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# Selecting Superior Securities



The Research Foundation of  
The Institute of Chartered Financial Analysts

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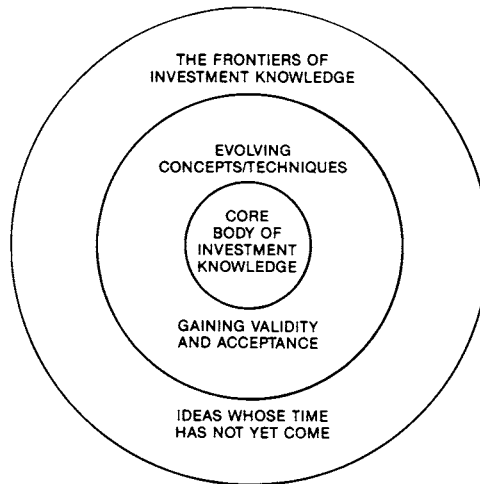
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The mission of the Research Foundation is to identify, fund and publish research material that:

- expands the body of relevant and useful knowledge available to practitioners;
- assists practitioners in understanding and applying this knowledge, and;
- enhances the investment management community's effectiveness in serving clients.



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## **Foreword**

The Research Foundation has been involved in practitioner-oriented research for more than 20 years, publishing or sponsoring a diverse assortment of monographs, proceedings, research papers, and books to broaden the knowledge and understanding of investment professionals. In 1986, the Foundation reaffiliated itself with the Institute of Chartered Financial Analysts to meet future needs more effectively. Now extensively reorganized, the Foundation intends to spark nothing less than a research renaissance.

The Research Foundation's mission is clearly stated: to identify, fund, and publish high-quality research material that expands the body of useful and relevant knowledge available to practitioners; assist practitioners in understanding and applying this knowledge; and contribute to the investment management community's effectiveness in serving clients.

The Foundation will continue to emphasize research that is of practical value to investment professionals. At the same time, it will explore new and challenging areas of research to provide members of the investment community with the latest knowledge about their rapidly-evolving profession.

Consistent with the Research Foundation's mission, this monograph makes a significant contribution to the evolving literature on market efficiency. The efficient market hypothesis has been at the center of investment theory for decades. In the late 1950s and early 1960s, researchers began debating whether stock prices exhibited random behavior. By 1970, a preponderance of academic research suggested that capital markets are informationally efficient—that investors could not systematically outperform very naive investment strategies, such as buying and holding a market index portfolio. It seemed that technical and fundamental research, based on publicly-available information, would improve investment performance marginally at best. Since then there has been a growing volume of academic litera-

ture which sheds serious doubt on this theory. Researchers began to uncover instances of market anomalies—or cases where investors could beat well-accepted benchmarks using publicly available information. At present, there is no consensus on whether markets are efficient or whether systematic patterns in stock returns can be exploited to earn excess market returns.

In this monograph, Reinganum discusses whether analyzing the characteristics of past stock market winners can yield significant insights into successful investment strategies. Unlike earlier research that isolates a particular attribute—such as price/earnings ratio or size—and then investigates its associated return behavior, Reinganum takes the opposite tack in this monograph: He singles out stocks with exceptionally high returns to see whether these firms share any common attributes. His view is that if history does repeat itself, these common attributes may provide the basis for a fruitful investment strategy.

Reinganum's topic and experimental design are consistent with the Research Foundation's mission. We are grateful to Dr. Reinganum for his contribution to the body of knowledge.

## **Acknowledgements**

This research spanned the course of two years. I benefited from discussion with Nai-Fu Chen, Kim Dietrich, Wayne Ferson, Larry Harris, Al MacGregor, Bill O'Neil, Jack Treynor, Rob Vishny, and Mark Weinstein. A special thanks is owed to Chuck D'Ambrosio, who carefully read and constructively critiqued earlier versions of this research. Partial funding and the research support provided by William O'Neil & Company are gratefully acknowledged. I would like to acknowledge my appreciation for the research support provided by the University of Chicago during my sabbatical year (1985-86) and by the University of Southern California during the 1986-87 academic year. I also acknowledge the financial support of the Research Foundation of the Institute of Chartered Financial Analysts. Naturally, all the views and any of the errors are those of the author.

Marc R. Reinganum

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# 1. Introduction

In the late 1950s and early 1960s, researchers began debating whether stock prices exhibited random behavior. Some claimed that stock price changes are unpredictable, with one article reporting that a pattern of simulated stock market prices generated by random numbers looked remarkably similar to patterns of actual stock market prices (Roberts 1959). This view was not universally accepted. For example, Alexander (1961) presented evidence suggesting that stock price changes are not completely random and that stock prices exhibit distinguishable trends. He proposed simple trading rules that would exploit these alleged trends. Later work by Fama and Blume (1966) disputed these findings and reported that Alexander's simple trading rules did not produce economically significant profits. By the mid-1960s and early 1970s, a preponderance of academic research supported the hypothesis that capital markets are informationally efficient (Fama 1970). This research suggested that investors could not systematically outperform very naive investment strategies, such as buying and holding a market index portfolio. It seemed that technical and fundamental research, based on publicly available information, would improve investment performance marginally at best, and probably not at all. It began to appear that throwing darts to select stocks would be just as effective.

By the late 1970s and early 1980s this simple view of

investment performance was again subjected to serious doubt. Drawing on earlier work by Nicholson (1960), Basu (1977) reported that portfolios comprising stocks with low price-earnings ratios outperformed portfolios with high price-earnings ratios by about 7 percent per year, even after returns were adjusted for risk. Banz (1981) and Reinganum (1981) presented even more dramatic findings: stocks with very small market capitalizations outperformed those with large capitalizations by about 20 percent annually. Other investment anomalies, characterizing peculiar patterns in the timing of stock returns, were also discovered. These ranged from a month-of-the-year, or January, effect (Keim 1983), to a week-of-the-month effect (Ariel 1987), to a day-of-the-week effect (French 1980; Gibbons and Hess 1981), and even included an hour-of-the-day effect (Harris 1986). Although each of these studies focused on a different problem, they shared at least one common conclusion: Investors may be able to beat well-accepted benchmarks using publicly available information. Of course, it is still debated whether such superior performance is the result of deficiencies in the benchmark or informational inefficiencies in the stock market.

This study discusses whether analyzing the characteristics of past stock market winners can yield significant insights into successful investment strategies. Unlike earlier research that isolates a particular attribute (such as P/E or size) and then investigates its associated return behavior, this study takes the opposite tack, singling out stocks with exceptionally high returns to see whether these firms share any common attributes. If history does repeat itself, these common attributes may provide the basis for a fruitful investment strategy.

This research differs in its data as well as in its experimental design. Most of the data for this study come from the *Datagraph* books (William O'Neil & Co.), which are sold primarily to institutional investors and report a host of fundamental and technical information for firms that trade on the listed exchanges

and the OTC markets.<sup>1</sup>

The *Datagraph* books offer a much wider choice of potential candidates for common attributes among stock market winners than do the Center for Research in Security Prices (CRSP) or COMPUSTAT data. Whereas there are many ways to define a “stock market winner,” the list of winners considered in this research is garnered from another O’Neil publication, *The Greatest Stock Market Winners: 1970-1983*, which contains 272 episodes of explosive price appreciation for companies trading on the New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and over-the-counter (OTC) markets.<sup>2</sup>

Chapter 2 summarizes the price performances of the “greatest winners.” Chapter 3 analyzes the behaviors of the technical and fundamental variables during the period of rapid price appreciation. If hindsight were foresight, these are the changes an analyst would like to have foreseen. Changes in the technical and fundamental indicators in the periods prior to this rapid appreciation are also characterized. Any common changes are taken to suggest a trading strategy; and results from a trading rule based on these changes are presented in Chapter 4. The trading rule results are presented for the period overlapping the initial analysis (1970-83). In Chapter 5, results for the trading rule are computed for a validation sample during 1984-86, a period completely outside that of the original sample. The final chapter summarizes the major findings.

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<sup>1</sup>For this research, William O’Neil & Co. provided a specially formatted computer tape containing the information on NYSE and AMEX firms from the *Datagraph* books (published weekly by William O’Neil & Co., Los Angeles). This is the first time William O’Neil & Co. has made these proprietary data available for an academic study.

<sup>2</sup>William O’Neil & Co. *The Greatest Stock Market Winners: 1970-1983*. Los Angeles: William O’Neil & Co., 1984.



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## 2. Defining The Set of the Greatest Stock Market Winners

The universe of winners considered in this research consists of any firm contained in *The Greatest Stock Market Winners: 1970-1983*. To be considered for inclusion on the list of great winners, a company typically had to at least double in value within a calendar year. The list included few exceptions to this guideline, and not all companies that doubled in value were selected.<sup>1</sup> In this research, the list of greatest winners—272 firms—was merged with a file containing historical information on 2,279 NYSE and AMEX companies. These data were published in various issues of O'Neil's *Datagraph* covering the period 1970-83. Of the 272 winning cases, 222 could be matched with the *Datagraph* information. The two numbers differ because (1) the historical data file does not contain OTC companies, whereas the list of greatest winners does; and (2) the

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<sup>1</sup>O'Neil personnel employed criteria other than price appreciation to choose firms. However, such criteria are not explicitly stated. Based on the University of Chicago's CRSP tapes, there are 4,049 occurrences of an NYSE or AMEX firm doubling in value within a given calendar year during the 1970-1983 period. For example, one additional criterion seemingly applied to stocks by O'Neil personnel is related to the price per share of a stock. In O'Neil's universe of 272 firms, fewer than 5 percent sold for less than \$10 a share. If one eliminated from the list of 4,049 firms those selling for less than \$10, the list would dwindle to 1,311 companies. Given the customer base subscribing to this publication, such a price level screen is not all that surprising. Furthermore, it does not bias this analysis. At worst, it might caution one against applying the findings from this research to those stocks selling for less than \$10.



CUSIP (Committee on Uniform Securities Identification Procedures) numbers of some companies could not be matched because of changes in the companies' names. The performance characteristics did not seem to change significantly for this pared-down list. For the complete list of 272 winners, the price appreciation averaged 361 percent; for the matched list of 222 winners, it averaged 349 percent. Table 1 lists the 222 winners, with their stock market performances and hypothetical buy and sell dates. The hypothetical buy and sell dates were assigned *ex post* and were not generated from actual stock market recommendations. The number of weeks between the hypothetical purchase and sale varied from company to company, as shown in Table 1.

Price appreciation data for the 222 winners are summarized in Panel A of Table 2. The mean unadjusted return of 349 percent was pulled up by the performance of two stocks with astronomical price advances (4,009 percent and 2,554 percent); the median unadjusted return was 237 percent. Thus, 111 of the 222 winners increased in value by at least 237 percent. Further, one-fourth of these firms earned a return of more than 370 percent, and more than 95 percent of the sample at least doubled in value.

The data in Panel A were not adjusted for movements in the stock market as a whole. The data in Panel B reflect this adjustment: The returns of the S&P 500 Index over the appropriate time periods were subtracted from the price appreciations of the individual securities. The mean adjusted return was 318 percent; the median was 209 percent.

Panel C shows how many weeks elapsed between the buy and sell dates for these firms. Half of the firms were held for less than 60 weeks. One-tenth of the firms were held for more than three years; only 5 percent of the firms were held for less than 26 weeks.

Regardless of the precise criteria by which companies merited inclusion in *The Greatest Stock Market Winners*, the perfor-

mance of these firms would seem exceptional by any standard. The unadjusted gains averaged 349 percent over calendar periods that typically ranged between 6 months and 3 years; the market-adjusted appreciations averaged 318 percent. In the next chapter, the firms' financial conditions in the buy quarter are compared to those in the sell quarter and to those in the quarters immediately preceding the buy signal.



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### 3. Fundamental and Technical Characteristics of the 222 Winners

This section analyzes the concurrent and antecedent attributes of the 222 greatest winners. Analysis of the concurrent attributes reveals the changes in financial condition, apart from the rapid price appreciation, that occurred in firms between the buy and sell dates. These changes suggest the variables an analyst should concentrate on forecasting. A careful examination of the antecedent attributes should identify common changes in financial conditions among the greatest winners that occurred prior to the buy quarter. In principle, such changes could form the basis of a reliable trading strategy based on publicly available information.

To aid in presenting the numerous variables in the *Datagraph* files, each variable is classified into one of five categories.<sup>1</sup> The first category is “smart money” and includes the behavior of professionally-managed funds and corporate insiders; the second contains valuation measures, such as price/book and price-earnings ratios; the third includes technical indicators, such as relative strength; the fourth consists of accounting earnings and profitability measures; and the final category contains several miscellaneous variables that did not seem to fit into the other four groups.

<sup>1</sup>These categories are strictly the author’s and are not part of the O’Neil data.

### **The “Smart Money” Variables**

The “smart money” variables refer to the stock holdings of professionally-managed investment funds and corporate insiders of four types: (1) banks, (2) mutual funds, (3) investment advisors, and (4) insurance companies. For each of these groups, O’Neil reports the number of institutions holding a particular issue, as well as the aggregate holdings of these institutions as a percentage of the outstanding common stock. Labelling these data smart money variables may be somewhat facetious.<sup>2</sup> Nonetheless, they disclose the actions of professional money managers, whose compensation may at least in part depend on the performance of the funds they oversee. For corporate insiders, O’Neil reports the number of buyers and sellers, as well as the number of shares they bought and sold. Even if they are not clairvoyant, corporate insiders and professional money managers are probably a well-informed group of investors.

**Bank holdings** among the 222 greatest stock market winners are shown in Table 3 for the buy quarter, the sell quarter, and the eight quarters preceding the buy date. Changes between the buy and sell quarters indicate what happens to bank holdings during the period of rapid price appreciation. At the beginning of the price advance—the buy quarter—the number of banks owning some shares in these 222 winners averages slightly greater than 12 (see Panel A of Table 3).

Bank sponsorship in these 222 companies was not evenly distributed. One-tenth of these firms were owned by more than 35 banks in the buy quarter, and at least one-fourth of these companies were not in the portfolios of any banks. Bank sponsorship, as measured by the percentage of outstanding shares held by these institutions, present a similar picture. On average, banks owned 6.46 percent of the shares of the 222 winners in the

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<sup>2</sup>At least since Jensen’s (1968) study on the performance of mutual funds, there is a general skepticism about the ability of these funds to outperform the market.

buy quarter (Panel B, Table 3). Again, the figures reveal an uneven ownership pattern. The banks owned more than 10 percent of the stock in one-fourth of the firms but no stock for another fourth of the sample.

In the sell quarter, after the major price advance, the pattern of bank sponsorship is clearly altered. On average, the number of banks owning stock in each company nearly doubled from 12.3 to 23.0, with the median jumping from 3 to 11. Although bank sponsorship was still not evenly distributed among the 222 winners, 185 of them were now held by at least one bank; in the buy quarter, banks owned 21 fewer.

Whereas the average number of banks holding each stock rose dramatically, the increase in the stake of each company owned by the banks was more modest, from 6.46 percent on average in the buy quarter to 8.09 percent in the sell quarter. At the end of the period of rapid price appreciation, more banks held these companies than at the beginning, and the banks in aggregate owned a greater proportion of these companies.

Although these data do not indicate whether the banks jumped on the bandwagon or merely followed it, bank ownership data in the eight quarters preceding the buy quarter suggest that they were not the bellwether of the subsequent surge in stock prices. In the year preceding the price advance, the average number of banks owning shares in each of these winners hovered around 10. Banks increased their holdings in these companies; the percentage of outstanding shares held by banks crept up in the two quarters before the buy date. These changes in bank sponsorship, however, are not nearly as great as those between the buy and sell dates. Bank sponsorship was not a leading indicator of great impending price changes.

**Mutual fund holdings** behaved similarly to those of banks (Table 4). Between the buy and sell dates, the number of mutual funds investing in each of the 222 winners nearly doubled, jumping from an average of 10.6 funds per company to 19.6. Although the number of mutual funds investing in each company

was not evenly distributed, a greater proportion of the 222 winners was held by at least one mutual fund than was held by at least one bank. Of the 222 winners, 206 and 221 were in the portfolio of at least one mutual fund in the buy and sell quarters, respectively. The aggregate holdings of mutual funds jumped more dramatically between the buy and sell dates than did that of banks. On average, mutual funds owned 4.91 percent of each of the 222 winners in the buy quarter and 7.88 percent of the outstanding stock in the sell quarter. Thus, as a group, mutual funds substantially increased their positions in the 222 winners between the buy and sell dates.

Prior to the buy quarter, mutual fund sponsorship was stable. The average holdings by mutual funds of the 222 winners ranges between 4 percent and 5 percent of the outstanding common stock. The average number of mutual funds investing in one of these companies was around 9. No apparent change in these figures presaged the impending price explosion. Thus, the actions of mutual funds, like those of banks, did not foretell the subsequent large price changes, though these changes were correlated contemporaneously with changes in mutual fund sponsorship.

**Investment advisor holdings** displayed the same basic patterns as those of mutual funds and banks but were more pronounced. Between the buy and sell dates, the number of investment advisors owning the 222 winners more than doubled, increasing from an average of 9.3 advisors per company to 20.9 (Panel A of Table 5). The change in investment advisor ownership was just as dramatic, more than doubling on average. The average percent of outstanding stock held by investment advisors rose from 7.2 in the buy quarter to 14.9 in the sell quarter. As a group, investment advisors concentrated their holdings in fewer companies than banks or mutual funds. Of the 222 winners, only 103 and 145 were in the portfolio of at least one investment advisor in the buy and sell quarters, respectively.

not foretell the big price change. Although sponsorship by investment advisors increased slightly in the quarter or two preceding the buy date, the increases are miniscule compared to those observed between the buy and sell dates. The past behavior of investment advisors was not a good predictor of future stock price movements.

Compared to banks, mutual funds, and investment advisors, **insurance companies** are the small institutional players in the stocks of these 222 winners. The number of insurance companies investing in these firms in both the buy and sell quarters was relatively small (Table 6). The average ownership stake of insurance companies was also much smaller than that of the other institutions; it increased from an average of 1.94 percent of the outstanding stock in the buy quarter to 2.61 percent in the sell quarter. Insurance companies tracked the other three groups in that the pattern of their ownership holdings prior to the buy date was relatively stable. Hence, as a group, they did not presage the impending stock price explosion.

Several general observations may be drawn from the **professionally-managed funds as a group**. If hindsight were foresight, one would like to have known of the impending significant increases in the sponsorship of stock held by banks, mutual funds, and investment advisors. On average, these groups of professionally-managed funds increased their ownership stakes in the 222 winners between the buy and sell dates by 25, 60, and 107 percent, respectively. At the conclusion of the rapid price advance, these funds were substantially invested in great winners. Prior to the buy quarter, their ownership claims tended to rise, but only slightly. The big increase in sponsorship occurred as the prices began to escalate sharply, indicating that professional money managers may participate in, but do not prophesy, the extraordinary price appreciation.

**Corporate insiders** are another group that may be privy to generally unavailable information about a company's prospects. Tracking their transactions may reveal this information and



provide a guideline to profitable trading. Indeed, several prior studies suggest that insider trading does predict future price changes (Jaffe 1974; Seyhun 1986). Insider trading data for these 222 companies, however, do not indicate any pattern of significant changes. Panel A of Table 7 summarizes statistics for the number of insiders purchasing stock. In most companies, no corporate insiders were buying stock either prior to the large price advance or after it.

The selling transactions seem equally uninformative. One might expect insider selling to subside prior to the major price advance. In fact, insider selling among these 222 companies actually increased slightly before the advance, rising from an average of 0.84 insider sales per company to 1.38. After the large price advance, insider selling was also slightly greater, which is consistent with expectations. Of course, insider buying was somewhat greater as well, which runs contrary to expectations. If insiders do know of impending major economic events that are likely to affect stock prices, their own trading did not reveal that information (at least for these 222 firms). Thus, direct purchases and sales by corporate insiders did not tip off investors to the major price advances that were ahead.

Whereas the smart money variables may reflect the actions of well-informed investors, the evidence suggests that well-informed investors did not predict major price advances: (1) The transactions of corporate insiders did not lead or were contemporaneous with large price changes; (2) the actions of professional money managers did not lead the large price changes but were a contemporaneous reaction; and (3) significant shifts in institutional ownership were contemporaneous with large price movements.

### **Valuation Measures**

The five different valuation variables used in this study were: (1) price/book ratios; (2) price-earnings ratios; (3) stock price level; (4) stock market capitalization; and (5) beta. Prior re-

search reports a relation between each of these variables and performance. This section investigates the behavior of each of these variables among the 222 greatest winners.

**Price/book ratios** compare the market values of equity to their book values. A ratio of less than 1.0 indicates that a company's market value is less than its book value and might suggest that the stock is underpriced. Among the 222 winners, 164 were selling for less than book value in the buy quarter. The median price/book ratio among the 222 winners was 0.60, and the average was 0.95 in the buy quarter (Panel A of Table 8). In the sell quarter, the average and median price/book values were 2.64 and 2.24. The results for the sell quarter are not surprising, because the group of firms analyzed had just experienced a major price advance. In the two quarters preceding the buy date, however, 183 and 184 of the 222 subsequent winners were selling at a market price less than their book values. Although a price/book value less than one may not identify perfectly a stock market winner, a price/book value less than one was a common characteristic among these 222 winners. This evidence suggests that *one aspect of an investment strategy should be to isolate firms that sell below book value.*

The distribution of **price-earnings ratios** (P/E) is displayed in Panel B of Table 8. In the buy quarter, the average P/E ratio was 13.6; the median P/E ratio, which is less influenced by the extreme values, was 10. Most previous research (e.g., Basu 1977; Reinganum 1981) posits an inverse relation between P/E ratios and performance: the lower the P/E, the higher the returns. Clearly, the P/E ratios for this set of 222 winners did not tend to be very small. In fact, only one-tenth of these firms possessed P/E ratios less than 5 in the buy quarter. In the quarters preceding the buy date, the mean P/E ratios fluctuated around 11 and 12. This evidence does not contradict earlier research, although it clearly indicates that very low P/E ratios were not a necessary ingredient of a successful investment strategy.

Whereas prior research showed that small, low-priced stocks outperformed large, high-priced ones, this group of 222 winners was not characterized by either low **stock prices** or small **stock market capitalizations**. Among the 222 winners, the average share price on the buy date is \$27.69 (Panel A of Table 9). The median price was slightly greater than \$24. Only 9 companies sold for less than \$10 a share. These companies were not particularly small as measured by stock market capitalization (number of shares times price per share). The mean capitalization was \$484.3 million, and was heavily influenced by the one-time inclusion of IBM at a market capitalization of \$37 billion. The median capitalization was \$120.1 million. Numbers presented in Reinganum (1983) indicate that this figure would fall in the seventh decile of capitalization rankings. Only one of the 222 winners had a market capitalization less than \$10 million on the buy date, and only 12 had capitalizations less than \$20 million. As a rule, these companies are not so small. One might find this characteristic somewhat surprising given the volume of research on the small-firm effect. As with P/E ratios, this evidence suggests that small firms, whether measured by share price or stock market capitalization, were not a necessary component of a successful investment strategy. A small-size investment screen was not justified by the data from these 222 winners.

Modern financial theory maintains that high-risk investments are expected to earn high returns. A stock's **beta** is a frequently-cited measure of risk, and is formally derived within the framework of the capital asset pricing model. Beta measures a security's risk relative to the market portfolio. In principle, the extraordinary returns earned by these 222 winners might simply be compensation for their extreme riskiness. The data, however, do not support such an interpretation. The average and median beta among these firms is 1.14.<sup>3</sup> Fewer than 5 percent of the companies possessed betas in excess of 2.0. In fact, the betas for 80 percent of the firms fell between 0.52 and 1.78.

Although the group of firms was slightly riskier than the market, the additional risk did not account for their extraordinary returns.

Investigation of valuation measures revealed those investment characteristics that should be stressed, and those that need not be highlighted. For example, the evidence from these 222 winners showed that during this period, one should have selected companies whose market value was less than their book value, a finding which is neither startling nor new. The more surprising discovery is that these 222 winners were not low-priced stocks, low-P/E companies, or small market capitalization firms.<sup>4</sup> This evidence does not contradict the findings of other research. Rather, it demonstrates that low-priced stocks, low-P/E companies, or small capitalization firms may be an integral part of some successful investment strategy, but none is needed in every successful strategy.

### **Technical Indicators**

Three technical indicators are considered in this section: (1) relative strength rank, (2) Datagraph rating, and (3) industry group rank. The relative strength rank of a stock ranges from 1 (the lowest) to 99 (the highest). The relative strength of a particular stock is calculated using a weighted average of the percentage price changes of the stock over the previous 12 months. The price change in the most recent quarter receives a weight of 40 percent, and the other three quarters receive weights of 20 percent each. The Datagraph rating is based on a

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<sup>3</sup>Betas are calculated using weekly returns during the period two years prior to the buy date. The proxy for the market portfolio is a value-weighted index of all New York and American Stock Exchange companies.

<sup>4</sup>One cannot rule out the possibility that O'Neil personnel implicitly (it is not stated in the publication) applied some of these criteria to define a great winner. For example, given their institutional customers, it might make commercial sense to exclude most companies selling at a price less than \$10 or whose market capitalizations are smaller than \$20 million.

proprietary O'Neil formula that assigns weights to "reported earnings (primary operating), capitalization, sponsorship, relative strength of stock, price-volume characteristics, group rank and other factors." The Datagraph rating also ranges from 1 (the lowest) to 99 (the highest). Finally, industry group rank is based on the average price appreciation of firms within each industry. Unlike the relative strength rank and Datagraph rating, the highest industry group rank is 1 and the lowest is about 200.

Table 10, Panel A, contains the **relative strength ranks** of the 222 winners. In the buy quarter, the mean relative strength was 90.2, and the median rank was 93. More than 95 percent of the sample 212 firms possessed relative strength measures in excess of 70 in the buy quarter. These figures suggest that, as a group, the prices of these firms had begun to increase compared to the rest of the market.

This phenomenon is also apparent in the relative strength ranks in the quarters immediately preceding the buy date. Both the mean and median relative strength ranks jump by about 12 between the month prior to the buy quarter (buy-1) and the buy quarters. In fact, the relative strength measures for 170 of the 222 winners increased between these two dates. These data suggest two common characteristics of a successful investment strategy: (1) *seek firms with relative strength ranks of at least 70*; and (2) *try to identify firms that exhibit positive changes in their relative strength from the prior quarter*.

The **Datagraph ratings** of the 222 winners also tend to be high in the quarter of the buy date (Panel B, Table 10). The mean rating in the buy quarter was 78.3, and the rating for 188 firms exceeded 70. The Datagraph ratings, as with the relative strength measures, also show increases—the mean and median ratings each increase by about 10 between the buy-1 and buy quarters. The ratings for 175 of the 222 winners increased over this period. Increases in Datagraph ratings overlap significantly with increases in relative strength between the buy-1 and buy dates. Of the 175 companies with Datagraph increases, 147 also

registered increases in relative strength. A common characteristic among this set of great winners was a *Datagraph rating in excess of 70* in the buy quarter. Although one might also consider incorporating positive changes in Datagraph ratings into an investment strategy, these changes seem captured by changes in relative strength.

The last technical indicator considered was **industry group rank**. This measure did not impart much additional information to that already gleaned from relative strength. In the buy quarter, the industries into which these 222 winners fell were ranked in relative strength: At least 75 percent of the sample were in the top half of the industry rankings (Table 11). Further, the relative performance of these industries improved prior to the buy date. Given the relative strength rankings, these findings are not surprising, as it is well known that price movements among firms in a given industry tend to be positively correlated. Given that the price changes of a particular firm tend to be positive (the relative strength measure), one should not be surprised to discover that the prices of other firms in that industry tend to rise. Of the 139 firms whose industry group rank improved between the buy-1 and buy date, 115 also registered improved relative strength. The industry group rank variable shows that these firms were in industries whose price appreciation was greater than those of most industries.

During this period, the technical indicators had the potential to lead major price movements. Information regarding relative strength seems to have been important: relative strength ratings greater than 70 *and* increasing seem to have been a common characteristic among winning firms. Datagraph ratings in excess of 70 were also prevalent among the 222 winners. Nevertheless, changes in Datagraph ratings and industry group ranks are common among these firms and seem to have been fairly well captured by changes in relative strength ratings.

### **Earnings and Profitability Measures**

The variables in this category gauge a firm's health, as evaluated by standard accounting measures. Three of the variables—pretax margins, changes in quarterly sales, and changes

in quarterly earnings—assess the firm’s short-run performance. The fourth variable, a five-year quarterly earnings growth rate, offers a picture of the firm’s financial health over a longer period. Unlike price data, accounting data are typically released with a lag. For example, fourth-quarter earnings may not be publicly released until sometime in the latter part of the first quarter, so it is likely that accounting information from the buy quarter may not be known until the following quarter. For this reason, only accounting information up through the buy-1 quarter should be considered to provide any leading indicators of the impending price advances.

The **pretax profit margins** of the 222 winners are presented in Panel A of Table 12. In the buy quarter, the average and median pretax margins were 12.7 and 11.2 percent, respectively. In the buy-1 quarter, these margins were slightly smaller, 12.3 and 10.8 percent, respectively. By the sell quarter, however, the pretax average and median profit margins increased to 14.5 and 13.0 percent. The pretax margins of these firms grew with the great run-up in price. Indeed, the nearly 2 percentage point increase in the pretax margins may have contributed to the price appreciation of these firms. Prior to the period of rapid price appreciation, the pretax profit margins gradually increased. The most pervasive feature of these data, however, is that 216 of the 222 winners had positive pretax margins in the buy quarter, and 215 had positive margins in the buy-1 quarter. This evidence clearly indicates that a *positive pretax profit margin* should be one of the selection screens in an investment strategy.

Percentage **changes in quarterly earnings** are shown in Panel B of Table 12. The quarterly changes are not seasonally adjusted; they represent changes in raw accounting earnings. On average, quarterly earnings in the buy quarter rose nearly 45.9 percent from the previous quarter. Quarterly earnings of the buy-1 quarter increased an average of 60.8 percent.

These average changes, however, are heavily influenced by several firms that experienced immense percentage changes in

quarterly earnings. In the buy-1 quarter, the median percentage change in quarterly earnings was 14.1 percent, and about three-fourths of the 222 experienced quarterly changes of less than 42 percent. A most noticeable feature of these data are the changes between the buy-2 and buy-1 quarters. The accounting data from these quarters are the last that could be used as a leading indicator of the forthcoming price advance. Between the buy-2 and buy-1 quarters, the average change in quarterly earnings increased from 50.4 percent to 60.8 percent; the median changes mirrored this increase, rising from 3.0 percent to 14.1 percent. These data exhibit an acceleration—a positive change in the change in quarterly earnings. Thus, another investment rule suggested by these 222 winners is to *seek out firms with a positive change in the change in quarterly earnings, that is, earnings acceleration.*

The behavior of **changes in quarterly sales** (Panel A of Table 13) closely parallels that of changes in quarterly earnings, with both accelerating during the buy-2 and buy-1 quarters. The average rates of changes are positive and increasing. Sales during the buy-1 quarter rose by 11.8 percent on average over the previous quarter; the buy-2 quarter increased an average of 6.7 percent. Prior to the buy-2 quarter, the changes in quarterly sales did not exhibit any particular trend. In general, the information contained in the changes in quarterly sales is redundant of the information regarding the changes in quarterly earnings.

Earnings over a longer period of time, reflected in the **five-year quarterly earnings growth rates**, are shown in Panel B of Table 13. These rates are computed with five years of quarterly earnings data and then annualized. In the buy and buy-1 quarters, the average growth rates were 23.0 percent and 21.6 percent, respectively, and the median growth rates were 17 and 16 percent, respectively. By the sell quarter, the average and median earnings growth rates increased dramatically to 38.2 and 30 percent, respectively. This increase may result because low rates from several years prior are compounded with high



subsequent rates when growth rates are calculated. The net effect is a noticeable rise in the overall five-year quarterly earnings growth rate.

In the buy-1 and previous quarters, the average five-year quarterly rate was very stable. In the buy-1 quarter, however, more than 85 percent of the firms had positive five-year quarterly earnings growth rates. This feature of the data from the 222 winners suggests an investment strategy that *selects companies with positive five-year quarterly earnings growth rates*.

### Miscellaneous Measures

Three variables—common shares outstanding, average daily trading volume, and the ratio of the price on the buy date to the previous two-year high—did not fit well in the other categories and are described here. The first two of these variables are regularly reported in the O’Neil *Datagraph* books. The third is intended to reveal whether the 222 winners were selling near their highs or lows at the time of the hypothetical buy date.

The data for **common shares outstanding** are presented in Panel A of Table 14. In the buy quarter, the average number of shares outstanding among the 222 winners is about 13.8 million; the median is less, 5.7 million, because a few companies among the 222 had more than 100 million outstanding shares. In the sell quarter, both the average and median number of outstanding shares nearly doubled. This probably indicates that many of the firms split their shares of stock during the period of rapid price increase. In the period preceding the rapid increase, the number of shares outstanding appears relatively stable. Perhaps the only point about the data that might be relevant to an investment strategy is that nearly 90 percent of the firms had fewer than 20 million shares of stock outstanding. Thus, one *might* limit the firms selected by an investment strategy to those with *fewer than 20 million outstanding shares of stock*.

A noticeable feature in the **average daily trading volume** data is the doubling of shares traded between the buy and sell

quarters (Panel B of Table 14). The average volume increased from 31,700 shares to 61,900 shares. Trading volume also increased between the buy-1 and buy quarters, but showed very little change prior to the buy-1 quarter. Although many of these companies split their stock between the buy and sell dates, it is debatable that this phenomenon caused the increased trading; other factors may have been at work.

**The ratio of the price on the buy date to the maximum price during the two previous years** is one measure of whether these firms had fallen out of favor in the investment community. Stated differently, this variable measures the extent to which the extraordinary success of these 222 winners is due to a contrarian investment strategy. Generally speaking, contrarian strategies seem to select stocks which suffer substantial price declines. It is unlikely, however, that these stocks would be selected by a contrarian rule. On the buy date, more than half the winners were selling within 8 percent of their previous two-year high price (Table 15). Fourteen of these firms were selling at their high price for the past two years. Only one company sold at a price less than half its previous two-year high. More than 80 percent of the sample was selling within 15 percent of its previous two-year high. Clearly, these firms did not sell at low prices relative to their historical values. Indeed, just the opposite was true. An investment strategy that *selected stocks that were selling within 15 percent of their maximum price during the previous two-year period* would have reflected a common characteristic among these 222 stock market winners.



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## 4. Trading Strategy Results: 1970-1983

The number of variables collected by O'Neil could provide the basis for numerous potential investment strategies. In the previous section, nine variables were singled out as potential leading indicators of a substantial price expansion.<sup>1</sup> From these nine variables alone, 512 (i.e.,  $2^9$ ) different possible investment strategies may be derived. Obviously, not all of these strategies are practical.

As a starting point, however, a strategy may be analyzed which is based on the nine technical and fundamental variables that either noticeably changed before the big price run-up or seemed to be pervasive among the winners; this strategy overlays nine investment screens on the data. The first strategy serves as a benchmark against which other trading rule results may be compared. The returns associated with several other trading rules are also computed. These strategies are not defined after an exhaustive search of all possible strategies, and thus it is not claimed that these are the *best* possible strategies. An investigation of these alternative strategies, however, reveals the sensitivity of the overall results to the inclusion or

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<sup>1</sup>It is not being claimed that all nine variables are necessary for a successful investment strategy, nor is it implied that other variables may not be helpful. The analysis of the 222 winners did suggest, however, that these nine variables merit further investigation.

deletion of key components from the strategy. The strategies also illustrate that lessons learned from the empirical regularities associated with the biggest winners may be applied profitably to a broader universe of companies.

The implementation of a trading rule is straightforward. After a buy signal is generated, a position in the stock is not assumed for 63 trading days (about 3 calendar months), which ensures that accounting information that is assumed to be known actually has been released. The stock is then purchased and held for two years.<sup>2</sup> The cumulative holding period return is calculated through each of the eight quarters. To establish a performance benchmark, the cumulative holding period returns of each selected stock are compared to the cumulative returns of the S&P 500 Composite Index (S&P 500) over the same period. The difference between the returns of the security and the S&P 500 is labelled an excess return. A buy signal for a particular company may be generated at multiple points in calendar time. In these cases, the returns for each buy signal are tracked separately.

The data used to generate a buy signal are contained on a tape supplied by William O'Neil & Co which includes the fundamental and technical variables for 2,279 New York and American Stock Exchange firms over the 1970-1983 period. This is the same period in which the characteristics of the 222 winners are delineated. The return data for the individual securities and the S&P 500 are gathered from the files provided by CRSP.

Under the *trading strategy using all 9 investment screens*, a buy signal is issued for a firm when all of the following conditions are met:

1. The price/book ratio is less than 1.0.

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<sup>2</sup>This research does not explore conditions under which a sell signal might be generated.

2. The five-year growth rate based on quarterly earnings is positive.
3. Quarterly earnings are accelerating, that is, there is a positive change in the percentage change in quarterly earnings.
4. Pre-tax profit margins are positive.
5. There are fewer than 20 million common shares outstanding.
6. The relative strength rank of the stock is at least 70.
7. The relative strength rank of the stock in the current quarter is greater than the rank in the previous quarter.
8. The O'Neil Datagraph rating is at least 70.
9. The stock is selling within 15 percent of its maximum price during the previous two years.

These nine investment screens were based on the common characteristics of O'Neil's 222 greatest stock market winners and applied to the universe of 2,279 firms contained on the large O'Neil tape.

For the 1970-83 period, the results of this composite trading strategy were impressive (Table 16): (1) It generated 627 buy signals for 406 different companies; (2) on average, the cumulative holding period returns of the selected securities exceed the equivalent return for the S&P 500 in each of the eight quarters; (3) after one quarter these stocks appreciated in value by 9.66 percent, whereas the S&P 500 appreciated by 1.64 percent (a differential of about 8 percentage points); (4) at the end of eight quarters, this performance differential averaged nearly 66 percentage points—the stocks selected by the investment strategy rose in value by nearly 81 percent, whereas the S&P 500 registered gains of only about 15 percent; (5) these performance differentials were not generated by a few instances in which firms experienced huge price appreciation—in half of the instances, firms earned returns at least 49 percentage points greater than those of the S&P 500 after eight quarters. Nearly

one-fourth of the sample experienced returns 100 percentage points greater than those of the S&P 500 after two years. In fact, after two years, 80 percent of the firms selected by this investment strategy had cumulative holding period returns greater than those of the S&P 500.

Even though these performance data are impressive, they may entail a serious bias. In particular, the 2,279 firms to which the nine investment screens were applied included the 222 greatest winners. Because the 222 greatest winners were used to design the nine investment filters, it is possible that the nine screens applied to the 2,279 firms might simply map back onto the 222 greatest winners, imparting an upward bias in the return statistics. To eliminate this bias, any firm on the list of 222 greatest winners was excluded from the investment strategy over the entire 1970-83 time period. To the extent that the samples of the 222 winners and the other firms were correlated, some subtle biases may remain, but they may be eliminated by applying the trading strategy in other time periods.

The investment strategy results, exclusive of the 222 winners, are shown in Table 17. The strategy generated 453 buy signals for 319 different companies over the 1970-83 period. As might be expected, the average excess return was less when the firms experiencing meteoric price appreciation were removed from the universe. Nonetheless, the strategy still performed very well. The selected firms outperformed the S&P 500 by more than 50 percentage points on average over a two-year interval, with the individual firms appreciating in value by more than 65 percentage points, whereas the S&P 500 managed gains of only about 15 percent. Further, the excess returns were not concentrated among a few firms. In more than 79 percent of the cases, these firms outperformed the S&P 500 over a two-year period. The firms selected by these nine investment screens earned excess holding period returns of about 23 percent per year.

28      The higher returns earned by the investment strategy need

not be abnormal in the sense that they may just reflect the compensation for bearing additional risk; however, risk, at least as measured by historical betas, does not explain the average 23 percent per year excess returns earned by firms selected by the investment strategy. The betas computed with weekly returns for individual securities and the S&P 500 averaged only 1.03 in the two-year period preceding the buy date (Panel A of Table 18). Half of the firms had betas of less than 1.0. The betas for 80 percent of the selected companies ranged in value between 0.45 and 1.66. Similar values for betas were obtained when the proxy for the market was a value-weighted NYSE-AMEX market index.

In earlier research, Banz (1981) and Reinganum (1981) demonstrate that the average returns of small firms exceed the average returns of large firms, even after controlling for differences in risk as measured by beta.<sup>3</sup> Firm size in these studies was measured by a company's stock market capitalization; that is, the price per share times number of shares outstanding. One explanation for the annual excess holding period returns of nearly 23 percent reported here is that the investment strategy is tilted in favor of small stocks. In a more recent study, Reinganum (1983) reported that his smallest group of firms possessed a median stock market capitalization of \$4.6 million. These very small firms earned about 32 percent per year on average over the 1963-82 period, unadjusted for market movements. After adjustment for market movements, the excess returns of these very small firms were of about the same magnitude as the excess returns associated with the investment strategy reported here.

As shown in Panel B of Table 18, the firms selected by this investment strategy were not small by Banz's and Reinganum's standards. The median stock market capitalization of the

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<sup>3</sup>For a more complete enumeration of the size effect literature, one can consult reviews by Schwert (1983) and Keim (1986).



selected firms was \$102.3 million. In the Reinganum (1983) study, this figure was closest to the median capitalization of his seventh decile portfolio, \$119 million, which was in the upper half of the capitalization ranking that included all New York and American Stock Exchange companies. Firms in the seventh decile portfolio earned average returns of 15.6 percent per year over the 1963-82 period. Firms selected by the nine investment screens in the 1970-83 period earned an average of 30.6 percent in the first year after they were bought. Thus, firms selected by this investment strategy apparently outperformed a portfolio of firms of about the same median stock market capitalization. Stated differently, the excess returns earned by this investment strategy cannot be attributed to the small-firm effect. This is not particularly surprising because fewer than 5 percent of the firms would be considered very small. Even if stock market capitalizations are a very good proxy for risk (see Chan and Chen 1986), they do not explain the success of the investment strategy outlined here.

The distribution of the two components of stock market capitalization, share prices and shares outstanding, are presented in Panels C and D of Table 18. The median share price of the selected firms was \$26.25. The share prices for one-fourth of the firms exceeded \$34.82. Only 8 percent of the firms sold for less than \$10.00 on the day they were purchased. Clearly, the selected companies were not low-priced stocks either. The median number of shares outstanding was slightly less than 4 million. The dispersion in outstanding shares was fairly large, with 80 percent of the companies falling in the range between 1.2 million shares and 12.8 million shares.

The nine criteria of the investment strategy were determined from an analysis of the 222 greatest stock market winners, and the sensitivity of the strategy results to all nine criteria was first assessed by examining the effects of deleting several of the strategy's key components. The first screen dropped was the requirement that the price/book ratios be less than 1.0; the

other eight filters were still applied. Naturally, this less restrictive investment strategy applied to more securities, generating 686 buy signals for 445 firms during the 1970-83 period. The resulting trading rule returns are displayed in Table 19.

Clearly, without the price/book ratio filter, return performance declined. After one year, the chosen firms experienced excess holding period returns of 14.6 percent; they appreciated in value by about 22.5 percent in one year, whereas the S&P 500 advanced by only about 7.9 percent. After two years, the excess holding period returns were 30.6 percent; the individual securities averaged gains of 47.8 percent over two years, and the S&P 500 increased by about 17.2 percent. Although these performance figures were still impressive, they suggested that the price/book ratio criterion plays a central role in the overall investment strategy. The deletion of the price/book ratio filter reduced the performance of the trading rule by about 7 percentage points per year, and the average excess holding period returns dropped over a two-year period from about 50 percent to 30 percent.

Although the price/book ratio rule seemed important to the strategy, the requirement that a stock possess a Datagraph rating greater than 70 was not critical. The eight investment screens remaining after the Datagraph rating requirement was deleted identified 935 buying opportunities for 547 different companies during the 1970-83 period. The excess holding period returns for this strategy averaged 21.2 percent and 45.9 percent after one and two years, respectively (Table 20). By comparison, the results that included the Datagraph rating restriction equalled 23.7 percent and 50.6 percent over one- and two-year periods. The difference was a mere 1.5 percentage points.

The Datagraph ratings contributed so little to the holding period returns of the portfolio strategy because the investment filters identified in this paper largely overlap the variables O'Neil used in calculating the ratings. This should not be too surprising, because the technical and fundamental variables chosen for the

trading rules were gleaned from an analysis of 222 companies classified as great stock market winners by O'Neil. It is a welcome finding that the Datagraph rating was of limited significance, because the other eight filters may be computed from data that were in the public domain and not proprietary.

A stock's relative strength is a potentially significant component of the trading strategy. Relative strength entered in the strategy in three ways. First, it entered directly because only securities with relative strength ranks greater than 70 could be considered. Second, it was a factor because only the previous quarter's relative strength rankings were eligible for selection. Finally, it entered indirectly through the security's Datagraph rating, which is based in part on relative strength.

In an attempt to purge the results of effects associated with relative strength, the consequence of removing these three variables from the investment strategy was estimated. Their removal left a trading rule with 6 screens, which dramatically increased the number of buy signals to 3,911 for 864 different companies during the 1970-83 period. The excess cumulative holding period returns associated with this strategy averaged 17.3 percent and 36.0 percent after one and two years, respectively (Table 21). The cumulative holding period returns of the securities, unadjusted for changes in the S&P 500, averaged 23.9 percent and 51.5 percent, respectively.

Clearly, relative strength alone did not drive the success of the investment strategy, but the strategy suffered when relative strength was not included as a criterion. The return performance was diminished by 6.4 percentage points in the first year relative to the returns earned by all nine investment screens. In other words, the returns were reduced an additional 4.9 percentage points beyond the 1.5 percentage points reduction associated with the elimination of just the Datagraph rating criterion. These findings are consistent with the conjecture that relative strength may be used to identify stock market winners.

the criteria pertaining to earnings. Earnings entered the trading strategy in three direct ways and one indirect way. A company was eligible for inclusion only if (1) its five-year quarterly earnings growth rate is positive; (2) the pretax profit margins were positive; and (3) earnings were accelerating; that is, this quarter's percentage change in quarterly earnings was greater than last quarter's percentage change. Because earnings are a component of the Datagraph rating, this criterion was also deleted.

With these deletions, five investment screens remained. During the 1970-83 period, these five filters identified 4,901 buy signals for 1,199 different companies. After one year, the excess cumulative holding period returns was 17.1 percent (Table 22). By the end of the second year, the average excess cumulative holding period return advanced to 34.5 percent. Even without the earnings screens, the remaining filters revealed an ability to select stocks whose performance exceeded the S&P 500. Nonetheless, at the margin, the earnings filters did appear to contribute to the success of the overall trading rule. Without the earnings filters, the performance dropped from 23.7 percent to 17.1 percent after the end of one year. Perhaps coincidentally, the decline in performance associated with the omission of the earnings criteria was nearly identical to that associated with the omission of the relative strength criteria. In any case, this evidence suggests that earnings may be helpful in formulating a successful investment strategy.

The final sensitivity analysis took a different tack. Instead of subtracting certain criteria from the set of nine filters, each investment screen was applied to the original set of 222 winners and the three screens that produce the highest median returns were selected. For example, from among the 222 winners, those with price-book values less than 1.0 had a median return of 260 percent; the median return of all 222 winners was 237 percent. The *three investment screens* with the highest median returns among the 222 winners were:

1. The price/book ratio is less than 1.0 (260 percent).
2. Quarterly earnings are accelerating; that is, there is a positive change in the percentage change in quarterly earnings (253 percent).
3. The relative strength rank of the stock in the current quarter is greater than the rank in the previous quarter (253 percent).

A buy signal was generated whenever the three criteria were satisfied. As might be expected, many more buy signals were generated with only three filters than with nine. The three-screen filter rule generated 13,080 buy signals compared to the 453 buy signals generated by the nine-filter rule. Clearly, the other six investment screens severely limited the selection of firms. But did these other six screens seem to matter?

The performance results for the investment strategy with only three filters are shown in Table 23. These results should be compared to those in Table 17. Perhaps surprisingly, the strategy with only three screens still did well relative to the S&P 500 index. After one year, these selected firms averaged excess holding period returns of 14.6 percent; they appreciated in value by 22.9 percent, whereas the S&P 500 advanced by only 8.3 percent. After two years, the average excess holding period returns were 32.0 percent.

Although these performance results are impressive, they fall short of the excess holding period returns earned when all nine investment screens were applied. For example, with nine investment screens, the average excess holding period returns were 23.7 percent after one year instead of 14.6 percent. Similarly, after two years, the strategy with nine investment screens produced an average excess holding period return of about 50 percent as opposed to 32 percent. At the margin, the other six investment rules seemed to improve performance. Thus, although the results should not be construed to mean that these three investment screens are the three best filters, the

results do suggest that all nine of the investment rules are not redundant. In other words, it seems unlikely that any one of the investment rules will yield better performance results than all nine jointly.



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## 5. Trading Strategy Results: 1984-1986

Although the 1970-83 trading rule results excluded companies classified by William O'Neil & Co. as great stock market winners, the sample was not completely independent of the 222 winners, because the 222 winners were selected *ex post* from the 1970-83 period. One way to investigate whether the trading rule performs as described is to validate it against a set of firms in a different time period. In principle, the validation outcomes help reveal which components of the trading rule are stable over time and which seem to be specific to the 1970-83 period.

Ideally, the number of observations in the validation sample would be about the same as those in the original sample, so that the power of the inferences drawn from the two samples would be equivalent. Unfortunately, these data do not lend themselves to this design. The original sample encompasses 14 years and the validation sample covers only three years.<sup>1</sup> Thus, the validation evidence should not be interpreted as either definitively confirming or refuting the stability of the trading rule strategy but should be viewed as just one additional piece of evidence regarding a strategy's efficacy. A complete validation would require many additional years of data.

The excess returns of the complete trading strategy with nine investment screens during 1984-86 are shown in Table 24.

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<sup>1</sup>Data for the validation sample were supplied on a separate tape by William O'Neil & Co. in early 1987.



To avoid double-counting the same security in this short period, a buy signal was issued only the first time the nine conditions are met. In this three-year period, 59 buy signals were generated. The performance results, although somewhat smaller than those of the 1970-83 period, were still impressive. The securities that passed the nine filters experienced excess returns of 22.2 percent after one year and 36.7 percent after two years on average; the raw cumulative returns of these securities, unadjusted for changes in the S&P 500, averaged 43.2 percent and 86.3 percent after one and two years, respectively. These sample averages were based on a small number of observations. Only 25 buy signals generated in 1984 could be tracked for a full eight quarters, and only 46 buy signals could be followed for four quarters. The levels of excess returns during 1984-1986 were lower than in the 1970-1983 period. In the earlier period, the cumulative excess holding period returns averaged 23.7 percent after one year, and in the later period they equalled 22.2 percent. A more noticeable difference appeared over a two-year holding period. The 1970-83 results revealed a cumulative excess holding period return of 50.6 percent whereas the 1984-86 performance averaged 36.7 percent. Nonetheless, the validation evidence suggests that the trading rule does work, even completely out of sample.

The sensitivity analyses performed in the previous chapter were repeated on the 1984-86 data to investigate whether the modified trading rules applied to the validation sample exhibit changes in the same direction as observed in the original sample. The first criterion eliminated was the requirement that price/book ratios be less than one. When this condition was relaxed, the number of buy signals jumped from 59 to 215. Clearly, the price/book ratio criterion was a stringent one in this period.<sup>2</sup>

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<sup>2</sup>The price/book ratios of companies are generally higher in the 1980s than they were in the 1970s. An alternative trading strategy might investigate companies with price/book ratios that are low relative to the rest of the securities instead of only those companies whose ratios fall below 1.0, a natural though somewhat arbitrary cutoff.

Table 25 contains the revised results for the trading strategy without the price/book ratio condition. The validation evidence reveals a pattern similar to the one in the original sample. With the deletion of a price/book ratio screen, investment performance suffered. After one year, the average excess cumulative return dropped to 11.4 percent from 22.2 percent; after two years, the average declined to 14.0 percent from 36.7 percent.<sup>3</sup> Thus, evidence from both the validation sample and the original sample is consistent with the conjecture that low price/book ratios are an important component of the trading strategy.

The Datagraph ratings, at the margin, did not matter very much in the original sample, and the same pattern is found in the validation sample (Table 26). When the restriction that a company's Datagraph rank be greater than 70 was lifted, the remaining eight investment screens identified 112 buying opportunities in the 1984-86 period. The excess holding period returns averaged 18.8 percent and 31.1 percent after one and two years, respectively. These average excess cumulative returns were slightly lower than those reported when the Datagraph restriction was imposed. Again, this similarity in returns results probably because many of the variables underlying the Datagraph rating are directly incorporated into the trading strategy.

Table 27 reports the effects of removing the two relative strength requirements as well as the Datagraph filter. When these conditions were eliminated, 157 buy signals were generated during 1984-86. After four quarters, the performance of this subset of trading rules was nearly 6 percentage points less than the performance of the complete set. After one year, the

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<sup>3</sup>In this table, as in some of the tables that follow, one observes that several companies possess *excess* returns smaller than -100 percent. These numbers are neither typographical errors nor programming errors. An excess return is defined as the difference between the security's holding period return and the equivalent return for the S&P 500. Whereas the holding period return for a security is bounded by -100 percent, this difference is not. For example, in Table 25 the excess holding period return for one company equalled -120.3 percent after two years, which resulted from that company's stock market value falling by about 70 percent during a period which the S&P 500 rose by about 50 percent.

six remaining filters yielded an average excess return of 16.6 percent, as opposed to an average of 22.2 percent for all nine filters. The direction and magnitude of this change in the validation sample is consistent with the evidence in the original sample after one year.

Whereas the direction of the change after two years in the validation sample was consistent with the evidence in the 1970-83 sample, the magnitude of the change was much smaller. In the validation, the performance after eight quarters declined to 30.5 percent on average from 36.7 percent, a difference slightly greater than 6 percentage points. In the 1970-83 sample, this difference averaged about 14 percentage points.

In the validation, the effects on the two-year excess returns of deleting the relative strength conditions were not very dramatic, for two possible reasons: (1) relative strength is not a stable component of this strategy, at least for a two-year horizon; or (2) the 1984-86 result with respect to relative strength is an outlier and does not accurately reflect the long-run influence of relative strength on investment performance. Before one can confidently conclude which of these interpretations is correct, data from additional years will need to be collected and analyzed.

Deleting the three earnings filters and the Datagraph requirement in the validation samples yielded results qualitatively similar to those obtained in the original sample. The remaining five investment screens earmarked 245 securities as eligible for purchase in the 1984-86 period. Without the earnings filters, investment performance declined (Table 28), decreasing after four quarters from 22.2 percent to 13.3 percent. At the end of eight quarters, the average excess cumulative returns also diminished; the remaining five filters generated returns of 21.3 percent, whereas the complete set of nine yielded 36.7 percent. These patterns of change were similar to those documented in the original sample. Thus, the validation sample evidence also suggests that the earnings filters play a key role in the trading strategy.

The final permutation included only three investment screens: (1) price/book ratios less than 1.0; (2) increasing relative strength ranks; and (3) accelerating quarterly earnings. During 1984-86, these three filters signalled 518 buying opportunities. On average, the cumulative excess holding period returns reached 8.5 percent and 16.3 percent after one and two years, respectively (Table 29), as compared to returns of 22.2 percent and 36.7 percent for the set of nine filters. In the original sample, as in the validation sample, this set of three filters did not perform as well as the complete set of nine. The performance of these three filters, however, comes closer to that of the nine filters in the 1970-83 sample than in the 1984-86 sample.

The validation sample seemed to corroborate many of the results discovered in the 1970-83 sample. The set of nine investment rules produced significant excess holding period returns in the 1984-86 period. After two years, the average excess holding period return equalled 36.7 percent, and the standard error of this estimate equalled 8.7 percent. In addition, the sensitivity analyses in the validation sample qualitatively upheld many of the findings from the original sample. In the validation and the original sample, investment performance suffered when the price/book ratio criterion was excluded. Further, at the margin, the Datagraph ratings were shown to affect performance very little, if at all, in both samples. Evidence from the validation and original samples suggested that the exclusion of the three earnings filters adversely influenced investment performance. Also, in both samples the set of three investment criteria (price/book less than 1.0, increasing relative strength, accelerating quarterly earnings) performed well but not quite as well as the full set of nine criteria. The relative performance of the three criteria, however, was not as great in the validation as in the original sample.

The 1984-86 validation results diverged from the results obtained in the original 1970-83 period only with respect to the two relative strength filters. In their absence, investment per-

formance during 1970-83 declined by about 6 percentage points after one year and 14 percentage points after two. In the validation, the results after one year were consistent with the 1970-83 evidence, with performance declining by about 6 percentage points. The cumulative results after two years, however, remained at about 6 percent in the 1984-86 period; the elimination of the relative strength criteria did not further reduce investment performance in the second year. Whether this means that relative strength is not a stable component of the trading strategy over a two-year horizon or whether it means that this short validation period is uncharacteristic of the effect of relative strength over longer time periods may only be resolved after additional data from other years is analyzed. Nonetheless, the validation results are consistent with the original sample for the overall trading strategy with nine investment screens.

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## 6. Implications and Conclusions

This research explored the anatomy of 222 stock market winners from 1970-83. The dissection highlighted several financial features that may aid managers in their quest for the well-behaved portfolio. If hindsight were foresight, one would like to know of the impending changes in institutional holdings. Institutional interest in a stock seems to increase along with that stock's price. For example, the ownership stake of investment advisors more than doubled on average at the conclusion of the 222 price advances. An accurate forecast of pretax profit margins would also be valuable. The pretax profit margins of the 222 winners rose during the period of rapid price appreciation. By the sell quarter, their margins increased by about 2 percent on average. In addition, the growth rates based on five years of quarterly earnings data advanced from an average of 23 percent during the buy period to 38.2 percent at the sell period. This change in the five-year earnings growth rate reflects the fact that low growth rates from earlier years are replaced with the high earnings growth rates during the period of the price expansion. Indeed, the changes in earnings growth rates and profit margins probably fueled, at least in part, the price advances.

Other distinctive features in the anatomy of the winners revealed themselves prior to the rapid price appreciation. These financial features do not require that a portfolio manager have a crystal ball with which to gaze into the future. Rather, they are

characteristics that may be gleaned from publicly available information. For example, the winners generally sell at a price less than their book value prior to their substantial price advances. In addition, the quarterly earnings of the winners are accelerating in the quarters preceding their price rise; that is, there is a positive change in the percentage change in quarterly earnings. Prior to their buy dates, the relative strengths of the winners are high and increasing, which reflects the incipient stages of the explosive price changes. In all, nine features are singled out. They are:

1. The price/book ratio is less than 1.0.
2. The five-year growth rate based on quarterly earnings is positive.
3. Quarterly earnings are accelerating, that is, there is a positive change in the percentage change in quarterly earnings.
4. Pre-tax profit margins are positive.
5. There are fewer than 20 million common shares outstanding.
6. The relative strength rank of the stock is at least 70.
7. The relative strength rank of the stock in the current quarter is greater than the rank in the previous quarter.
8. The O'Neil Datagraph rating is at least 70.
9. The stock is selling within 15 percent of its maximum price during the previous two years.

These nine investment criteria are not judged on the basis of the statistical sophistication (or the lack thereof) underlying their discovery, but on the basis of the results they produce in other samples. To this end, the nine characteristics form the basis for a simple trading strategy which, applied to a universe of 2,279 New York and American Stock Exchange firms over the 1970-83 period, significantly outperformed the S&P 500 index. For further validation, the trading rule is applied to data from a

completely different period. During 1984-86, the nine investment screens selected securities that appreciated in value by 86.2 percent on average, while the S&P 500 increased on average by 49.5 percent. These results are not quite as impressive as those from the 1970-83 period, but they do indicate that the trading rule captures stable elements of a successful investment strategy.

One implication of this research perhaps stands above all others: there is *no one correct way* to select superior securities. The absence of certain characteristics from the trading strategy merit mention, *viz*, those associated with superior performance in various studies of investment anomalies. This trading strategy is not tilted in favor of stocks with small market capitalizations, or with low share prices or, with low price-earnings ratios. It is not a contrarian strategy in that it does not select companies with substantial previous price declines. Indeed, only firms that are selling near their maximum price for the two previous years are eligible for inclusion. It is not claimed that low P/E stocks or stocks with small market capitalizations do not perform well. Substantial evidence shows that these investment strategies do select superior securities over long periods of time. Despite the absence of these other characteristics, however, the trading strategy defined in this study performs exceptionally well. The excess returns earned by this strategy are economically significant and suggest that there may be more than one way to skin the performance cat.





# Tables



TABLE 1

**LISTING OF 222 STOCK MARKET WINNERS  
IN CHRONOLOGICAL ORDER OF HYPOTHETICAL BUY DATES**

<u>Company</u>	<u>Hypothetical Buy Date</u>	<u>Hypothetical Sell Date</u>	<u>Performance</u>	<u>Weeks Held</u>
A M F INC	21AUG70	30JUN72	167%	97
ECHLIN INC	21AUG70	26JAN73	257	127
CLOROX CO	28AUG70	12JAN73	329	124
HOUSE OF FABRICS INC	28AUG70	26MAR71	123	30
PETRIE STORES CORP	28AUG70	04FEB73	303	127
QUAKER STATE OIL REFG	28AUG70	05JAN73	231	123
KAUFMAN & BROAD INC	04SEP70	09JUN72	145	92
RUBBERMAID INC	11SEP70	22SEP72	280	106
SCHEIB EARL INC	18SEP70	07JUL72	378	94
DEVELOPMENT CORP OF AMER	23OCT70	09JUN72	557	85
NEW PROCESS COMPANY	23OCT70	14JAN72	304	64
STANDARD MOTOR PROD CL A	30OCT70	21JAN72	208	64
DISNEY PRODUCTIONS	06NOV70	12JAN73	249	114
BAKER INTL CORP	20NOV70	15DEC72	214	108
CIRCLE K CORP	20NOV70	23JUN72	221	83
MCDONALDS CORP	20NOV70	16FEB73	438	117
RITE AID CORP	20NOV70	23JUN72	429	83
COLECO INDUSTRIES INC	27NOV70	04AUG72	260	88
N C H CORP	27NOV70	02FEB73	196	114
OVERNITE TRANSPORTATION	27NOV70	21APR72	238	73
T R E CORP	27NOV70	04FEB72	214	62
SCOTTYS INC	18DEC70	14APR72	397	69
JOHNSON & JOHNSON	31DEC70	18AUG72	121	85
BAUSCH & LOMB INC	12MAR71	25FEB72	222	50
LEASEWAY TRANSPORTATION	26MAR71	23JUN72	119	65
MAGIC CHEF INC	07MAY71	03MAR72	74	43
FLEETWOOD ENTERPRISES	14MAY71	14JUL72	142	61
WINNEBAGO INDUSTRIES INC	21MAY71	07JUL72	377	59
MASCO CORP	27AUG71	02JUN72	90	40
ANTHONY INDUSTRIES	26NOV71	28JUL72	202	35
AUGAT INC	26NOV71	18AUG72	159	38
HALLIBURTON COMPANY	26NOV71	19JAN73	140	60
PONDEROSA INC	26NOV71	05JAN73	198	58
HEWLETT-PACKARD CO	03DEC71	16FEB73	103	63
MOBILE HOME IND INC	03DEC71	26MAY72	111	25
SONY CORP AMER SHS NEW	14JAN72	12JAN73	198	52
MARION LABORATORIES INC	04FEB72	11AUG72	88	27
A S A LTD	16FEB73	15FEB74	272	52
HOMESTAKE MINING CO	23NOV73	18JAN74	109	8

TABLE 1 — Continued

LISTING OF 222 STOCK MARKET WINNERS  
IN CHRONOLOGICAL ORDER OF HYPOTHETICAL BUY DATES

<u>Company</u>	<u>Hypothetical Buy Date</u>	<u>Hypothetical Sell Date</u>	<u>Performance</u>	<u>Weeks Held</u>
M C A INCORPORATED	06DEC74	10OCT75	227%	44
PITTSTON CO	20DEC74	25JUL75	113	31
UNITED TECHNOLOGIES CORP	20DEC74	04JUL75	82	28
MARK CONTROLS CORP	24JAN75	18FEB77	389	108
MOORE MCCORMACK RES INC	24JAN75	25JUL75	186	26
PALL CORP	31JAN75	01AUG75	167	26
TANDY CORP	31JAN75	27FEB76	357	56
DIAMOND SHAMROCK CORP	14FEB75	09JUL76	183	72
E SYSTEMS INC	14FEB75	28JAN77	370	102
GENERAL DYNAMICS CORP	28FEB75	20JUN75	104	16
ENTEX INC	09MAY75	14OCT77	218	127
DAYTON HUDSON CORP	16MAY75	26MAR76	139	45
HARRIS CORP DEL	17OCT75	15SEP78	418	152
NORTHROP CORPORATION	07NOV75	18MAR77	141	71
ALLIS CHALMERS CORP	19DEC75	24SEP76	134	40
TELEDYNE INC	26DEC75	01OCT76	269	40
BEST PRODUCTS INC	09JAN76	21JUL78	350	132
JOHNSON CONTROLS INC	23JAN76	12MAY78	347	120
GEARHART INDUSTRIES INC	12MAR76	18AUG78	374	127
NATIONAL PRESTO IND	12MAR76	01OCT76	104	29
MITCHELL ENERGY & DEV.	07MAY76	21JAN77	171	37
WOODS PETROLEUM CORP	14MAY76	04FEB77	207	38
UNITED INDUSTRIAL CORP	11JUN76	27MAY77	109	51
WASTE MANAGEMENT INC	10SEP76	21NOV80	900	219
ELGIN NATIONAL IND	17SEP76	22APR77	98	31
BALLY MFG CORP	15OCT76	08SEP78	564	99
M G M GRAND HOTELS INC	05NOV76	08SEP78	283	96
SAVIN CORP	19NOV76	16SEP77	226	43
PETRO LEWIS CORP	03DEC76	07MAR80	850	170
BALDOR ELECTRIC CO	25MAR77	29SEP78	342	79
HUMANA INC	17JUN77	19JUN81	1325	209
COMMUNITY PSYCHIATRIC CN	22JUL77	24JUN83	2554	309
FLIGHTSAFETY INTL INC	29JUL77	15MAY81	965	198
DOME MINES LTD	02SEP77	24OCT80	576	164
STORAGE TECHNOLOGY CORP	02SEP77	08SEP78	398	53
DATAPOINT CORP	28OCT77	17APR81	755	181
BROWN FORMAN INC CL B	04NOV77	19NOV82	369	263
PALL CORP	04NOV77	09JAN81	411	166
SCOA INDUSTRIES INC	04NOV77	08SEP78	186	44

TABLE 1 — Continued

**LISTING OF 222 STOCK MARKET WINNERS  
IN CHRONOLOGICAL ORDER OF HYPOTHETICAL BUY DATES**

<u>Company</u>	<u>Hypothetical Buy Date</u>	<u>Hypothetical Sell Date</u>	<u>Performance</u>	<u>Weeks Held</u>
SMITHKLINE BECKMAN CORP	04NOV77	08SEP78	135%	44
FLUKE MFG CO INC	11NOV77	22AUG80	246	145
HILTON HOTELS CORP	11NOV77	25AUG78	190	41
DOME PETROLEUM LTD	18NOV77	22FEB80	576	118
LA QUINTA MOTOR INNS INC	25NOV77	08JAN82	753	216
M/A-COM INC	20JAN78	29MAY81	950	175
TELEDYNE INC	20JAN78	19JUN81	503	178
FAIRCHILD INDUSTRIES	27JAN78	09JAN81	371	154
VEECO INSTRUMENTS INC	27JAN78	09JAN81	656	154
A V X CORP	03FEB78	15SEP78	119	32
BOEING CO	03FEB78	02FEB79	182	52
PRIME COMPUTER INC	17FEB78	05JUN81	1595	172
TORO CO	17FEB78	20APR79	207	61
MEASUREX CORP	24FEB78	22JUN79	152	69
NUCOR CORP	10MAR78	12JUN81	550	170
WANG LABS INC CL C CONV	10MAR78	05JUN81	1352	169
UNITRODE CORPORATION	17MAR78	05OCT79	195	81
RESORTS INTL CL A	24MAR78	15SEP78	836	25
AMDAHL CORP	21APR78	08SEP78	139	20
STANDARD OIL OF OHIO	08DEC78	28NOV80	348	103
TEXAS OIL & GAS CORP	08DEC78	28NOV80	525	103
TUBOS DE ACERO DE MEXICO	22DEC78	28SEP79	260	40
CROWN CENTRAL PETE CL A	12JAN79	08FEB80	328	56
PENNZOIL CO	12JAN79	05DEC80	167	99
TOSCO CORP	19JAN79	13JUL79	278	25
TOYS R US	19JAN79	12AUG83	1671	238
LEAR PETROLEUM CORP	26JAN79	22FEB80	330	56
COMPUTERVISION CORP	09FEB79	24APR81	1235	115
GULF CANADA LTD	09FEB79	07MAR80	366	56
CANADIAN MARCONI CO	16FEB79	01FEB80	147	50
CHARTER CO	02MAR79	15JUN79	387	15
GERBER SCIENTIFIC INC	02MAR79	14NOV80	489	89
GLOBAL MARINE INC	02MAR79	02JAN81	808	96
HEILEMAN G BREWING	02MAR79	21OCT83	831	242
HELMERICH & PAYNE INC	02MAR79	02JAN81	348	96
MATERIALS RESEARCH CORP	02MAR79	02JAN81	507	96
G C A CORPORATION	09MAR79	12JUN81	844	118
WESTERN CO OF NO AMER	16MAR79	28NOV80	551	89
FLUOR CORP	11MAY79	21NOV80	434	80

**TABLE 1**  
**LISTING OF 222 STOCK MARKET WINNERS**  
**IN CHRONOLOGICAL ORDER OF HYPOTHETICAL BUY DATES**

<u>Company</u>	<u>Hypothetical Buy Date</u>	<u>Hypothetical Sell Date</u>	<u>Performance</u>	<u>Weeks Held</u>
COMMODORE INTL LTD	18MAY79	17JUN83	4009%	213
OCEAN DRILLING & EXPLOR	18MAY79	28NOV80	347	80
ZAPATA CORP	18MAY79	23JAN81	289	88
ROWAN COMPANIES INC	25MAY79	05DEC80	261	80
N L INDUSTRIES	08JUN79	04DEC81	274	130
PARADYNE CORP	10AUG79	05JUN81	594	95
HANDY & HARMAN	24AUG79	22FEB80	111	26
KIRBY EXPLORATION INC	26SEP79	07AUG81	1413	97
MITCHELL ENERGY & DEV.	16NOV79	28NOV80	349	54
WARNER COMMUNICATIONS	16NOV79	19FEB82	252	118
CHARTER MED CORP CL B CV	30NOV79	12JUN81	539	80
VARCO INTL INC	18APR80	19DEC80	297	35
SOUTHWEST AIRLINES CO	16MAY80	05JUN81	269	55
CARLISLE CORPORATION	23MAY80	24APR81	315	48
DANIEL INDUSTRIES INC	06JUN80	05DEC80	119	26
BERGEN BRUNSWIG CL A	13JUN80	10JUN83	453	156
BOWNE & CO	13JUN80	19JUN81	188	53
PANDICK INC	13JUN80	24JUN81	917	158
PRIME COMPUTER INC	20JUN80	05JUN81	236	50
DOW JONES & CO	01AUG80	30SEP83	359	165
KEY PHARMACEUTICALS INC	08AUG80	26AUG83	358	159
WHITEHALL CORP	08AUG80	01JUL83	1126	151
M E I CORP	20FEB81	10DEC82	226	94
DIEBOLD INC	02OCT81	22APR83	130	81
HOUSE OF FABRICS INC	24NOV81	17DEC82	220	55
OXFORD INDUSTRIES INC	25DEC81	07OCT83	339	93
TELECONCEPTS CORP	12FEB82	01APR83	641	59
LIMITED INC	19FEB82	01JUL83	674	71
DAYTON HUDSON CORP	26FEB82	24JUN83	154	69
MERCANTILE STORES	05MAR82	15JUL83	217	71
MACY R H & CO	19MAR82	24JUN83	202	66
SAGA CORP	19MAR82	29JUL83	246	71
SMUCKER J M CO	19MAR82	06MAY83	150	59
BLAIR JOHN & COMPANY	26MAR82	16SEP83	254	77
SUPERMARKETS GENERAL	26MAR82	24JUN83	177	65
VARIAN ASSOCIATES INC	02APR82	01JUL83	292	65
BROWN GROUP INC	09APR82	08JUL83	158	65
ZAYRE CORP	09APR82	29JUL83	288	68
STOP & SHOP COMPANIES	07MAY82	14OCT83	518	75

TABLE 1 — Continued

**LISTING OF 222 STOCK MARKET WINNERS  
IN CHRONOLOGICAL ORDER OF HYPOTHETICAL BUY DATES**

<u>Company</u>	Hypothetical	Hypothetical	<u>Performance</u>	Weeks
	<u>Buy Date</u>	<u>Sell Date</u>		<u>Held</u>
DILLARD DEPT STORES CL A	14MAY82	21OCT83	227%	75
V F CORP	28MAY82	01JUL83	258	57
FLEETWOOD ENTERPRISES	04JUN82	01JUL83	414	56
GIANT FOOD INC CL A	04JUN82	29JUL83	191	60
E SYSTEMS INC	25JUN82	01JUL83	175	53
WALGREEN COMPANY	25JUN82	02DEC83	171	75
WATKINS-JOHNSON CO	25JUN82	01JUL83	167	53
DUN & BRADSTREET COS INC	09JUL82	24JUN83	89	50
EDO CORPORATION	09JUL82	08JUL83	273	52
INTL BUSINESS MACHINES	09JUL82	21OCT83	103	67
MARY KAY COSMETICS	09JUL82	15APR83	212	40
PULTE HOME CORP	23JUL82	24JUN83	644	48
CAROLINA FREIGHT CORP	13AUG82	05AUG83	289	51
FAMILY DOLLAR STORES	13AUG82	15JUL83	323	48
MAGIC CHEF INC	13AUG82	05AUG83	276	51
PAYLESS CASHWAYS INC	13AUG82	08JUL83	184	47
SEARS ROEBUCK & CO	13AUG82	29JUL83	128	50
AYDIN CORP	20AUG82	29JUL83	114	49
BANDAG INC	20AUG82	10JUN83	109	42
CARTER-WALLACE INC	20AUG82	13MAY83	128	38
COACHMEN INDUSTRIES INC	20AUG82	01JUL83	469	45
COLLINS & AIKMAN CORP	20AUG82	08JUL83	210	46
CULLINET SOFTWARE INC	20AUG82	10JUN83	205	42
DONNELLEY R R & SONS	20AUG82	06OCT83	115	59
FINANCIAL CORP AMER	20AUG82	29JUL83	290	49
FORD MOTOR OF CANADA	20AUG82	28OCT83	159	62
GENRAD INC	20AUG82	30SEP83	190	58
HASBRO INC	20AUG82	24FEB84	286	79
LOCKHEED CORP	20AUG82	21OCT83	119	61
LOWES COMPANIES INC	20AUG82	08JUL83	148	46
MARION LABORATORIES INC	20AUG82	17JUN83	182	43
MARRIOTT CORP	20AUG82	01JUL83	95	45
N C R CORP	20AUG82	02DEC83	130	67
OMNICARE INC	20AUG82	20MAY83	141	39
RYLAND GROUP	20AUG82	03JUN83	310	41
SERVICE CORPORATION INTL	20AUG82	08JUL83	178	46
STANDARD MOTOR PROD CL A	20AUG82	15JUL83	171	47
U S TOBACCO CO	20AUG82	24FEB84	138	79
CHILTON CORP	27AUG82	14OCT83	494	59



TABLE 1 — Continued

LISTING OF 222 STOCK MARKET WINNERS  
IN CHRONOLOGICAL ORDER OF HYPOTHETICAL BUY DATES

<u>Company</u>	<u>Hypothetical Buy Date</u>	<u>Hypothetical Sell Date</u>	<u>Performance</u>	<u>Weeks Held</u>
CHRYSLER CORP	27AUG82	01JUL83	279%	44
RUBBERMAID INC	27AUG82	22JUL83	134	47
STRIDE RITE CORP	27AUG82	01JUL83	187	44
TELEX CORP	27AUG82	10DEC82	137	15
U S SHOE CORP	27AUG82	01JUL83	198	44
CLOROX CO	03SEP82	24JUN83	124	42
AMES DEPARTMENT STORES	10SEP82	09DEC83	222	65
BOLT BERANEK & NEWMAN	17SEP82	29JUL83	328	45
COLECO INDUSTRIES INC	17SEP82	10JUN83	561	38
HARTMARX CORP	17SEP82	05AUG83	106	46
LOGICON INC	17SEP82	10JUN83	132	38
HAZELTINE CORP	01OCT82	24JUN83	194	38
INTEGRATED RESOURCES	01OCT82	17JUN83	246	37
MERRILL LYNCH & CO INC	01OCT82	15JUL83	184	41
OHIO MATTRESS CO DEL	01OCT82	12AUG83	214	45
T I E COMMUNICATIONS	01OCT82	29JUL83	221	43
JAMES RIVER CORP	08OCT82	08JUL83	177	39
NORTHERN TELECOM LTD	08OCT82	30SEP83	159	51
ROHM & HAAS CO	15OCT82	08JUL83	125	38
TERADYNE INC	15OCT82	13JAN84	258	65
NATIONAL EDUCATION CORP	22OCT82	01JUL83	297	36
AMERICAN S&L ASSOC FLA	29OCT82	24JUN83	317	34
FRUEHAUF CORP	24DEC82	13JAN84	105	55
GOLDEN NUGGET INC	24DEC82	29JUL83	155	31
AMREP CORPORATION	31DEC82	24FEB84	142	60
CIRCUIT CITY STORES INC	21JAN83	21OCT83	295	39
JAMESWAY CORPORATION	18FEB83	07OCT83	119	33

TABLE 2

**PRICE APPRECIATION AND LENGTH OF TIME POSITION  
HELD FOR THE 222 GREATEST STOCK MARKET WINNERS**

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**Panel A: Price Appreciation (in percent)**

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				Percentiles	
Mean	349	5%	104	95%	945
Median	237	10%	119	90%	652
		25%	159	75%	370

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**Panel B: Excess Price Appreciation Above S&P 500 Return  
(in percent)**

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				Percentiles	
Mean	318	5%	75	95%	898
Median	209	10%	96	90%	607
		25%	126	75%	347

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**Panel C: Elapsed Time Between Buy and Sell Dates (in weeks)**

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				Percentiles	
Mean	77	5%	26	95%	178
Median	60	10%	34	90%	155
		25%	44	75%	96

**TABLE 3**  
**BANK HOLDINGS IN THE SELL, BUY,**  
**AND EIGHT PRECEDING QUARTERS**

**Panel A: Number of Banks Owning Shares**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	23.0	0	0	0	1.75	11	33.5	57.0	86.3	178
BUY	12.3	0	0	0	0.00	3	13.2	35.7	48.7	178
BUY-1	10.6	0	0	0	0.00	3	11.0	29.7	42.4	170
BUY-2	9.8	0	0	0	0.00	2	10.0	27.7	38.8	169
BUY-3	10.0	0	0	0	0.00	2	10.0	26.8	37.3	181
BUY-4	10.3	0	0	0	0.00	3	11.0	27.0	39.0	194
BUY-5	10.0	0	0	0	0.00	2	10.0	25.2	38.0	196
BUY-6	9.7	0	0	0	0.00	2	10.0	25.0	37.0	195
BUY-7	9.2	0	0	0	0.00	2	9.5	25.2	36.0	195
BUY-8	8.8	0	0	0	0.00	1	9.0	23.0	41.0	188

**Panel B: Percent of Outstanding Shares Held by Banks**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	8.09	0	0	0	0.75	5.0	13.0	19.7	24.0	43.7
BUY	6.46	0	0	0	0.00	3.0	10.2	16.0	25.0	34.7
BUY-1	6.24	0	0	0	0.00	3.0	10.0	17.0	23.8	34.0
BUY-2	5.43	0	0	0	0.00	2.0	9.0	16.0	21.5	31.7
BUY-3	5.42	0	0	0	0.00	2.0	9.0	16.0	20.6	31.7
BUY-4	5.50	0	0	0	0.00	2.0	9.0	16.0	20.0	32.0
BUY-5	5.35	0	0	0	0.00	2.0	9.0	16.0	22.2	31.0
BUY-6	5.04	0	0	0	0.00	1.5	8.2	14.5	18.7	32.0
BUY-7	5.06	0	0	0	0.00	1.0	8.0	15.6	19.3	33.1
BUY-8	5.08	0	0	0	0.00	1.0	7.0	16.0	23.2	31.6

TABLE 4

MUTUAL FUND HOLDINGS IN THE SELL, BUY,  
AND EIGHT PRECEDING QUARTERS

Panel A: Number of Mutual Funds Owning Shares

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	19.6	1	2	4	9	13	25	41.0	50.0	80.7
BUY	10.6	0	0	1	2	6	12	23.0	37.8	58.6
BUY-1	8.6	0	0	0	1	4	11	19.7	30.5	49.7
BUY-2	8.6	0	0	0	1	4	11	21.1	32.0	55.0
BUY-3	9.1	0	0	0	1	4	11	23.6	29.6	57.0
BUY-4	9.5	0	0	0	1	4	12	24.0	27.0	63.0
BUY-5	9.7	0	0	0	1	4	13	22.2	27.2	74.0
BUY-6	9.4	0	0	0	1	4	11	24.0	29.0	71.3
BUY-7	9.0	0	0	0	1	3	10	24.0	30.3	70.1
BUY-8	9.0	0	0	0	1	4	10	23.0	29.8	84.9

Panel B: Percent of Outstanding Stock Held by Mutual Funds

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	7.88	0	1	1	3	6	11.0	16.0	18.0	39.3
BUY	4.91	0	0	0	1	3	8.0	12.0	14.0	22.5
BUY-1	4.37	0	0	0	0	3	7.0	11.0	13.8	23.0
BUY-2	4.14	0	0	0	0	3	7.0	10.0	13.8	22.8
BUY-3	4.22	0	0	0	0	2	7.0	11.0	13.3	22.4
BUY-4	4.44	0	0	0	0	3	7.0	12.0	15.0	19.0
BUY-5	4.56	0	0	0	0	3	7.0	11.0	16.1	24.2
BUY-6	4.25	0	0	0	0	3	6.0	11.0	16.0	23.0
BUY-7	4.35	0	0	0	0	2	6.5	11.0	17.3	24.1
BUY-8	4.56	0	0	0	0	2	7.0	13.0	18.6	24.2

TABLE 5

INVESTMENT ADVISOR HOLDINGS IN THE SELL, BUY,  
AND EIGHT PRECEDING QUARTERS

Panel A: Number of Investment Advisors Owning Shares

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	20.9	0	0	0	0	14	31.0	47.0	74.5	125
BUY	9.3	0	0	0	0	0	13.0	26.4	35.8	110
BUY-1	7.7	0	0	0	0	0	9.0	23.7	30.8	100
BUY-2	7.2	0	0	0	0	0	8.2	22.7	30.8	96
BUY-3	7.2	0	0	0	0	0	7.0	21.0	31.8	105
BUY-4	7.4	0	0	0	0	0	7.0	21.0	36.0	107
BUY-5	7.2	0	0	0	0	0	6.5	20.4	34.2	110
BUY-6	7.1	0	0	0	0	0	6.0	20.5	30.7	117
BUY-7	6.7	0	0	0	0	0	5.0	22.0	27.5	115
BUY-8	6.4	0	0	0	0	0	4.0	22.0	28.2	121

Panel B: Percent of Outstanding Stocks Held by  
Investment Advisors

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	14.9	0	0	0	0	10.5	25.0	36.0	40.7	82.3
BUY	7.2	0	0	0	0	0.0	13.0	23.0	31.8	58.1
BUY-1	6.3	0	0	0	0	0.0	10.2	20.7	31.5	58.0
BUY-2	5.8	0	0	0	0	0.0	9.2	21.0	27.8	44.0
BUY-3	5.4	0	0	0	0	0.0	8.5	21.6	26.3	36.0
BUY-4	5.4	0	0	0	0	0.0	8.0	20.0	27.0	37.0
BUY-5	5.2	0	0	0	0	0.0	7.0	20.2	29.1	38.0
BUY-6	5.3	0	0	0	0	0.0	8.0	22.5	27.0	34.1
BUY-7	5.0	0	0	0	0	0.0	6.5	21.0	24.6	35.1
BUY-8	4.8	0	0	0	0	0.0	7.0	19.0	25.6	36.2

TABLE 6

**INSURANCE COMPANY HOLDINGS IN THE SELL, BUY,  
AND EIGHT PRECEDING QUARTERS**

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**Panel A: Number of Insurance Companies Owning Shares**

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Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	4.36	0	0	0	0	2	7.0	11.0	15.7	23.5
BUY	2.80	0	0	0	0	0	4.0	8.0	11.0	34.7
BUY-1	2.28	0	0	0	0	0	3.0	6.7	11.8	21.3
BUY-2	1.90	0	0	0	0	0	2.0	6.0	8.0	20.3
BUY-3	1.94	0	0	0	0	0	1.5	6.0	8.6	22.7
BUY-4	2.38	0	0	0	0	0	2.0	7.0	10.0	38.0
BUY-5	2.15	0	0	0	0	0	2.0	7.0	9.0	24.7
BUY-6	2.08	0	0	0	0	0	2.0	7.0	8.5	28.8
BUY-7	1.89	0	0	0	0	0	1.0	6.0	8.3	30.0
BUY-8	2.35	0	0	0	0	0	2.0	7.2	10.0	38.4

---

**Panel B: Percent of Outstanding Stocks Held by  
Insurance Companies**

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Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	2.61	0	0	0	0	1	4	8.0	10.0	14.5
BUY	1.94	0	0	0	0	0	3	7.0	8.0	15.5
BUY-1	1.58	0	0	0	0	0	2	6.0	8.0	14.5
BUY-2	1.47	0	0	0	0	0	2	5.7	8.0	13.3
BUY-3	1.38	0	0	0	0	0	1	6.0	7.3	11.8
BUY-4	1.45	0	0	0	0	0	2	6.0	8.0	11.0
BUY-5	1.29	0	0	0	0	0	1	5.0	7.0	10.0
BUY-6	1.24	0	0	0	0	0	1	5.0	7.0	13.0
BUY-7	1.06	0	0	0	0	0	1	4.0	6.3	13.0
BUY-8	1.27	0	0	0	0	0	1	4.0	7.0	14.8

**TABLE 7**  
**CORPORATE INSIDER TRANSACTIONS AMONG THE**  
**222 GREATEST WINNERS IN THE SELL, BUY,**  
**AND EIGHT PRECEDING QUARTERS**

**Panel A: Number of Insiders Buying Stock**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	0.44	0	0	0	0	0	1	2	2.84	3.77
BUY	0.37	0	0	0	0	0	1	1	2.00	3.77
BUY-1	0.31	0	0	0	0	0	0	1	2.00	3.00
BUY-2	0.35	0	0	0	0	0	0	1	2.00	4.00
BUY-3	0.21	0	0	0	0	0	0	1	1.00	2.86
BUY-4	0.32	0	0	0	0	0	1	1	2.00	3.00
BUY-5	0.30	0	0	0	0	0	0	1	2.00	3.02
BUY-6	0.21	0	0	0	0	0	0	1	1.00	2.15
BUY-7	0.29	0	0	0	0	0	0	1	2.00	4.00
BUY-8	0.29	0	0	0	0	0	0	1	1.00	3.12

**Panel B: Number of Insiders Selling Stock**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	1.80	0	0	0	0	1	3	5	6	10
BUY	1.38	0	0	0	0	1	2	4	5	8
BUY-1	0.84	0	0	0	0	0	1	3	4	9
BUY-2	0.72	0	0	0	0	0	1	3	4	6
BUY-3	0.80	0	0	0	0	0	1	2	4	7
BUY-4	0.68	0	0	0	0	0	1	2	3	5
BUY-5	0.75	0	0	0	0	0	1	2	4	9
BUY-6	0.67	0	0	0	0	0	1	2	4	6
BUY-7	0.78	0	0	0	0	0	1	3	4	7
BUY-8	0.69	0	0	0	0	0	1	3	3	7

TABLE 8

**PRICE/BOOK AND PRICE-EARNINGS RATIOS AMONG  
THE 222 GREATEST WINNERS IN THE SELL, BUY,  
AND EIGHT PRECEDING QUARTERS**

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**Panel A: Price/Book Ratios**


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Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	2.64	0.17	0.33	0.42	1.15	2.24	3.43	4.95	6.49	11.26
BUY	0.95	0.07	0.12	0.20	0.31	0.60	1.10	2.14	2.74	6.92
BUY-1	0.69	0.04	0.08	0.14	0.26	0.45	0.80	1.52	1.94	5.28
BUY-2	0.62	0.04	0.08	0.13	0.26	0.40	0.68	1.39	1.86	4.74
BUY-3	0.58	0.04	0.07	0.11	0.22	0.41	0.66	1.33	1.89	4.75
BUY-4	0.49	0.05	0.07	0.11	0.18	0.40	0.60	1.10	1.41	2.83
BUY-5	0.52	0.05	0.07	0.10	0.20	0.38	0.61	1.06	1.58	3.19
BUY-6	0.50	0.05	0.07	0.10	0.18	0.38	0.63	1.03	1.71	2.82
BUY-7	0.49	0.05	0.06	0.09	0.18	0.34	0.57	0.95	1.55	3.35
BUY-8	0.45	0.04	0.07	0.09	0.18	0.29	0.50	0.96	1.46	2.52

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**Panel B: Price-Earnings Ratios**


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Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	29.4	7.0	9.0	11.0	16.5	24.0	37.0	59.0	71.1	92.1
BUY	13.6	2.0	4.0	5.0	7.0	10.0	14.0	20.0	27.8	119.7
BUY-1	11.7	2.0	4.0	5.0	6.0	8.0	12.0	18.0	23.0	152.0
BUY-2	10.8	1.9	4.0	5.0	6.0	9.0	13.0	17.0	21.0	36.3
BUY-3	10.9	1.9	5.0	5.0	6.0	9.0	13.0	18.0	23.4	48.6
BUY-4	11.1	1.9	5.0	5.0	6.0	8.0	13.0	18.0	27.1	68.0
BUY-5	12.1	2.0	4.6	5.0	7.0	9.0	13.0	21.0	34.0	66.7
BUY-6	12.5	2.0	4.0	5.0	7.0	9.0	14.0	21.0	26.4	100.0
BUY-7	11.7	2.0	4.0	5.0	7.0	9.0	14.0	21.0	27.5	59.0
BUY-8	11.7	2.0	4.0	5.0	6.0	9.0	14.0	19.2	25.6	76.2



**TABLE 9**  
**SHARE PRICES, MARKET CAPITALIZATIONS, AND**  
**BETAS OF THE 222 GREATEST WINNERS**

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**Panel A: Share Prices on the Buy Date (in \$)**

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		Percentiles			
Mean	27.69	5%	10.71	95%	58.59
Median	24.07	10%	12.80	90%	49.70
		25%	17.32	75%	32.81

---

**Panel B: Stock Market Capitalization on**  
**Buy Date (in \$ million)**

---

		Percentiles			
Mean	484.3	5%	19.3	95%	1,375.5
Median	120.1	10%	30.9	90%	802.9
		25%	53.9	75%	316.4

Note: Stock market capitalizations are defined as price per share times number of shares outstanding.

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**Panel C: Stock Betas**

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		Percentiles			
Mean	1.14	5%	0.41	95%	1.97
Median	1.14	10%	0.52	90%	1.78
		25%	0.79	75%	1.46

Note: Betas are calculated by using weekly returns during the period 2 years prior to the buy date. The proxy for the market portfolio is a value-weighted index of all New York and American Stock Exchange companies.

TABLE 10

**RELATIVE STRENGTH RANKS AND DATAGRAPH RATINGS OF  
THE 222 GREATEST WINNERS IN THE SELL, BUY,  
AND EIGHT PRECEDING QUARTERS**

**Panel A: Relative Strength Ranks (99 = Highest, 1 = Lowest)**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	74.0	5.2	20.0	37.0	62.0	82.0	93.0	97.0	98.0	99.0
BUY	90.2	52.1	72.0	78.0	87.0	93.0	97.0	99.0	99.0	99.0
BUY-1	78.1	21.6	45.0	50.0	69.0	81.0	92.0	96.0	98.0	99.0
BUY-2	70.0	6.7	23.0	32.9	56.0	78.0	90.0	96.0	98.0	99.0
BUY-3	64.4	1.1	11.0	17.0	48.0	69.0	87.0	94.0	98.0	99.0
BUY-4	57.9	1.0	11.0	18.0	37.0	61.0	82.0	92.0	96.0	98.0
BUY-5	58.4	3.7	9.0	16.0	35.5	63.0	83.5	94.0	96.5	98.1
BUY-6	60.6	4.4	10.0	16.0	40.0	63.0	86.0	95.0	97.0	99.0
BUY-7	58.6	1.0	8.2	15.0	37.0	61.5	83.7	93.0	98.0	99.0
BUY-8	60.8	1.8	9.0	17.1	39.0	65.5	84.0	95.0	97.0	99.0

**Panel B: Datagraph Ratings (99 = Highest, 1 = Lowest)**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	72.2	40.3	50.1	55.0	64.0	73.0	81.5	88.0	91.0	96.7
BUY	78.3	1.2	60.0	64.0	73.0	80.0	87.0	93.0	96.0	99.0
BUY-1	67.4	1.4	45.0	51.0	58.0	70.0	77.0	85.0	89.0	97.0
BUY-2	63.9	23.4	37.0	43.0	54.0	66.0	75.0	84.0	86.0	94.8
BUY-3	61.8	20.1	29.0	37.0	50.0	63.0	76.0	83.0	90.5	96.9
BUY-4	57.7	10.6	29.8	35.0	46.0	59.0	70.0	77.0	83.0	94.1
BUY-5	59.9	21.8	34.0	38.0	49.0	59.0	71.0	83.2	88.6	97.1
BUY-6	60.9	10.6	29.0	37.0	49.0	63.0	74.0	85.0	92.2	97.0
BUY-7	58.4	16.8	26.2	34.0	46.0	58.5	71.0	84.5	89.0	96.3
BUY-8	56.9	1.0	24.1	33.0	43.2	58.0	70.7	81.0	85.0	94.5

**TABLE 11**

**INDUSTRY GROUP RANKS OF THE 222 GREATEST WINNERS  
IN THE SELL, BUY, AND EIGHT PRECEDING QUARTERS**

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**Panel A: Industry Group Rank (1 = Highest)**

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Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	81	1	5	12	33	72	130	167	173	197
BUY	54	1	3	7	19	43	82	115	145	177
BUY-1	72	2	6	16	39	65	101	139	157	179
BUY-2	81	1	7	16	37	74	128	158	171	186
BUY-3	88	2	7	16	42	81	133	176	186	223
BUY-4	91	1	8	24	45	87	140	169	180	190
BUY-5	94	3	10	15	42	92	151	175	180	198
BUY-6	89	2	7	18	45	80	132	176	180	193
BUY-7	92	3	8	14	42	91	137	175	183	234
BUY-8	96	1	9	16	50	98	145	176	188	196

TABLE 12

**PRETAX PROFIT MARGINS AND CHANGES IN QUARTERLY  
EARNINGS AMONG THE 222 GREATEST WINNERS IN THE  
SELL, BUY, AND EIGHT PRECEDING QUARTERS**

**Panel A: Pretax Profit Margins (in percent)**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	14.5	-3.2	3.7	5.7	8.2	13.0	18.5	26.4	33.0	46.3
BUY	12.7	-3.5	2.9	4.0	7.0	11.2	16.2	23.5	28.2	39.6
BUY-1	12.3	-6.0	2.2	3.5	6.5	10.8	15.7	24.5	30.6	45.0
BUY-2	12.0	-6.0	2.0	3.4	6.1	10.5	15.3	23.9	32.1	45.4
BUY-3	11.1	-6.4	1.6	2.4	5.5	10.0	14.8	21.6	28.4	38.6
BUY-4	10.2	-6.9	1.4	2.2	4.9	9.3	13.5	20.8	26.7	37.9
BUY-5	9.7	-14.5	0.5	1.8	4.4	8.5	12.7	19.8	24.8	38.1
BUY-6	9.8	-6.0	0.6	1.9	4.3	8.3	12.5	20.1	28.4	40.6
BUY-7	9.0	-24.2	0.4	1.8	4.1	8.2	12.2	18.9	24.9	40.7
BUY-8	8.4	-24.4	-3.1	1.8	4.1	7.8	11.9	17.7	25.1	40.9

**Panel B: Changes in Quarterly Earnings (percentages)**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	16.9	-70	-44	-32	-10	8.05	29.4	66	113	262
BUY	45.9	-82	-41	-26	0	7.40	39.0	103	179	1747
BUY-1	60.8	-63	-42	-22	0	14.10	41.7	108	232	1731
BUY-2	50.4	-91	-60	-33	-4	3.00	35.7	100	241	1158
BUY-3	22.6	-90	-50	-40	-3	0.00	33.3	100	150	500
BUY-4	29.0	-97	-73	-45	-11	0.00	34.3	100	180	867
BUY-5	32.7	-92	-54	-37	-14	0.00	43.1	137	221	603
BUY-6	41.5	-276	-76	-50	-16	0.00	30.4	97	147	1925
BUY-7	19.2	-700	-81	-53	-7	1.90	42.3	100	194	484
BUY-8	35.8	-326	-59	-37	-10	4.00	40.0	131	257	828

TABLE 13

**FIVE-YEAR EARNINGS GROWTH RATES AND QUARTERLY CHANGES IN SALES FOR THE 222 GREATEST WINNERS IN THE SELL, BUY, AND EIGHT PRECEDING QUARTERS**

**Panel A: Changes in Quarterly Sales (percentages)**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	8.4	-29	-21	-9	-1.5	7.10	14.8	29.7	40.4	96.8
BUY	9.5	-48	-22	-10	-1.4	7.30	16.0	32.9	40.4	93.9
BUY-1	11.8	-35	-14	-7	0.2	9.25	16.0	30.6	54.2	153.1
BUY-2	6.7	-30	-25	-17	-2.7	5.20	14.0	25.2	34.8	114.1
BUY-3	8.5	-47	-31	-15	-4.3	6.00	16.3	30.9	44.1	99.7
BUY-4	7.1	-74	-29	-13	-3.7	4.40	15.5	27.5	40.7	158.8
BUY-5	9.8	-29	-15	-9	-1.2	5.60	15.7	32.6	49.1	86.5
BUY-6	3.9	-36	-24	-18	-4.7	4.30	12.0	22.1	29.2	57.9
BUY-7	7.0	-52	-32	-17	-4.4	4.20	14.4	31.2	51.8	144.5
BUY-8	10.7	-41	-19	-7	0.0	9.30	18.9	34.6	45.2	95.3

**Panel B: Five-year Earnings Growth Rates (in percent, annualized)**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	38.2	-14.0	3.3	10.6	18.0	30.0	48.5	83.8	98.1	156
BUY	23.0	-22.5	-10.5	-4.0	8.5	17.0	31.0	55.0	70.5	131
BUY-1	21.6	-24.5	-10.7	-5.0	7.0	16.0	29.5	54.0	70.2	128
BUY-2	21.4	-28.6	-13.0	-6.2	6.0	16.0	30.0	52.2	71.6	137
BUY-3	20.1	-29.2	-13.0	-7.0	4.0	16.0	29.0	54.0	69.0	152
BUY-4	21.5	-20.8	-10.1	-4.6	6.2	16.0	30.7	54.6	72.6	159
BUY-5	21.2	-18.6	-9.6	-4.0	5.0	17.0	31.5	55.6	73.2	114
BUY-6	22.9	-16.8	-7.0	-4.0	6.5	17.0	33.5	58.0	76.0	137
BUY-7	24.7	-14.7	-8.5	-3.0	9.0	19.0	36.7	63.1	78.1	178
BUY-8	24.2	-13.7	-8.6	-0.6	8.0	19.0	36.2	62.3	75.0	90

TABLE 14

**COMMON SHARES OUTSTANDING AND TRADING VOLUME FOR  
THE 222 GREATEST WINNERS IN THE SELL, BUY,  
AND EIGHT PRECEDING QUARTERS**

**Panel A: Common Shares Outstanding (in 000s)**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	23360	1431	2034	2985	5895	10925	25652	47805	65924	328405
BUY	13885	712	1301	1583	2637	5740	11355	21113	34899	308358
BUY-1	13197	712	1257	1506	2577	5145	10832	19317	34827	281323
BUY-2	13098	712	1131	1493	2557	4955	10767	19317	34258	281323
BUY-3	13110	711	1110	1434	2540	4930	10845	18652	33114	294743
BUY-4	12834	710	1110	1420	2560	5050	11320	18820	32490	315620
BUY-5	12883	705	1110	1414	2522	5110	11275	19033	32518	323784
BUY-6	12915	680	1116	1420	2440	5090	11320	19388	30762	337393
BUY-7	12899	678	1115	1380	2385	5090	10955	19590	30975	342838
BUY-8	12871	677	1111	1359	2387	4875	10712	19302	31755	360903

**Panel B: Average Daily Trading Volume (last 50 trading days, in 00s)**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
SELL	619	23.8	40.0	53.2	118	290	569	1420	2574	7040
BUY	317	6.6	17.3	26.3	53	123	259	528	858	5708
BUY-1	201	0.0	8.1	13.0	32	74	178	391	672	3619
BUY-2	206	0.0	8.0	12.3	30	76	171	364	764	4510
BUY-3	184	0.0	7.0	11.0	32	78	176	373	505	2247
BUY-4	163	0.0	7.0	11.0	30	76	168	356	503	2383
BUY-5	183	0.0	3.9	10.8	27	73	174	315	517	3929
BUY-6	178	0.0	3.0	7.0	26	65	166	327	546	4156
BUY-7	175	0.0	2.7	9.0	27	62	160	312	456	3853
BUY-8	175	0.0	4.0	8.8	26	74	163	304	526	3304

**TABLE 15**

**RATIO OF PRICE ON BUY DATE TO MAXIMUM PRICE DURING  
PREVIOUS 2 YEARS FOR THE 222 GREATEST WINNERS**

		Percentiles			
Mean	0.899	5%	0.699	95%	1.000
Median	0.922	10%	0.785	90%	0.996
		25%	0.871	75%	0.969

Note: These figures are computed by dividing the price of the stock on the buy date by its maximum price during the previous 2 year period. All prices have been adjusted for stock splits.

TABLE 16

**DISTRIBUTION OF CUMULATIVE EXCESS HOLDING PERIOD  
RETURNS EARNED BY THE STRATEGY BASED ON  
NINE INVESTMENT SCREENS  
(returns are in percentages)**

Quarter	Percentile									
	Mean	1st	5th	10th	25th	50th	75th	90th	95th	99th
BUY+1	8.02	-25.0	-16.7	-10.6	-2.9	6.4	17.5	27.9	36.2	63.7
BUY+2	16.06	-30.3	-21.5	-13.3	-2.9	12.7	27.8	47.6	68.0	124.6
BUY+3	24.10	-31.6	-22.6	-14.5	-0.0	18.4	42.3	66.5	84.6	150.5
BUY+4	32.73	-34.3	-23.9	-14.4	0.3	23.8	55.4	94.5	118.8	186.6
BUY+5	40.81	-38.9	-22.8	-14.6	2.8	28.2	64.1	106.7	143.7	232.4
BUY+6	52.16	-52.6	-26.3	-15.5	5.1	33.3	77.4	137.3	179.8	318.6
BUY+7	57.19	-48.2	-30.7	-16.0	9.1	41.1	88.0	149.1	193.5	348.0
BUY+8	65.77	-52.7	-30.3	-17.0	6.9	49.1	98.9	167.6	220.4	376.8

Notes: An excess return is defined as the difference between the holding period return of the security and the holding period return of the S&P 500 Index over the same period of time. A buy signal is issued for the firm when the following conditions are met: (1) the price/book ratio is less than 1; (2) the five-year earnings growth rate is positive; (3) earnings are accelerating; (4) pretax profit margins are positive; (5) number of common shares outstanding is less than 20 million; (6) the O'Neil datagraph rating is at least 70; (7) the stock is selling within 15 percent of its high during the previous 2 years; (8) the relative strength rating of the stock is at least 70; and (9) the relative strength of the stock is greater in the current quarter than in the previous quarter.



TABLE 17

**DISTRIBUTION OF CUMULATIVE EXCESS HOLDING PERIOD RETURNS EARNED BY THE STRATEGY BASED ON NINE INVESTMENT SCREENS *EXCLUDING* FIRMS ON THE LIST OF 222 GREATEST WINNERS (returns are in percentages)**

Quarter	Percentile									
	Mean	1st	5th	10th	25th	50th	75th	90th	95th	99th
BUY+1	5.9	-24.7	-18.2	-12.2	-3.7	4.7	14.8	26.0	31.6	46.2
BUY+2	11.5	-30.0	-22.1	-13.8	-5.2	9.8	22.6	37.1	54.1	89.6
BUY+3	18.2	-34.6	-23.1	-17.4	-2.7	14.7	34.5	55.8	72.2	133.4
BUY+4	23.7	-36.0	-25.4	-17.7	-3.8	17.4	43.5	74.1	96.8	158.2
BUY+5	30.2	-40.4	-25.1	-16.5	-2.3	20.5	51.7	91.2	113.3	182.6
BUY+6	37.8	-56.5	-29.0	-18.2	0.1	27.6	62.6	114.5	144.3	219.9
BUY+7	44.0	-53.1	-33.6	-18.7	5.5	34.5	71.1	126.1	160.1	242.3
BUY+8	50.6	-56.2	-32.4	-20.2	5.1	39.4	83.4	132.0	170.1	303.8

Notes: An excess return is defined as the difference between the holding period return of the security and the holding period return of the S&P 500 Index over the same period of time. A buy signal is issued for the firm when the following conditions are met: (1) the price/book ratio is less than 1; (2) the five-year quarterly earnings growth rate is positive; (3) earnings are accelerating; (4) pretax profit margins are positive; (5) number of common shares outstanding is less than 20 million; (6) the O'Neil datagraph rating is at least 70; (7) the stock is selling within 15 percent of its high during the previous 2 years; (8) the relative strength rating of the stock is at least 70; and (9) the relative strength of the stock is greater in the current quarter than in the previous quarter. Any firm that was classified as one of the 222 greatest winners is excluded from this strategy.

TABLE 18

**BETAS, STOCK MARKET CAPITALIZATIONS,  
SHARE PRICES AND SHARES OUTSTANDING  
AMONG FIRMS SELECTED BY THE STRATEGY  
WITH NINE INVESTMENT SCREENS**  
(excluding any firm on the list of 222 greatest winners)

**Panel A: Betas**

		Percentiles			
Mean	1.03	5%	0.29	95%	1.95
Median	0.99	10%	0.45	90%	1.66
		25%	0.69	75%	1.34

Note: Betas are calculated relative to the S&P 500 index using weekly returns during the period 2 years prior to the buy date.

**Panel B: Stock Market Capitalizations (in \$ millions)**

		Percentiles			
Mean	182.9	5%	11.0	95%	614.0
Median	102.3	10%	19.6	90%	441.9
		25%	40.8	75%	241.3

**Panel C: Share Prices (in \$)**

		Percentiles			
Mean	28.21	5%	7.88	95%	58.50
Median	26.25	10%	11.30	90%	45.70
		25%	18.25	75%	34.82

**Panel D: Common Shares Outstanding (in 000s)**

		Percentiles			
Mean	5649	5%	921	95%	15052
Median	3958	10%	1246	90%	12797
		25%	2108	75%	7890

TABLE 19

**DISTRIBUTION OF CUMULATIVE EXCESS HOLDING PERIOD  
RETURNS EARNED BY THE STRATEGY BASED ON  
ALL NINE INVESTMENT SCREENS EXCEPT FOR  
PRICE/BOOK RATIOS LESS THAN ONE  
(excludes 222 winners, 1970-1983)**

Quarter	Percentile									
	Mean	1st	5th	10th	25th	50th	75th	90th	95th	99th
BUY+1	3.9	-28.2	-19.2	-14.1	-5.4	2.7	12.6	23.4	30.1	48.6
BUY+2	7.9	-36.7	-23.3	-18.0	-8.7	5.3	19.7	35.0	48.1	89.6
BUY+3	11.6	-46.8	-30.4	-22.4	-8.8	8.5	27.9	48.5	63.8	98.6
BUY+4	14.6	-55.3	-35.3	-26.4	-10.7	8.5	33.4	61.6	85.5	131.5
BUY+5	17.9	-68.3	-42.4	-30.8	-11.7	10.7	40.5	81.2	99.4	145.0
BUY+6	22.7	-70.4	-50.1	-30.8	-12.7	13.1	47.4	95.7	125.1	185.0
BUY+7	25.8	-79.2	-53.1	-38.0	-12.2	15.5	57.8	97.0	135.6	200.0
BUY+8	30.6	-85.3	-58.2	-41.2	-12.9	21.1	64.5	113.1	146.5	277.4

Notes: An excess return is defined as the difference between the holding period return of the security and the holding period return of the S&P 500 Index over the same period of time. A buy signal is issued for the firm when the following conditions are met: (1) the five-year quarterly earnings growth rate is positive; (2) earnings are accelerating; (3) pre-tax profit margins are positive; (4) number of common shares outstanding is less than 20 million; (5) the O'Neil datagraph rating is at least 70; (6) the stock is selling within 15 percent of its high during the previous 2 years; (7) the relative strength rating of the stock is at least 70; and (8) the relative strength of the stock is greater in the current quarter than in the previous quarter. Any firm that was classified as one of the 222 greatest winners is excluded from this strategy. All excess returns are expressed as percentages.

TABLE 20

**DISTRIBUTION OF CUMULATIVE EXCESS HOLDING PERIOD  
RETURNS EARNED BY THE STRATEGY BASED ON  
ALL NINE INVESTMENT SCREENS EXCEPT FOR  
DATAGRAPH RATINGS GREATER THAN 70  
(excludes 222 winners, 1970-1983)**

Quarter	Percentile									
	Mean	1st	5th	10th	25th	50th	75th	90th	95th	99th
BUY+1	3.9	-28.2	-19.2	-14.1	-5.4	2.7	12.6	23.4	30.1	48.6
BUY+1	6.4	-25.4	-17.4	-11.8	-3.59	5.3	14.8	26.1	32.8	53.2
BUY+2	11.2	-29.2	-20.1	-13.3	-4.61	9.2	22.2	39.3	53.2	85.0
BUY+3	16.8	-35.9	-22.2	-16.3	-3.47	13.0	30.5	54.8	68.1	127.3
BUY+4	21.2	-37.0	-25.7	-18.1	-4.51	15.8	39.0	65.5	87.6	142.8
BUY+5	27.6	-42.4	-28.8	-18.8	-3.57	19.6	47.8	82.9	106.5	193.6
BUY+6	34.2	-50.5	-29.7	-19.1	0.21	23.4	58.1	99.0	136.2	227.8
BUY+7	41.0	-54.1	-32.7	-19.8	3.18	29.2	67.0	108.7	150.0	252.3
BUY+8	45.9	-56.0	-31.0	-18.5	3.55	32.9	75.3	124.0	160.1	301.9

Notes: An excess return is defined as the difference between the holding period return of the security and the holding period return of the S&P 500 Index over the same period of time. A buy signal is issued for the firm when the following conditions are met: (1) the price/book ratio is less than 1; (2) the five-year quarterly earnings growth rate is positive; (3) earnings are accelerating; (4) pretax profit margins are positive; (5) number of common shares outstanding is less than 20 million; (6) the stock is selling within 15 percent of its high during the previous 2 years; (7) the relative strength rating of the stock is at least 70; and (8) the relative strength of the stock is greater in the current quarter than in the previous quarter. Any firm that was classified as one of the 222 greatest winners is excluded from this strategy. All excess returns are expressed as percentages.

TABLE 21

**DISTRIBUTION OF CUMULATIVE EXCESS HOLDING PERIOD  
RETURNS EARNED BY THE STRATEGY BASED ON  
ALL NINE INVESTMENT SCREENS EXCEPT FOR  
RELATIVE STRENGTH AND DATAGRAPH RATINGS FILTERS  
(excludes 222 winners, 1970-1983)**

Quarter	Percentile									
	Mean	1st	5th	10th	25th	50th	75th	90th	95th	99th
BUY+1	4.3	-23.9	-15.7	-11.1	-4.3	3.4	11.2	20.8	27.9	47.6
BUY+2	8.5	-32.2	-20.0	-14.4	-4.7	6.4	18.1	32.5	42.8	76.0
BUY+3	13.3	-35.1	-22.8	-15.9	-4.0	10.4	26.0	43.9	58.2	108.2
BUY+4	17.3	-37.8	-24.7	-17.0	-3.5	13.8	31.7	54.1	72.9	123.1
BUY+5	22.0	-44.4	-28.5	-19.1	-3.9	16.5	39.6	68.3	91.5	148.3
BUY+6	26.3	-48.7	-30.1	-19.8	-2.5	18.1	46.5	78.6	107.0	180.0
BUY+7	30.7	-54.9	-32.6	-22.0	-2.6	22.3	52.5	90.7	123.6	202.5
BUY+8	36.0	-60.0	-33.3	-22.7	-1.3	26.2	61.2	103.1	138.2	247.6

Notes: An excess return is defined as the difference between the holding period return of the security and the holding period return of the S&P 500 Index over the same period of time. A buy signal is issued for the firm when the following conditions are met: (1) the price/book ratio is less than 1; (2) the five-year quarterly earnings growth rate is positive; (3) earnings are accelerating; (4) pretax profit margins are positive; (5) number of common shares outstanding is less than 20 million; (6) the stock is selling within 15 percent of its high during the previous 2 years. Any firm that was classified as one of the 222 greatest winners is excluded from this strategy. All excess returns are expressed as percentages.

TABLE 22

**DISTRIBUTION OF CUMULATIVE EXCESS HOLDING  
PERIOD RETURNS EARNED BY THE STRATEGY BASED ON  
ALL NINE INVESTMENT SCREENS EXCEPT FOR  
THE THREE EARNINGS FILTERS AND  
THE DATAGRAPH RATINGS FILTER  
(excludes 222 winners, 1970-1983)**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
BUY+1	4.7	-31.4	-20.1	-14.5	-5.6	3.1	13.0	24.6	34.7	60.7
BUY+2	8.6	-38.9	-26.7	-19.0	-6.9	6.1	19.9	37.2	51.8	92.4
BUY+3	12.9	-46.5	-30.5	-22.4	-7.8	8.5	27.4	50.4	68.4	136.3
BUY+4	17.1	-54.0	-34.6	-25.5	-8.9	11.0	35.1	63.2	87.2	157.1
BUY+5	21.1	-60.8	-39.8	-29.2	-9.7	13.2	41.1	76.2	105.3	198.7
BUY+6	24.8	-64.7	-44.6	-31.8	-9.7	15.0	47.8	87.8	123.4	233.2
BUY+7	29.8	-68.3	-47.1	-32.5	-9.4	17.1	54.1	100.7	139.2	259.5
BUY+8	34.5	-71.7	-49.2	-32.9	-9.0	20.4	62.0	113.2	155.4	299.2

Notes: An excess return is defined as the difference between the holding period return of the security and the holding period return of the S&P 500 Index over the same period of time. A buy signal is issued for the firm when the following conditions are met: (1) the price/book ratio is less than 1; (2) number of common shares outstanding is less than 20 million; (3) the stock is selling within 15 percent of its high during the previous 2 years; (4) the relative strength rating of the stock is at least 70; and (5) the relative strength of the stock is greater in the current quarter than in the previous quarter. Any firm that was classified as one of the 222 greatest winners is excluded from this strategy. All excess returns are expressed in percentages.

**TABLE 23**

**DISTRIBUTION OF CUMULATIVE EXCESS HOLDING PERIOD  
RETURNS EARNED BY THE STRATEGY BASED ON ONLY THE  
PRICE/BOOK, INCREASING RELATIVE STRENGTH  
AND ACCELERATING EARNINGS SCREENS  
(excludes 222 winners, 1970-1983)**

Quarter	Percentile									
	Mean	1st	5th	10th	25th	50th	75th	90th	95th	99th
BUY+1	2.8	-35.8	-23.1	-16.9	-7.4	1.6	10.7	22.6	33.2	63.8
BUY+2	7.0	-43.9	-28.3	-20.5	-8.2	4.0	17.7	36.1	51.7	100.2
BUY+3	10.7	-53.9	-33.8	-24.4	-9.2	6.3	24.4	47.5	66.9	137.6
BUY+4	14.6	-57.8	-36.9	-26.5	-9.7	8.9	30.5	58.9	84.6	158.9
BUY+5	18.3	-64.0	-42.4	-29.9	-10.3	11.0	36.8	70.9	100.8	192.7
BUY+6	22.6	-69.0	-44.5	-30.3	-9.8	13.2	42.6	82.8	117.4	224.0
BUY+7	26.9	-70.7	-46.2	-33.3	-9.8	15.9	48.8	95.3	134.8	246.9
BUY+8	32.0	-75.6	-47.5	-32.7	-8.6	19.3	56.1	106.6	148.3	285.9

Notes: An excess return is defined as the difference between the holding period return of the security and the holding period return of the S&P 500 Index over the same period of time. A buy signal is issued for the firm when the following conditions are met: (1) the price/book ratio is less than 1; (2) earnings are accelerating; and (3) the relative strength of the stock is greater in the current quarter than in the previous quarter. Any firm that was classified as one of the 222 greatest winners is excluded from this strategy. All excess returns are expressed in percentages.

TABLE 24

**DISTRIBUTION OF CUMULATIVE EXCESS HOLDING  
PERIOD RETURNS EARNED BY THE STRATEGY BASED ON  
NINE INVESTMENT SCREENS (1984-1986)**

Quarter	Percentile									
	Mean	1st	5th	10th	25th	50th	75th	90th	95th	99th
BUY+1	4.2	-47.6	-17.6	-16.7	-1.1	3.2	12.6	21.3	32.5	37.5
BUY+2	11.8	-46.2	-33.0	-14.0	-3.1	8.1	28.7	49.4	60.2	96.4
BUY+3	14.6	-52.4	-37.4	-15.9	-3.8	10.5	27.7	58.9	66.3	98.3
BUY+4	22.2	-37.7	-32.0	-17.0	5.8	15.8	40.4	66.6	87.5	94.5
BUY+5	25.0	-62.0	-46.8	-22.5	-2.1	21.6	51.6	72.9	114.4	144.6
BUY+6	29.9	-62.0	-59.2	-53.8	10.3	32.3	51.4	85.0	124.4	137.0
BUY+7	34.5	-62.7	-58.4	-44.8	2.2	34.3	63.0	83.9	123.3	136.9
BUY+8	36.7	-52.4	-47.2	-20.1	5.0	29.2	77.4	99.7	106.9	107.4

Notes: An excess return is defined as the difference between the holding period return of the security and the holding period return of the S&P 500 Index over the same period of time. A buy signal is issued for the firm when the following conditions are met: (1) the price/book ratio is less than 1; (2) the five-year quarterly earnings growth rate is positive; (3) earnings are accelerating; (4) pretax profit margins are positive; (5) number of common shares outstanding is less than 20 million; (6) the O'Neil datagraph rating is at least 70; (7) the stock is selling within 15 percent of its high during the previous 2 years; (8) the relative strength rating of the stock is at least 70; and (9) the relative strength of the stock is greater in the current quarter than in the previous quarter. All excess returns are expressed in percentages.



**TABLE 25**

**DISTRIBUTION OF CUMULATIVE EXCESS HOLDING PERIOD  
RETURNS EARNED BY THE STRATEGY BASED ON  
ALL NINE INVESTMENT SCREENS EXCEPT FOR  
PRICE/BOOK RATIOS LESS THAN ONE  
(1984-1986)**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
BUY+1	2.7	-34.3	-20.8	-17.0	-7.3	2.5	12.3	22.0	33.1	51.7
BUY+2	6.2	-45.8	-32.4	-21.7	-9.6	4.1	18.5	35.4	53.6	93.3
BUY+3	7.4	-60.1	-39.9	-29.1	-12.9	4.5	23.1	43.3	70.2	107.1
BUY+4	11.4	-72.0	-43.3	-34.3	-13.0	7.5	35.1	62.0	83.7	156.6
BUY+5	12.3	-80.5	-58.7	-44.7	-14.7	8.8	39.9	63.8	108.9	150.6
BUY+6	9.1	-101.7	-71.7	-58.9	-29.8	11.1	36.2	72.7	112.3	270.8
BUY+7	10.4	-106.2	-80.4	-62.2	-41.4	1.6	52.9	76.6	119.2	282.9
BUY+8	14.0	-120.3	-99.2	-72.6	-34.1	12.0	54.0	95.6	106.5	380.9

Notes: An excess return is defined as the difference between the holding period return of the security and the holding period return of the S&P 500 Index over the same period of time. A buy signal is issued for the firm when the following conditions are met: (1) the five-year quarterly earnings growth rate is positive; (2) earnings are accelerating; (3) pre-tax profit margins are positive; (4) number of common shares outstanding is less than 20 million; (5) the O'Neil datagraph rating is at least 70; (6) the stock is selling within 15 percent of its high during the previous 2 years; (7) the relative strength rating of the stock is at least 70; and (8) the relative strength of the stock is greater in the current quarter than in the previous quarter. All excess returns are expressed in percentages.

TABLE 26

**DISTRIBUTION OF CUMULATIVE EXCESS HOLDING PERIOD  
RETURNS EARNED BY THE STRATEGY BASED ON  
ALL NINE INVESTMENT SCREENS EXCEPT FOR  
DATAGRAPH RATINGS GREATER THAN 70 (1984-1986)**

Quarter	Mean	Percentile									
		1st	5th	10th	25th	50th	75th	90th	95th	99th	
BUY+1	3.8	-45.9	-17.0	-10.0	-3.6	2.9	9.1	17.3	25.2	85.1	
BUY+2	10.4	-45.1	-29.8	-14.5	-1.1	9.3	17.7	34.5	54.7	117.3	
BUY+3	14.3	-50.7	-32.4	-22.6	-1.0	13.8	24.9	44.7	61.7	191.7	
BUY+4	18.8	-46.1	-37.0	-25.1	5.6	15.4	32.3	61.2	73.9	248.6	
BUY+5	22.8	-72.6	-43.7	-24.7	3.9	21.6	40.0	64.5	82.3	200.3	
BUY+6	25.3	-77.4	-58.4	-32.0	1.4	25.3	46.7	84.4	110.0	137.0	
BUY+7	31.9	-96.2	-72.8	-46.7	12.2	33.5	61.2	81.7	122.5	181.4	
BUY+8	31.1	-130.8	-73.5	-43.4	4.6	36.8	64.9	82.1	99.7	176.7	

Notes: An excess return is defined as the difference between the holding period return of the security and the holding period return of the S&P 500 Index over the same period of time. A buy signal is issued for the firm when the following conditions are met: (1) the price/book ratio is less than 1; (2) the five-year quarterly earnings growth rate is positive; (3) earnings are accelerating; (4) pretax profit margins are positive; (5) number of common shares outstanding is less than 20 million; (6) the stock is selling within 15 percent of its high during the previous 2 years; (7) the relative strength rating of the stock is at least 70; and (8) the relative strength of the stock is greater in the current quarter than in the previous quarter. All excess returns are expressed in percentages.

**TABLE 27**

**DISTRIBUTION OF CUMULATIVE EXCESS HOLDING PERIOD  
RETURNS EARNED BY THE STRATEGY BASED ON  
ALL NINE INVESTMENT SCREENS EXCEPT FOR  
RELATIVE STRENGTH AND DATAGRAPH RATINGS FILTERS  
(1984-1986)**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
BUY+1	3.6	-24.8	-16.4	-10.6	-3.3	2.5	9.2	16.0	24.3	60.4
BUY+2	8.4	-45.0	-26.7	-16.9	-3.8	8.9	17.4	32.2	46.2	106.4
BUY+3	12.2	-56.0	-33.7	-27.9	-3.6	13.1	24.5	44.2	64.5	142.9
BUY+4	16.6	-59.4	-37.4	-25.6	-1.2	14.6	29.4	60.2	74.1	183.6
BUY+5	22.5	-77.0	-43.2	-26.5	0.0	21.8	40.8	69.8	86.9	181.9
BUY+6	26.5	-81.9	-51.6	-32.5	1.4	28.5	49.6	80.3	113.5	136.9
BUY+7	30.8	-122.8	-75.5	-45.7	8.0	37.1	60.2	87.9	123.2	177.7
BUY+8	30.5	-130.8	-85.3	-48.3	5.2	36.8	65.0	86.3	106.5	176.7

Notes: An excess return is defined as the difference between the holding period return of the security and the holding period return of the S&P 500 Index over the same period of time. A buy signal is issued for the firm when the following conditions are met: (1) the price/book ratio is less than 1; (2) the five-year quarterly earnings growth rate is positive; (3) earnings are accelerating; (4) pretax profit margins are positive; (5) number of common shares outstanding is less than 20 million; (6) the stock is selling within 15 percent of its high during the previous 2 years. All excess returns are expressed as percentages.

TABLE 28

**DISTRIBUTION OF CUMULATIVE EXCESS HOLDING PERIOD  
RETURNS EARNED BY THE STRATEGY BASED ON  
ALL NINE INVESTMENT SCREENS EXCEPT FOR  
THE THREE EARNINGS FILTERS AND THE  
DATAGRAPH RATINGS FILTER  
(1984-1986)**

Quarter	Mean	Percentile									
		1st	5th	10th	25th	50th	75th	90th	95th	99th	
BUY+1	1.9	-32.1	-17.7	-13.3	-5.3	2.3	8.3	15.7	23.8	33.5	
BUY+2	5.9	-42.6	-27.4	-19.3	-7.4	5.7	15.3	29.2	41.0	85.7	
BUY+3	9.3	-40.4	-32.2	-26.1	-9.4	7.5	24.0	41.0	58.5	119.2	
BUY+4	13.3	-54.6	-37.6	-26.1	-10.5	9.7	28.7	53.4	76.1	144.7	
BUY+5	14.9	-71.0	-48.5	-34.7	-13.7	16.4	36.8	61.9	77.8	144.2	
BUY+6	17.2	-77.5	-51.8	-38.6	-12.8	20.5	40.8	69.7	95.2	136.9	
BUY+7	20.1	-90.5	-61.9	-47.0	-18.2	22.6	53.0	83.6	111.0	151.1	
BUY+8	21.3	-116.0	-75.5	-60.4	-24.4	26.4	63.4	82.5	105.0	166.9	

Notes: An excess return is defined as the difference between the holding period return of the security and the holding period return of the S&P 500 Index over the same period of time. A buy signal is issued for the firm when the following conditions are met: (1) the price/book ratio is less than 1; (2) number of common shares outstanding is less than 20 million; (3) the stock is selling within 15 percent of its high during the previous 2 years; (4) the relative strength rating of the stock is at least 70; and (5) the relative strength of the stock is greater in the current quarter than in the previous quarter. All excess returns are expressed in percentages. All returns are expressed in percentages.

**TABLE 29**

**DISTRIBUTION OF CUMULATIVE EXCESS HOLDING PERIOD  
RETURNS EARNED BY THE STRATEGY BASED ON  
ONLY THE PRICE/BOOK, INCREASING RELATIVE  
STRENGTH AND ACCELERATING EARNINGS SCREENS  
(1984-1986)**

Quarter	Mean	Percentile								
		1st	5th	10th	25th	50th	75th	90th	95th	99th
BUY+1	1.6	-35.1	-19.4	-14.2	-5.4	2.3	8.6	15.3	21.3	37.1
BUY+2	3.7	-45.8	-29.2	-20.0	-9.0	4.5	15.5	25.0	35.4	58.9
BUY+3	6.1	-54.4	-34.8	-27.0	-12.3	6.6	21.0	38.3	45.5	93.3
BUY+4	8.5	-60.7	-42.0	-28.3	-12.5	7.9	25.2	42.8	61.4	99.7
BUY+5	10.3	-70.5	-55.4	-36.7	-14.8	9.7	30.6	52.4	64.4	158.5
BUY+6	12.1	-100.3	-58.4	-44.1	-17.5	14.1	38.3	61.2	80.9	143.1
BUY+7	14.9	-113.9	-66.2	-55.0	-21.9	18.1	50.4	76.4	92.4	146.4
BUY+8	16.3	-122.4	-80.5	-59.5	-26.8	20.8	57.3	81.0	96.0	233.4

Notes: An excess return is defined as the difference between the holding period return of the security and the holding period return of the S&P 500 Index over the same period of time. A buy signal is issued for the firm when the following conditions are met: (1) the price/book ratio is less than 1; (2) earnings are accelerating; and (3) the relative strength of the stock is greater in the current quarter than in the previous quarter. All excess returns are expressed in percentages.

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