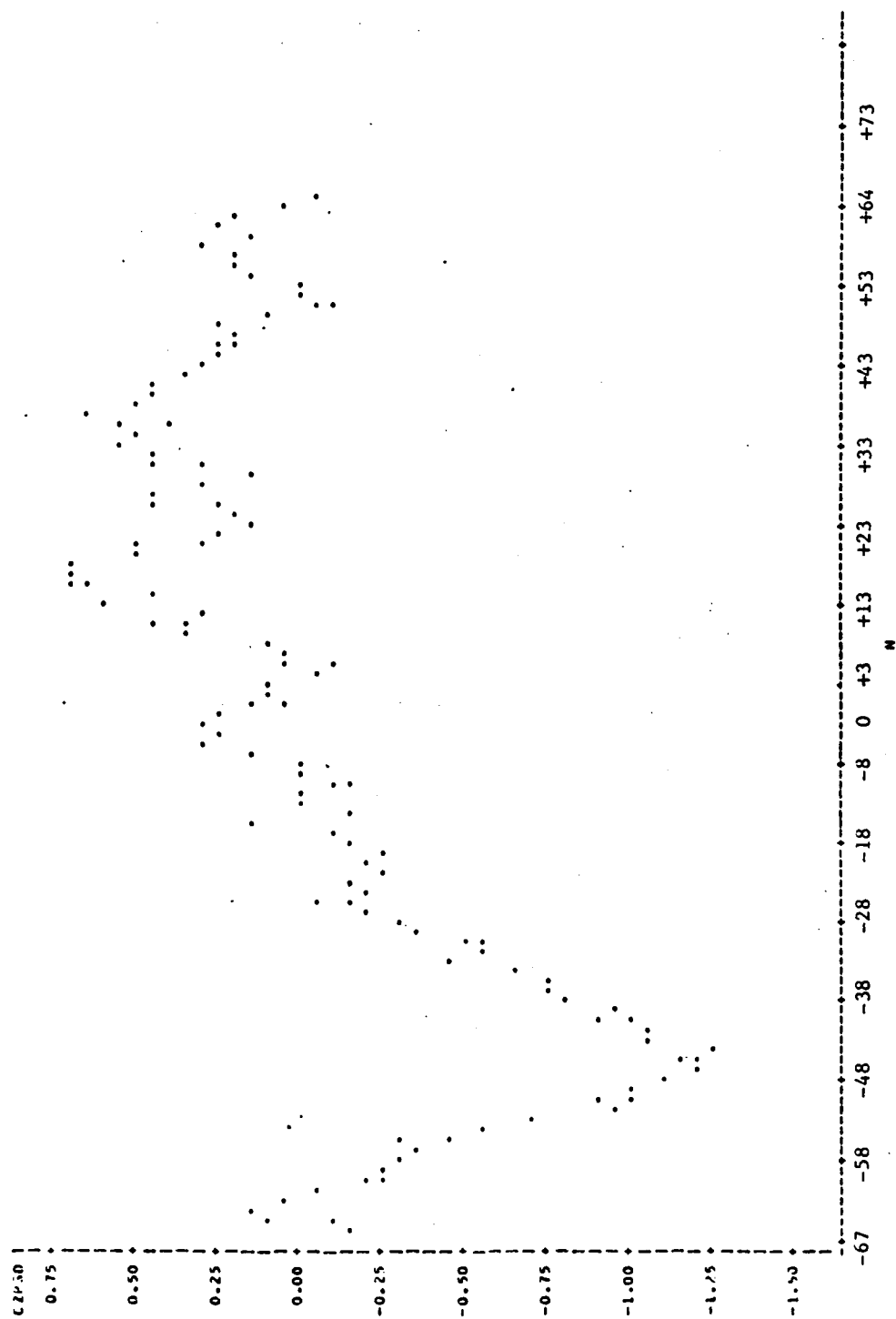


NOTE: 1 QUS MEDDEN

Figure A.15. Sample Plot by Learn: +/-0, LRN = 1

PLOT: +/-0

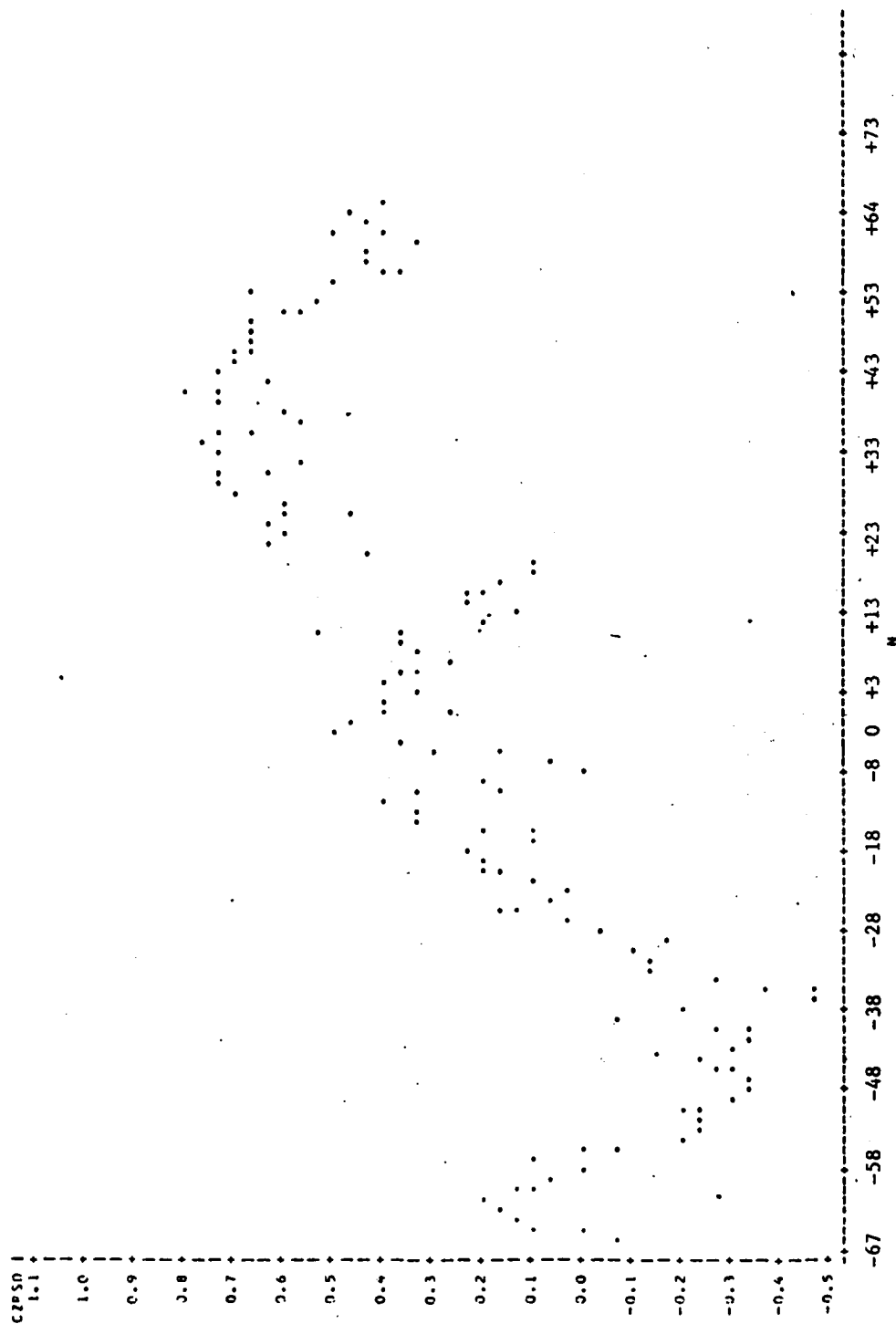
LRN = 2



NOTE: 7 ORS HIDDEN

Figure A.16. Sample Plot by Learn: +/-0, LRN = 2

PLOT: +/-0

LRN = ≥ 3 

NOTE: 2 RMS HIDDEN

Figure A.17. Sample Plot by Learn: +/-0, LRN = ≥ 3

VITA

Michael H. Lubatkin was born September 18, 1948 in Spring Valley, New York. Upon graduating from Spring Valley High School in 1966, he attended Pennsylvania State University and the Hebrew University before receiving a B. A. degree in Economics from the State University of New York at Albany in June of 1970. He received a Master's degree in elementary education in 1972 from the State University of New York at Geneseo. Following a five-year period in Boston where he taught elementary school and painted homes, he entered the Graduate School of Business Administration of The University of Tennessee, Knoxville, in the winter of 1977.

Today, Mr. Lubatkin is an Assistant Professor of Management at Wichita State University. He has presented papers at regional and national conferences in both Marketing and Management and has papers accepted for publication from the Journal of Business Strategy and the Academy of Management Review.

He is married to the former Christa Schaedel of Stuttgart, Germany, and has two children, Justin and Eleah.