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Professional Stock Analysts' Recommendations: Implications for Individual Investors

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Conclusions regarding analyst performance often depend on the evaluation technique employed. Using a wide variety of techniques, we find that although there is some evidence that analysts do have the ability to identify undervalued and overvalued securities, individual investors generally experience inferior portfolio performance by following analyst recommendations published in the "Market Highlights" section of USA Today (even before transaction costs are included). As a result, individual investors should view studies that purport to show superior performance with skepticism. This statement is particularly true when the assertions are based on stock index comparisons.

I. INTRODUCTION

An individual investor's search for an optimal portfolio typically consists of two key decisions: (a) how to allocate funds across asset classes, and (b) which securities to purchase within each class. To aid investors with the security selection decision, many brokerage firms offer investment advice. Professional stock analysts, for example, regularly issue buy, sell, and hold recommendations. The interesting question that arises is as follows: If an investor had acted on a particular recommendation, how would his investment have performed over the following calendar year? Would a recommended buy have provided excess returns? Would a recommended sell have resulted in a loss if the investor had not acted on the negative recommendation?

Despite the considerable amount of time and effort that brokerage firms devote to fundamental and technical analysis, many academicians and investment practitioners question the notion that "Wall Street" research can be used to enhance portfolio performance. In *One Up On Wall Street*, for example, Peter Lynch (1989) argues that professional analysts generally miss the best investment opportunities because they tend to issue buy recommendations after a firm's stock price has risen dramatically (Lynch refers to this situation as "street lag.") Lynch believes that street lag occurs because many analysts follow only those stocks which have attracted the attention of large institutional investors. By that time, how-

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ever, Lynch generally finds that a firm's stock price already reflects most of the good news about the company. In fact, Lynch (1989) believes that a large increase in institutional ownership, coupled with favorable comments by professional analysts, often represents an opportune time to sell. Dorfman (1993, April) reaches a similar conclusion. He cites evidence that, of the 12 stocks that were listed in a *Wall Street Journal* article (on March 6, 1992) as being the most popular among 200 money managers, 9 declined in price over the next 12 months (the S&P 500 Index rose approximately 10% during this period). Finally, most academicians seem to believe that markets are at least semi-strong form efficient, and that it is difficult for investors (even professional stock analysts) to continually identify undervalued securities (e.g., see Roll, 1994).

To test the academicians' hypothesis, the *Wall Street Journal* has been conducting a series of six-month contests that compare the investment performance of professional stock analysts to: (a) the Dow Jones Industrial Average (DJIA) and (b) a group of randomly selected stocks (the dartboard portfolio). The results for all contests show the professional analysts winning 31 times while the DJIA has won 26 times.[1] The average six-month gain is 8.1% for the professional analysts and 3.8% for the DJIA, but the test does not examine risk-adjusted returns. Moreover, each analyst is limited to one stock, and returns include capital gains and losses but not dividends.

The purpose of this study is two-fold. First, this study reviews the techniques that are commonly used to evaluate investment performance: stock index comparisons, event study methodologies, and the Sharpe, Treynor, and Jensen measures. Second, this study examines the question raised earlier; that is, if an investor followed the professional analysts' recommendations, what would the result have been over a period of time? When a professional analyst makes a buy or sell recommendation, his standard time horizon for performance is six months to a year; therefore, this time frame has been adopted in this study.

The results of this study indicate that the conclusion one draws regarding analyst performance depends critically on the evaluation technique employed. Stock index comparisons, for example, often produce biased results because the recommended securities exhibit different risk than the benchmark selected. Similarly, event study methodologies often produce biased results because the recommended securities exhibit abnormal performance during the estimation period selected. Based on an analysis of each technique, we believe that the Sharpe, Treynor, and Jensen methodologies provide the most defensible results. While these methodologies generally have not been used to test analyst performance, they have been used to evaluate portfolio managers.

The results of this study also indicate that while analysts do identify mispriced securities, it is difficult for individual investors to capitalize on investment recommendations. When transaction costs are included, investors generally earn normal returns even when trades are assumed to occur at pre-recommendation prices. Investors who purchase securities following recommendation announcements generally earn lower returns than investors who trade at pre-recommendation prices. This result is consistent not only with the announcement effect documented in previous studies, but also with market efficiency in the semi-strong form.

II. BACKGROUND

A market is said to be efficient if security prices reflect all available information, and information is freely and quickly disseminated in an unbiased manner (Fama, 1970). Financial

theorists have identified three conditions that make a market efficient: (a) there are a large number of profit-maximizing investors; (b) transaction costs are insignificant; and (c) investors have free and equal access to all relevant information. While most observers believe that the U.S. stock markets are semi-strong form efficient (i.e., security prices adjust rapidly to reflect publicly-available information), financial research indicates that security prices do not reflect private information.[2] As a result, fundamental and technical analysis may be a worthwhile endeavor. Investors who are more adept at analyzing and interpreting publicly-available information, and investors who can uncover nonpublic information, should earn positive risk-adjusted returns. Grossman and Stiglitz (1980) point out, however, that investors will search for new information only if the cost and effort produces higher investment returns.[3]

Previous studies that examine analyst recommendations generally fall into one of two categories: (a) studies that test accuracy, and (b) studies that test information content. In the early 1980s several researchers tested the accuracy of *Value Line Investment Survey* timeliness rankings (*Value Line* analysts forecast stock price performance over a twelve-month period and rank stocks from 1 (outperform) to 5 (underperform)). The results of these studies were mixed. Copeland and Mayers (1982), for example, found no evidence that investors who followed an active trading strategy earned positive abnormal returns by investing in stocks with a particular *Value Line* ranking. While a portfolio of rank 5 stocks did experience statistically significant abnormal returns of approximately –3% (based on a 26-week holding period), Copeland and Mayers (1982) argued that the cost of implementing a short sale trading rule would offset the gain.

Holloway (1981), on the other hand, concluded that investors who bought and held *Value Line* rank 1 stocks did outperform the market. Holloway (1981) also tested an active trading strategy that involved rebalancing the portfolio weekly to reflect ranking changes, but the results were significant only when transaction costs were ignored. In a later study Holloway (1983) found that an active trading strategy did result in significant abnormal returns even when transaction costs were included. While Holloway (1983) used Friday's closing prices to calculate returns (Value Line recommendations were published on Friday), he indicated that timing was critical. When returns were calculated using prices for the following Monday, the returns for the rank 1 portfolio were significantly lower.

More recently, financial researchers have used an event study methodology to test the information content of analysts' recommendations. Numerous studies (Givoly & Lakonishok, 1979; Groth, Lewellen, Schlarbaum, & Lease, 1979; Bjerring, Lakonishok, & Vermaelen, 1983; Liu, Smith, & Syed, 1990; Barber & Loeffler, 1993) have documented positive abnormal returns around the announcement of analysts' recommendations.[4] Liu et al. (1990), for example, analyzed the reaction of stock prices to security recommendations listed in the "Heard on the Street" column in the *Wall Street Journal*. Based on the finding that investors earned positive cumulative abnormal returns (CARs) of approximately 3.4% over a 21-trading day period centered around the announcement date, they concluded that analyst recommendations convey new information to the market (the information hypothesis). Barber and Loeffler (1993) analyzed recommendations listed in the monthly "Dartboard" column of the *Wall Street Journal*. While the professional analyst stock picks earned CARs of approximately 4% on the publication date, the CARs were partially reversed over the next 25 days, which caused Barber and Loeffler to conclude that investment recommendations have both an information and a price pressure effect. The price

pressure hypothesis suggests that the abnormal returns associated with investment recommendations are caused primarily by the actions of naive investors.

III. DATA

This study examines professional analysts' recommendations announced in the "Market Highlights" section of *USA Today*[5] that pertain to firms listed on either the New York Stock Exchange or the American Stock Exchange. The study period is January 1988 to December 1990. Return data for individual securities and the market were taken from the CRSP (Center for Research in Security Prices) tapes. The initial sample contained 374 investment recommendations, but 24 recommendations were excluded due to insufficient price data during the estimation periods, and 21 observations were excluded because the time span between conflicting recommendations was less than 125 trading days (approximately 6 months). As a result, the final sample contains 329 recommendations.[6]

The following example illustrates the issues related to conflicting recommendations. On October 30, 1990, Prudential Bache issued a sell recommendation for Armstrong World Industries. Ten trading days later (on November 13, 1990) Smith Barney issued a buy recommendation. If the focus of this study were to analyze the recommendations of a particular brokerage firm, then Armstrong World Industries would remain in the "sell" subsample until Prudential Bache upgraded its opinion of the stock.[7] Instead, this study assumes that the Smith Barney "buy" recommendation negates the Prudential Bache "sell" recommendation. Moreover, because the time period between the two recommendations is short (less than 125 trading days), the Prudential Bache observation is excluded from the sample. The focus of this study is to test the accuracy of "Wall Street" research over a relatively long time horizon rather than to isolate the short-term impact of recommendation announcements on stock prices.

During a telephone interview, a *USA Today* employee indicated that only stocks whose price had been affected by the recommendation would actually be included in the newspaper article.[8] Because the objective of this study is to evaluate the performance of brokerage house investment recommendations, we want a sample that contains only those recommendations that changed investors' expectations. We acknowledge, however, that our results and conclusions may apply only to this subset of analysts' recommendations.

It it important to note that investment recommendations usually are disclosed to the brokerage firm's institutional and retail clients prior to publication in *USA Today*. A *USA Today* employee indicated, however, that the time span between disclosure to clients and publication in *USA Today* is relatively short (i.e., 1 to 3 days).

Peter Lynch (1989) argues that investors are least likely to earn abnormal returns by following recommendations on stocks that have attracted the attention of large institutional investors. Because 238 recommendations (70% of the total sample) involve firms that are included in the S&P 500 Index, one would expect the stock prices of the sample firms to be particularly efficient.

Table 1 shows the number of analyst recommendations by year. Two hundred and forty-five recommendations (75%) are positive (strong buy, buy, or reiterate buy), and 84 recommendations (25%) are negative (sell or a change from buy to hold). The data provide

TABLE 1
Brokerage Firm Investment Recommendations
Announced in *USA Today* (1988-1990)

	Positive Recommendations			*Negative Recommendations*			
	Strong Buy[*]	*Buy*[†]	*Reiterate Buy*	*Buy To Hold*[‡]	*Sell*[§]	*Total*	*Market Return*[¶]
1988	3	20	8	7	—	38	12.4%
1989	8	36	37	16	9	106	27.2
1990	7	66	70	35	20	198	–6.6
Total	18	116	111	57	27	329	
% of Total	5.5%	35.3%	33.7%	17.3%	8.2%	100%	

Notes: [*] Includes changes from buy to strong buy, moderately attractive to very attractive, and recommendations that reiterate a strong or aggressive buy.
[†] Includes changes from neutral to above average, and stocks placed on the firm's recommended list.
[‡] Includes changes from above average to average, and stocks dropped from the firm's recommended list.
[§] Includes recommendations that reiterate a sell.
[¶] The 12-month return on the S&P 500 stock index.

support for the belief that analysts have a predilection for making positive recommendations to avoid offending current or potential investment banking clients.

The percentage of negative recommendations, which increases between 1988 and 1990, coincides with the decrease in the stock market (as measured by the S&P 500 Index). In 1988, 18% of the recommendations were negative, but in 1990, 28% of the recommendations were negative. Given the industry's aversion to issuing negative recommendations, one might expect negative recommendations to be more accurate than positive recommendations. This study tests this hypothesis and examines the sensitivity of the results to different holding periods.

Academicians who analyze analyst performance generally use an event study methodology. Studies published in the popular press, on the other hand, often utilize stock index comparisons. The following section critiques the most commonly used methodologies for evaluating analyst performance.

IV. Evaluating Portfolio Performance

A. Stock Index Comparisons

While financial theory indicates that investment performance should be evaluated using risk-adjusted returns, numerous benchmarks have been applied in practice. Dorfman (1994), for example, reports the results of a study by Zacks Investment Research, Inc. that examines the performance of stocks recommended by 16 major brokerage firms during 1993. Based on the finding that 12 of the 16 firms' stock picks outperformed the S&P 500 Index, and 9 of the 16 firms' stock picks outperformed the Wilshire 5000 Index (which contains non-S&P 500 stocks), Dorfman concludes that the analysts performed extremely well. A more detailed analysis, however, indicates that the choice of an appropriate benchmark is crucial.

If one assumes that there is a 50-50 chance that a brokerage firm's stock recommendations will outperform the market in a given year (define this occurrence as a success), then

the binomial probability model indicates that there is a 3.8% chance of observing 12 or more successes in 16 trials. The low probability strongly suggests that the analysts were able to identify undervalued securities. If the Wilshire Index is used, on the other hand, the binomial model fails to reject the null hypothesis (i.e., the probability of observing 9 or more successes in 16 trials is 40.4%). The key issue is whether the S&P 500 Index or the Wilshire Index is the appropriate benchmark. Dorfman cites evidence that the analysts tend to recommend small (i.e., non-S&P 500) stocks, but Dorfman does not conduct the binomial tests. Moreover, because risk-adjusted returns are not examined, the magnitude of the analysts' relative performance cannot be evaluated.

B. Event Study Methodologies

The current study employs the following market model to calculate the excess return, or prediction error (PE_{jt}), for each firm j at event day t:

$$PE_{jt} = R_{jt} - (\gamma_j + \beta_j R_{mt}). \tag{1}$$

R_{jt} is the rate of return on security j for day t, and R_{mt} is the return on the CRSP value-weighted index on day t. The coefficients γ_j and β_j are ordinary least squares estimates of the intercept and slope, respectively, from a pre-event market model regression for days -500 to -251.[9] Day zero ($t = 0$) is defined as the last trading day before a recommendation is reported in the "Market Highlights" section of *USA Today*. Prediction errors are estimated over the interval $t = -5$ days prior to the announcement of the brokerage house investment recommendation to $t = +250$ days after the announcement. The cumulative prediction error (*CPE*) from day T_1 to day T_2 for each recommendation j is:

$$CPE_j = \sum_{T_1}^{T_2} PE_{jt}. \tag{2}$$

Cumulative prediction errors are estimated over various intervals. For a sample of N securities, the mean cumulative prediction error (*MCPE*) is defined as:

$$MCPE = (1/N) \sum_{j=1}^{N} CPE_j. \tag{3}$$

The expected value of *MCPE* is zero in the absence of abnormal performance (i.e., if *MCPE* equals zero, then one cannot reject the null hypothesis that investors earned normal returns).

The test statistic is based on an aggregation of mean standardized cumulative prediction errors (*MSCPE*) (see Appendix). The test statistic for a sample of N securities is:

$$Z = \sum_{j=1}^{N} (MSCPE_j)/\sqrt{N}. \tag{4}$$

Each $MSCPE_{jt}$ is assumed to be distributed unit normal in the absence of abnormal performance. Under this assumption, Z is also unit normal.

Event study methodologies evaluate investment performance by subtracting a security's expected rate of return from its actual rate of return (see Equation 1). When a security's expected rate of return is estimated using parameters calculated from a pre- or post-event estimation period, the methodology tests only whether a security's performance during the event period differs from its performance during the estimation period. As a result, any abnormal returns measure relative performance rather than absolute performance. If no abnormal returns are observed during the event period, the researcher can conclude only that the security's performance did not change relative to the estimation period. It is not possible to rule out, however, the possibility that the security was a good investment during both periods.[10] The null hypothesis of no abnormal performance during the estimation period (i.e., $\bar{\gamma}_p = 0$) is tested for each category p.

C. Sharpe, Treynor, and Jensen Measures

While the Sharpe, Treynor, and Jensen measures are commonly used to evaluate the performance of portfolio managers, these techniques generally have not been used to analyze the performance of professional stock analysts.

Sharpe's measure examines average excess return per unit of total risk:

$$\text{Sharpe} = (\overline{R_p - R_f}) / \sigma_p, \tag{5}$$

where $\overline{R_p - R_f}$ = the average monthly excess return on a portfolio of stocks with a particular analyst recommendation (where R_f equals the one-month return on a three-month T-Bill), and σ_p = the standard deviation of returns for portfolio p.

Treynor's measure, on the other hand, examines average excess return per unit of systematic risk:

$$\text{Treynor} = (\overline{R_p - R_f}) / \beta_p, \tag{6}$$

where β_p = the beta coefficient for portfolio p.

The Sharpe and Treynor measures for the market portfolio are calculated in a similar fashion using the CRSP value-weighted index (the results using the CRSP equal-weighted index are essentially the same).

Jensen's measure examines excess return as a function of systematic risk.

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}), \tag{7}$$

where R_{mt} = the monthly return on the CRSP value-weighted or equal-weighted index. The coefficients α_p and β_p are estimated using OLS regression. If α_p is statistically different from zero, then the null hypothesis of no abnormal performance is rejected.

This study calculates Sharpe, Treynor, and Jensen measures for two trading strategies. One strategy assumes that an investor buys a recommended stock at the beginning of the month that contains the publication date ($t = 0$) and holds the stock for 13 months (i.e., the holding period is $t = 0$ to $t = +12$). The second strategy assumes that an investor buys a recommended stock at the beginning of the month *following* the publication date and holds the stock for 12 months (i.e., the holding period is $t = +1$ to $t = +12$). As a result, each performance measure is calculated using pre-recommendation prices (prices on which the ana-

TABLE 2
Portfolio Construction for Strong Buy Category

			Holding Periods	
No.	*Company*	*Announcement Month*	*Strategy 1 (t = 0 to t = +12)*	*Strategy 2 (t = +1 to t = +12)*
1	Walt Disney	Mar 1988	Mar 1988-Mar 1989	Apr 1988-Mar 1989
2	Clark Equip	Apr 1988	Apr 1988-Apr 1989	May 1988-Apr 1989
3	Ford	Nov 1988	Nov 1988-Nov 1989	Dec 1988-Nov 1989
			.	
18	Georgia Gulf	Dec 1990	Dec 1990-Dec 1991	Jan 1991-Dec 1991

lysts' recommendations are based) and post-recommendation prices (prices at which investors are likely to trade). Strong buy, buy, reiterate buy, downgrade to hold, and sell recommendations are examined separately.

The Sharpe, Treynor, and Jensen measures for the buy, reiterate buy, and downgrade to hold categories are calculated using monthly returns from January 1988 to December 1991 (48 months). The performance measures for the strong buy and sell categories are calculated using 46 and 35 monthly returns, respectively. The first strong buy recommendation is published in March 1988; the first sell recommendation is published in February 1989.

Portfolio construction for the strong buy category is illustrated in Table 2 ($N = 18$ recommendations). On March 10, 1988, *USA Today* reported a strong buy recommendation on Walt Disney. Strategy 1 assumes that investors buy Walt Disney on March 1, 1988 and sell the stock on March 31, 1989. Similarly, investors buy Clark Equipment on the first trading day of April 1988 and sell on the last trading day of April 1989. The April 1988 return for the strong buy portfolio, R_{pt}, is an equal-weighted average of the monthly returns on Walt Disney and Clark Equipment. There are 46 monthly returns for the strong buy category (March 1988-December 1991). These 46 monthly returns are used to calculate the Sharpe, Treynor, and Jensen measures. The portfolio construction for the post-recommendation strategy is similar except investors buy Walt Disney stock on April 1, 1988 and sell on March 31, 1989.

V. RESULTS

A. Event Study Results

To evaluate analyst performance using an event study methodology, one should recall that event studies measure relative performance: the techniques test only whether stock performance during the event period differs from that observed during the estimation period. As a result, investors should consider the cumulative prediction errors earned during the event period, and the abnormal performance (if any) observed during the estimation period itself.[11]

An initial examination of the strong buy category, for example, suggests inferior performance (see Table 3). Based on a pre-event estimation period, investors earned cumula-

TABLE 3
Event Study Methodology Results: 6- and 12-Month Holding Periods

Interval	*Strong Buy*		*Buy*		*Repeat Buy*		*Buy To Hold*		*Sell*	
(Trading Days)	*MCPE*	*Z*	*MCPE*	*Z*	*MCPE*	*Z*	*MCPE*	*Z*	*MCPE*	*Z*
Pre-Event Estimation Period										
[−5, 125]	−.0495	−1.32	.0304	2.22***	.0102	1.33	−.0871	−4.21***	−.0672	−2.02**
[−5, 250]	−.1410	−2.40**	.0288	1.57	−.0183	−.65	−.1290	−4.03***	−.0922	−2.06**
[1, 125]	−.0919	−2.19**	−.0133	−.36	−.0282	−1.02	−.0432	−2.17**	.0283	1.00
[1, 250]	−.1834	−3.01***	−.0149	−.26	−.0567	−2.34**	−.0850	−2.57**	.0032	.08
Estimation Period Parameter										
$\bar{\gamma}_p$	.00066		.00012		.00025		.00008		−.00021	
t-stat	4.40***		1.46		3.09***		.80		-1.66	
Post-Event Estimation Period										
[−5, 125]	.0016	−.02	.0416	3.25***	.0655	3.36***	−.0665	.09	−.1209	−1.97**
[−5, 250]	-.0423	−.54	.0491	3.27***	−.0935	2.80**	−.0979	.03	−.1780	−1.34
[1, 125]	-.0436	−.90	−.0033	.93	−.0250	1.21	−.0231	1.61	−.0269	−.18
[1, 250]	-.0875	−1.17	.0041	1.61	−.0529	1.25	−.0545	1.10	−.0839	−.05
Estimation Period Parameter										
$\bar{\gamma}_p$	.00018		.00004		−.00020		−.00004		.00004	
t-stat	.69		.30		−1.80*		−.23		.15	

Notes: *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.
The sample sizes for each category are as follows: strong buy (18 recommendations), buy (116), reiterate buy (111), buy to hold (57), and sell (27).

tive abnormal returns of -18% over the 12-month period following recommendation announcements. Stocks that received a strong buy recommendation, however, performed extremely well during the estimation period. The null hypothesis of no abnormal performance is rejected at the 1% level ($\bar{\gamma}_p$ = .00066 and t = 4.40). The bias over a 250-day interval is 16.5% (.00066 × 250 = .1650). Together, these results indicate that (a) strong buy recommendations typically follow a period of superlative performance, and (b) the superior performance does *not* continue past the recommendation announcement date. A similar argument applies to the repeat buy category.

Negative recommendations, on the other hand, tend to be the most accurate. Investors lose approximately 8.5% following downgrades from buy to hold (t = -2.57, which is significant at the 5% level). Stock price performance during the estimation period is not statistically significant ($\bar{\gamma}_p$ = *.00008 and* t = .80). In addition, there is some evidence that investors earn negative abnormal returns following sell recommendations. The average abnormal return during the estimation period is -.00021 per day (t = -1.66, which is significant at the 12% level), and no significant change in this performance is observed following sell recommendations.

The results for the post-event estimation period, which are reported in the lower panel of Table 3, indicate that investors generally earn normal returns by following analyst recommendations. Only the estimation period parameter for the repeat buy category is statistically significant ($\bar{\gamma}_p$ = -.0002 and t = -1.80, which is significant at the 10% level). In sum, the results indicate that both pre- and post-event estimation period parameters can be biased (particularly for the repeat buy category).

Regardless of the estimation period selected, as one would expect investors generally earn higher returns by purchasing stocks at pre-recommendation prices (see, e.g., the t = -5 to t = +250 interval). Announcement day effects are discussed in the next section.

B. Announcement Day Effects

While the objective of this study is to examine a long-term holding period following analysts' recommendations, it is interesting to note the returns surrounding the announcement date. The announcement effect for positive recommendations (strong buy, buy and repeat buy) is approximately 4% (see Table 4). Negative recommendations (buy to hold and sell) are associated with MCPEs of approximately -4% to -6%.

In general, the abnormal returns are focused on the announcement date (t = 0). For the strong buy and buy categories, the returns over the five-day period ending one day before the announcement date (t = -5 to t = -1) are not statistically significant. The cumulative abnormal return for the repeat buy category is .85% over this interval (t = 2.28, which is significant at the .05 level), but an additional 3% is earned on the announcement date. For the sell category, 67% of the cumulative abnormal return observed over the t = -5 to t = 0 interval is earned on the announcement date. As a result, relatively small price changes are observed between the date recommendations are disclosed to clients and the date recommendations are disclosed to the general public (t = 0). Recall that the *USA Today* publication date is t = +1.

Relatively small price changes are also observed on or immediately following the *USA Today* publication date. Stocks that receive a strong buy recommendation earn positive abnormal returns of approximately 1.77% over the t = +1 to t = +5 interval (t = 1.93, which

TABLE 4
Event Study Methodology Results: Announcement Day Effects

Interval	*Strong Buy*		*Buy*		*Repeat Buy*		*Buy To Hold*		*Sell*	
(Trading Days)	*MCPE*	*Z*	*MCPE*	*Z*	*MCPE*	*Z*	*MCPE*	*Z*	*MCPE*	*Z*
[−5, −1]	.0034	.20	.0010	.19	.0085	2.28**	−.0078	−1.74*	−.0310	−5.16***
[−1, −1]	.0002	.80	.0062	4.88***	.0070	4.82***	−.0067	−3.71***	−.0100	−3.96***
[0, 0]	.0390	8.88***	.0416	28.58***	.0304	22.04***	−.0385	−21.37***	−.0623	−22.94***
[1, 1]	.0167	3.46***	.0047	3.94***	.0012	.99	−.0028	−1.83*	.0026	.55
[1, 5]	.0177	1.93*	.0109	3.63***	.0054	2.38**	−.0119	−3.23***	.0102	1.38

Notes: *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.
The sample sizes for each category are as follows: strong buy (18 recommendations), buy (116), reiterate buy (111), buy to hold (57), and sell (27).

is significant at the .10 level). Buy recommendations gain 1.09%, repeat buy recommendations gain .54%, downgrades from buy to hold lose 1.19%, and sell recommendations experience normal returns.

Despite the price change requirement for *USA Today* to publish recommendations, the results of this study are similar to the findings of previous research. Liu et al. (1990) reported MCPEs of 3.0% for buy recommendations and -3.6% for sell recommendations over the six-day period ending with $t = 0$. They concluded that the publication of recommendations in the *Wall Street Journal's* "Heard-on-the-Street" column (which was the source of their recommendations) impacts security prices. As their forecast period contained only 21 trading days centered around the publication date, they did not consider the long-term impact.

Our findings also support the results in Barber and Loeffler (1993), who examined the recommendations in the monthly "Dartboard" column in the *Wall Street Journal.* They found that analyst buy recommendations resulted in a MCPE of 3.53% on the publication date ($t = 12.19$). While they concluded that the initial price response was partially reversed over the following 25-day period, they did not test for bias in the estimation period parameters.

Because the results in Tables 3 and 4 do not include brokerage commissions, the actual returns experienced by most investors would have been less. Bodie, Kane, and Marcus (1993) indicate that the commissions charged by full-service brokerage firms often represent about 2% of the transaction value. Based on a hypothetical purchase of 200 shares at $26 per share, for example, Bodie, Kane, and Marcus indicate that full-service brokers would charge about $135 while discount brokers would charge approximately $61.

C. Sharpe, Treynor, and Jensen Measures

The Sharpe, Treynor, and Jensen measures also provide evidence that professional analysts do identify mispriced securities (see Table 5). The results in the upper panel of Table 5 are based on pre-recommendation prices (i.e., the holding period is 13 months: $t = 0$ to $t = +12$). The Sharpe measures for the strong buy, buy, and reiterate buy categories do not exhibit a consistent pattern, but the Treynor measures exceed the market portfolio ratios. The Jensen alpha measures are positive, but the results are not statistically significant.[12]

The results for negative recommendations (sell and downgrades from buy to hold) are more pronounced. In each case the Sharpe and Treynor measures are less than the market portfolio benchmarks. Jensen's alpha measures are negative, and the results for the downgrade to hold category are statistically significant at the 5% level ($\alpha_p = -1.01\%$ per month and $t = -2.28$). None of the results in Table 5 reflect transaction costs.

Whether investors who act after the publication in *USA Today* can benefit from analyst recommendations is more problematic (see the lower panel in Table 5). Not only do the Sharpe and Treynor measures indicate inferior portfolio performance, but the Jensen alpha measures are negative (though not statistically significant).

In general, the beta coefficients for each category are greater than 1, and the null hypothesis that $\beta_p = 1$ can be rejected at the 10% level. As a result, professional analysts tend to issue recommendations on stocks that exhibit above-average risk.

TABLE 5

Analyst Investment Recommendations: Sharpe, Treynor, and Jensen Measures (1988-1990)

	Sharpe's Measure		*Treynor's Measure*		*Jensen's Measure*			
Recommendation	*Analyst Portfolio*	*Market Portfolio*	*Analyst Portfolio*	*Market Portfolio*	α_p	*t*	β_p	*t*
13-month period beginning with announcement month [$t = 0$; $t = +12$]								
1. Strong Buy	.168	.168	.767	.668	.163	.28	1.65	4.59***
2. Buy	.242	.207	1.076	.818	.318	.83	1.23	2.51***
3. Reiterate Buy	.178	.207	.829	.818	.013	.03	1.18	1.68*
4. Downgrade To Hold	.016	.207	.072	.818	−1.013	−2.28**	1.36	3.26***
5. Sell	−.050	.152	−.287	.648	−1.267	−1.38	1.35	1.67*
12-month period following announcement month [$t = +1$; $t = +12$]								
1. Strong Buy	.098	.187	.447	.743	−.489	−.87	1.65	4.70***
2. Buy	.130	.189	.572	.749	−.221	−.60	1.25	2.79***
3. Reiterate Buy	.138	.189	.595	.749	−.200	−.60	1.29	3.66***
4. Downgrade To Hold	.096	.189	.418	.749	−.458	−1.25	1.38	4.22***
5. Sell	.100	.173	.600	.740	−.175	−.19	1.25	1.15

Notes: [a, b, c] indicate statistical significance at the 10%, 5%, and 1% level, respectively. Tests on α_p are against zero; tests on β_p are against one.

VI. CONCLUSIONS

The results of this study have both theoretical and practical implications. From a theoretical standpoint this study tests whether professional stock analysts can identify undervalued securities (a test of strong form market efficiency). From a practical standpoint this study tests whether investors can profit from analyst recommendations. Two factors should be considered. First, potential gains must be evaluated net of transaction costs. Second, while an analyst may identify an undervalued security and issue a buy recommendation, an investor who purchases the security typically must pay a price that reflects any information embedded in the recommendation announcement. As a result, an investor may not be able to capitalize on a recommendation even if it is "correct" ex post.

This study tests the accuracy of analyst recommendations published in the "Market Highlights" section of *USA Today*. Investment performance is evaluated for two groups of investors: (a) institutional and retail clients who trade before recommendations are disclosed to the general public, and (b) individual investors who trade after recommendations are published in *USA Today*. The use of recommendations published in *USA Today* has the advantage that these are recommendations available to a wide range of investors. Still, because *USA Today* publishes only those recommendations that have affected stock prices, it is important to note that the conclusions of this study may apply only to this subset of analysts' recommendations.

The results of this study support the conclusion that professional stock analysts do identify mispriced securities. Similar to previous research, we find an announcement effect of approximately 4% for positive recommendations. When a twelve-month holding period is examined and returns are based on pre-recommendation prices, the Sharpe, Treynor, and Jensen measures consistently rank the analyst buy portfolios above the sell and hold portfolios. Even though the returns are not statistically significant, the returns may exceed the costs of implementing an active strategy for large institutional investors (Bodie et al., 1993).

Individual investors, on the other hand, tend to experience subpar returns by following analyst recommendations. When returns are based on post-recommendation prices, the Sharpe and Treynor measures indicate inferior performance relative to the benchmark portfolio. The Jensen alpha measures are negative, but the results are not statistically significant. Because the results do not reflect transaction costs, the returns for most individual investors would be even lower. These results support Peter Lynch's concept of "street lag" (i.e., by the time an individual investor can act on an analyst's recommendation, the "good news" is already impounded in the stock price).

Finally, the results indicate that the conclusion one draws regarding analyst performance often depends on the methodology employed. Stock index comparisons are the least reliable because recommended stocks often exhibit greater risk than the benchmark selected. If an event study methodology is used, on the other hand, researchers should test whether the market model intercept for the estimation period is equal to zero. Ignoring this test can lead to bias in the abnormal returns reported for the event period (see also Copeland & Mayers, 1982; Edmister, Graham, & Scott, 1994).

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show that the Dodd-Warner test statistic is biased and that the bias increases with the length of the interval examined. As a result, we use the test statistics suggested by Karafiath and Spencer (1988) and Mikkelson and Partch (1988). These test statistics are smaller than would be obtained if the serial correlation in the prediction errors were ignored.

The formula for the test statistic is:

$$MSCPE_j = (1/(T_2 - T_1 + 1))\left(\sum_{t=T_1}^{T_2} PE_{jt} / var \sum_{t=T_1}^{T_2} PE_{jt} \right),$$

where T_1 is the first day of the interval, T_2 is the last day of the interval, and the denominator is the square root of the variance of the cumulative prediction errors of firm j. The variance is defined to be:

$$var\left(\sum_{t=T_1}^{T_2} PE_{jt} \right) = MSE_j \left[T + T^2/ED + \left(\sum_{t=T_1}^{T_2} R_{mt} - T\overline{R_m} \right)^2 / \sum_{t=-500}^{-251} (R_{mt} - \overline{R_m})^2 \right].$$

MSE_j is the standard deviation of the regression, T is the number of days in the interval $(T_2 - T_1 + 1)$, ED is the number of days in the estimation period for the market model, R_{mt} is the market return on day t, and $\overline{R_m}$ is the mean market return during the estimation period. Because the weights used in calculating the *MSCPE*-statistic are a modified inverse of the standard deviation of the cumulative prediction errors, the *Z*-statistic can differ in sign from the average prediction error (since returns of securities with lower variance are given greater weight).

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NOTES

1. *Wall Street Journal*, March 7, 1995, Section C.

2. Empirical studies indicate that corporate insiders and stock specialists generally do profit by having access to nonpublic information (see most investment texts, e.g., Reilly & Norton, 1995, for a review of this literature).

3. Ippolito (1993) reviews studies that test mutual fund performance and finds support for the Grossman and Stiglitz hypothesis: mutual funds appear to earn positive risk-adjusted returns, but the returns are offset by higher operating expenses and trading costs. As a result, active and passive investors earn the same rate of return net of expenses.

4. Research has found that announcements by investment advisory agencies (Moody's, S&P, Value Line) also provide information to the market (see Griffin & Sanvicente, 1982; Holthausen & Leftwich, 1986).

5. This data source was selected because it reaches a broad spectrum of investors.

6. The 329 sample recommendations involve 204 firms: 138 firms received 1 recommendation, 39 firms received 2 recommendations, 11 firms received 3 recommendations, 8 firms received 4 recommendations, 5 firms received 5 recommendations, 1 firm received 6 recommendations, 1 firm received 8 recommendations, and 1 firm received 9 recommendations.

7. Zacks Investment Research Inc. of Chicago used this technique to evaluate 32,000 recommendations made by 1,275 analysts during 1992 (Dorfman, 1993, September). The results of that study indicated that following the analysts' stock recommendations would have produced a return of 8.9% (compared to a total return of 7.6% on the S&P 500 index). In 26 of the 30 industries, however, an investor would have outperformed the analysts' picks by buying an equally-weighted portfolio consisting of nonrecommended firms in the same industry. Mr. Ryan, a research manager at Zacks, attributed this result to the superlative investment performance of small-capitalization stocks during 1992.

8. The sample recommendations are typical of the following excerpt from the "Market Highlights" section of *USA Today* (March 10, 1988, page 3B): "**Walt Disney** gained 1 to 63-1/4 on a 'strong buy' from Cyrus J. Lawrence, and **Analog Devices** jumped 1-1/8 to 14-3/4 after it was recommended by Goldman, Sachs." The announcement date ($t = 0$) for this example is Wednesday, March 9, 1988.

9. Analyst performance is also evaluated using (a) a post-event estimation period ($t = +251$ to $t = +500$ trading days), and (b) the CRSP equal-weighted index as the market return. Because the findings of this study are not affected by the choice of the market index, the results for the equal-weighted index are not reported separately.

10. If γ_j in Equation 1 is positive and statistically significant, then the test would be biased against finding a positive abnormal return. However, a stock with a positive γ_j during the estimation period and no abnormal return during the event period would still be regarded as a good investment.

11. Copeland and Mayers (1982) also note the problems that arise when the estimation period parameters are biased. Edmister et al. (1994) test for bias in the pre-event estimation period parameters. We test for bias in both the pre- and post-event estimation periods.

12. Bodie et al. (1993) argue that large institutional investors may be able to justify fundamental and technical analysis even though the returns are not "significant" using conventional statistical tests. The results for the buy category, for example, suggest an abnormal dollar return of approximately \$3.82 million per year on a \$100 million portfolio (.00318 × 12 months/yr × \$100 mil. = \$3.82 mil.). Even though the return is not statistically significant, it may exceed the cost of implementing an active strategy.

APPENDIX

Standard event study methodology is used to estimate the excess returns (see Dodd & Warner, 1983). For intervals longer than one day, however, Karafiath and Spencer (1988)

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