Do Brokerage Analysts' Recommendations Have Investment Value?

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ABSTRACT

An analysis of new buy and sell recommendations of stocks by security analysts at major U.S. brokerage firms shows significant, systematic discrepancies between prerecommendation prices and eventual values. The initial return at the time of the recommendations is large, even though few recommendations coincide with new public news or provide previously unavailable facts. However, these initial price reactions are incomplete. For buy recommendations, the mean postevent drift is modest (+2.4%) and short-lived, but for sell recommendations, the drift is larger (−9.1%) and extends for six months. Analysts appear to have market timing and stock picking abilities.

BROKERAGE FIRMS MAKE ENORMOUS investments in collecting, analyzing, and publishing research and recommendations. Yet, beginning with Cowles' (1933) well-known study, "Can Stock Market Forecasters Forecast?", evidence persists that the recommendations of most analysts do not produce abnormal returns.[1] Where there are exceptions to this conclusion, criticisms of sample bias or imprecise data lessen the impact of the findings.[2]

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[1] For findings on security analysts, see Bidwell (1977), Diefenbach (1972), Logue and Tuttle (1973). For those on investment managers, see Jensen (1968), Fama (1991).

[2] Bjerring, Lakonishok, and Vermaelen (1983) find superior performance by a single Canadian brokerage house. Dimson and Marsh (1984) find accurate forecasting of U.K. stock returns, and Groth, Lewellen, Schlarbaum, and Lease (1979) find superior performance by a single U.S. investment firm in the 1960s. Elton, Gruber, and Grossman (1986) document excess returns for the calendar month of and the first month after brokerage recommendation changes, although of much smaller magnitude than the returns shown here. Stickel (1995) and Francis and Soffer (1994) use data that codify the date of only published analyst reports, many coming days or weeks (or not at all) after the news is first disseminated orally and by the *First Call* data source used here.

This article offers new evidence on stock price formation and on the ability of analysts to predict or influence stock prices. It examines a comprehensive set of recommendations from the fourteen major U.S. brokerage firms. One important contribution is an analysis of the market reaction to new sell recommendations and to withdrawals of buy and sell recommendations that have been rarely studied.

Information is costly to process. Brokerage firms spend hundreds of millions of dollars annually analyzing stocks and trying to persuade investors that certain stocks are more or less attractive than others. Grossman and Stiglitz (1980) observe that market prices cannot perfectly reflect all available information, or else information gatherers would earn no compensation for their costly activities. In a competitive and rational world, this costly activity must be compensated by commensurate expected profits in the form of underwriting fees, trading profits, and commissions from securities trading, the latter an indirect product of the investment research examined here.

Similarly, investors should be willing to pay for brokerage investment advice only if the expected benefit is at least as great as the cost of the advice. A logical source of benefits for an investor would be excess stock returns following changes in broker recommendations.

Brokerage research builds on factual sources of firm-specific information such as annual reports and earnings announcements, but is primarily evaluative and predictive. Schipper (1991) and Francis and Philbrick (1993) point out that accounting scholars expend great energies analyzing the earnings and cash flow forecasts of analysts, even though producing earnings forecasts is secondary to the analysts' main objective of making timely stock recommendations. Buy and sell recommendations follow from predictions of stock values using all available sources of industry and firm-specific information, so they offer a direct test of the ability of well-informed market participants to outperform the stock market averages.

This article pursues two distinct lines of inquiry. First, I analyze the price and volume reactions to different types of recommendation changes, both at the event time (measured by a three-day window), and in months before and after the event. These measurements benefit from a new source of data, *First Call,* which identifies the precise day that recommendation changes take place. I document significant initial price and volume reactions. Size-adjusted prices increase, on average, 3.0 percent for buy recommendations and drop 4.7 percent for sell recommendations in the three-day event-period window. There is also significant postrecommendation stock price drift in the direction forecast by the analysts. The postrecommendation drift associated with buy recommendations is significant but short-lived, with an incremental mean size-adjusted return of +2.4 percent for the first postevent month beginning two days after the recorded date of the recommendation. Sell recommendations are associated with postrecommendation drift of −9.1 percent over a longer six-month postevent period.

Furthermore, excess returns before the removal of buy and sell recommendations are in a direction consistent with the recommendations that were in place before the recommendation removal. Analysts presumably believe that stocks added to the buy list are underpriced and will rise. As some prices rise to a point where the stock is viewed as overvalued, analysts remove it from the buy list. That is, I find that stock prices rise after the firms are added to the buy list, and, in a separate analysis, that stock prices have been rising prior to removals from the buy list. For sell recommendations, the opposite price pattern obtains.

A second focus of the article is an in-depth examination of the documented postrecommendation excess returns. Does this drift suggest that security analysts have predictive ability? If so, how? Simulation techniques allow a comparison of the market timing and stock selection "accuracy" of the analysts' recommendations. This is achieved by holding firms in the samples of added-to-buy or added-to-sell stocks constant and comparing raw returns after the actual recommendation dates with returns after pseudo "event" dates or randomly shuffled "event" dates. The results suggest that, for buy recommendations, analysts' predictive value is mostly a matter of market timing and short-term stock picking. The more impressive forecasting ability in the case of sell recommendations is a factor of industry selection added to market timing and stock picking.

I draw three conclusions from the empirical results. First, the immediate reactions to recommendation changes appear to be permanent, not quickly mean-reverting.[3] This implies that recommendations embody valuable information for which a brokerage firm should be compensated. I argue, therefore, that the immediate reactions are *direct* evidence supporting the expanded (Grossman and Stiglitz) definition of market efficiency, unlike the *indirect* evidence from managed portfolios offered by Ippolito (1989) and disputed by Elton, Gruber, Das, and Hlavka (1993).

Second, the drift results remain mostly an unsolved puzzle. They contribute to a category of findings showing initial underreaction and subsequent drift associated with significant informational events such as earnings announcements, stock repurchases, and dividend initiations and omissions (Bernard and Thomas (1989 and 1990) Ikenberry, Lakonishok, and Vermaelen (1995) and Michaely, Thaler, and Womack (1995)).

Third, new buy recommendations occur seven times more often than sell recommendations, suggesting that brokers are reluctant to issue sell recommendations. "Costs" of issuing sell recommendations are greater than the "costs" of buy recommendations. The asymmetric returns to new sell and new buy recommendations (in contrast to previous findings) appear consistent with this cost-based hypothesis.

Section I describes the available data and the financial characteristics of the chosen samples. Sections II and III analyze the short- and long-run market reactions to the different types of recommendation events. Section III also

[3] Returns in other studies of recommendations such as those from *The Wall Street Journal's* "Heard on the Street" and "Dartboard" columns show substantial if not complete mean reversion in the first 10 or 15 days, as discussed in Section II.B.

evaluates possible challenges to and empirical explanations for the postrecommendation drift, and Section IV concludes the article.

I. Data, Sample Selection, and Sample Description

The primary data examined in this paper come from *First Call,* a real-time database created by First Call Corporation of Boston, which collects the daily commentary of portfolio strategists, economists, and security analysts at a majority of U.S. and international brokerage firms and sells it to professional investors through an on-line PC-based system. As brokerage firms report information from their "morning calls" electronically, First Call Corporation makes it available almost immediately to subscribers to its *First Call* service that are also customers of the brokerage firms.[4]

The major benefit of *First Call* for subscribers is that it is a convenient, centralized source of quasi-private news. The cost of subscribing to *First Call* is substantial, and institutional investors typically pay for subscriptions through soft-dollar commissions.

For the researcher, the major advantage of *First Call* over other sources is that it provides the specific date (and the approximate time) that information is made available to investors. Other sources of brokerage information (such as *Investext* and the Zacks data) rely on coding of the written reports that are released by the brokerage firms, which may produce two specific inclusion errors. First, not all comments made by brokerage analysts become disseminated as written reports; second, written reports are often dated some time after the "morning comments" that they reflect.

Investext, for instance, reflects only published reports, which may be dated after the applicable "morning comment." There is also an agency issue with respect to the Zacks data. Most brokerage firms do not send their research directly to Zacks (whom they view as a competitor), so Zacks obtains its written research reports from second-hand sources. Most brokerage firms, therefore, have little incentive to validate the accuracy of the Zacks data. They do have a great incentive to make sure that *First Call* reports their commentary correctly, as many brokerage-firm customers use *First Call* as a substitute for daily calls from brokerage salespeople.

In the 1989–1991 time period that I analyze, there are more than 150,000 comments per year in the database. While some are general portfolio strategy and economic recommendations, most are company-specific. All comments provide the following information: 1) the time and date recorded in the system,

[4] A "morning conference call" to the brokerage salesforce is customary in the brokerage industry, usually before the 9:30 A.M. (NYSE) stock market opening. Equity industry analysts (and overall stock market and bond market strategists) review new information about the companies that they follow and opine on their attractiveness. In the 1989–1991 period, immediate dissemination of the "morning call" (to important customers before the stock market opening) preceded the information's availability on the *First Call* system by one or two hours. *First Call* subscribers also receive updated comments made during the trading day, such as earnings opinion changes following a surprising earnings announcement.

2) the name and ticker symbol of the relevant company, 3) the brokerage firm and analyst producing the comment, 4) a headline summarizing the topic, and 5) the text of the comment, sometimes including tables of earnings estimates and financial ratios. Content ranges from new stock recommendations and revised earnings estimates to new product and industry analyses.

A small subset of daily comments are analyzed in this research: changes in stock recommendations by the 14 highest-ranking U.S. brokerage research departments, as identified in the 1989 and 1990 October issues of *Institutional Investor*.[5] *Institutional Investor* annually ranks research departments and security analysts of the major U.S. brokerage firms, mainly according to polls of institutional investors. The strategy of collecting recommendation changes from only the major brokerage firms assures that the information events analyzed had been available immediately to most professional and institutional investors.

The most simple stock rating system consists of the ratings "buy," "hold," and "sell." Most brokerage firms, however, use a slightly expanded system, such as "buy," "attractive," "neutral," "unattractive," and "sell." Although the stock rating categories of the 14 firms have different names, all could be reduced to four or five ordered categories.

I examine only changes to and from the extremes: either stocks added to or removed from the most attractive category (hereafter, added-to-buy and removed-from-buy) or stocks added to or removed from the least attractive category (added-to-sell and removed-from-sell). These four types of changes are chosen because they would be among the most prominent news items in a typical day and the most likely to be conveyed immediately to important institutional customers.

Approximately 3000 potential recommendation changes were identified by a key word search of headlines of all comments. The text of each comment was read to assign the correct rating. Only *changes* of recommendation, not reiterations of previous opinions (which occur frequently), are included in the samples.

The samples consist of 1573 recommendation changes made on 822 different companies in the four buy and sell recommendation-change categories. Twenty-six recommendation changes on U.S. firms and all changes on non-U.S. firms are eliminated from the sample because data from the Center for Research in Security Prices (CRSP) and COMPUSTAT were unavailable. Although multiple recommendations of the same firm occur in the sample, Section III.*A* shows that they are few and do not materially change the results. Table I provides summary characteristics of the collected samples.

Two properties of the collected samples are significant. First, the companies recommended by the brokerage firms are predominantly large-capitalization companies. Fifty-seven percent of the combined sample observations are from

[5] The number of firms examined (14) also corresponds to the natural division between national and regional/specialty firms. The largest 14 firms are generally regarded as national if not global firms. The composition of the top 14 firms does not change significantly from year to year.

Table I

Description of Recommendation Change Samples

Samples are obtained from searching the database, *First Call,* which is created and sold by First Call Corporation, Boston, Mass., to professional, institutional investment managers. Observations are limited to those made by the top 14 brokerage research departments according to the 1989 and 1990 October issues of *Institutional Investor.*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample Category	Number of Obs. in Final Sample (on Separate Cos.)	Date Range of Sample	Number (%) in Sample in Market Cap. Deciles 9–10 (Large Cap.)	Number (%) in Sample in Market Cap. Deciles 6–8 (Medium Cap.)	Number (%) in Sample in Market Cap. Deciles 1–5 (Small Cap.)	Mean Number of Analysts With Earnings Per Share (EPS) Ests. as Reported by I/B/E/S	Number (%) in Sample w/ Concurrent EPS Report
Added-to-Buy-List changes	694 (528)	Jan. 1989–Jun. 1990	384 (55%)	221 (32%)	89 (13%)	17.9	64 (9%)
Removed-from-Buy-List changes	570 (420)	Jan. 1989–Jun. 1990	350 (61%)	182 (32%)	38 (7%)	19.2	84 (15%)
Added-to-Sell-List changes*	209* (185)	Jan. 1989–Dec. 1991	107 (51%)	73 (35%)	29 (14%)	17.8	30 (15%)
Removed-from-Sell-List changes	100 (95)	Jan. 1989–Jun. 1990	54 (54%)	38 (38%)	8 (8%)	18.9	13 (13%)
Total Observations	1573		895 (57%)	514 (33%)	164 (10%)	18.4	191 (12%)

* After preliminary analysis, additional observations were collected for the added-to-sell category. Thus, the annualized ratio of buy-to-sell recommendations is closer to 7 to 1 rather than 7 to 2 as shown here.

the two largest market capitalization deciles on the CRSP NYSE/AMEX tape, roughly corresponding to market capitalization of at least $1 billion in 1990. Only 1 percent of the collected recommendations are for stocks in the two smallest market capitalization deciles. The average number of analysts following companies with recommendation changes on the I/B/E/S database is 18. Hence, my results pertain to large-capitalization, well-followed companies.

Second, favorable (added-to-buy) recommendations are much more prevalent than unfavorable (added-to-sell) ones. The ratio of buy to sell recommendations in this sample is about 7 to 1.[6] Pratt (1993) notes that Zacks Investment Research estimates this ratio at 10 to 1. The institutional reasons for this buy-sell asymmetry are discussed in Section IV. A logical hypothesis is that analysts recommend stocks that they feel are underpriced (for "buys") or overpriced (for "sells") relative to current market or industry valuation levels.[7] Financial characteristics and financial ratios are natural decision tools for this analysis.

Table II shows summary statistics of several common financial characteristics of companies at the time of recommendation, partitioned by the type of recommendation change. These summary statistics are consistent with the underpriced versus overpriced hypothesis in terms of direction, although the absence of pairwise data prevents drawing conclusions with statistical significance.[8] The median I/B/E/S forecast price-to-earnings (PE) ratios of stocks *added* to the buy category are slightly lower than ratios of those *removed* from the buy category (12.5x versus 13.0x).[9] Conversely, the PE ratios based on I/B/E/S estimates of stocks added to the sell list are higher than those removed from that category (12.9x versus 12.0x).

The average percentage changes in mean I/B/E/S earnings estimates for the current fiscal year are also different in the two groups. For added-to-buy stocks, the percentage change in I/B/E/S earnings forecasts from the month before to the month after the recommendation is +2.7 percent; the change for stocks removed from the buy list is −2.9 percent. For stocks added-to-sell, the average I/B/E/S earnings estimate change is −5.8 percent compared to +3.1 percent for stocks removed-from-sell. These differences in forecast earnings changes are statistically significant at $\alpha = 0.01$.

[6] Table I shows a ratio of 3.5 to 1 because new sell recommendations are collected for a longer period than new buy recommendations. I increase the original sample of 110 added-to-sell recommendations by incorporating observations from an additional year and a half (in 1990–1991) because the original sample was small and the result surprising. The additional 99 observations show results that are practically identical to the prior results, confirming the original analysis.

[7] Other criteria also figure into recommendations. For example, analysts' recommendations may be influenced by a possible investment banking relationship with the recommended firm, particularly with respect to "negative" recommendations. See Pratt (1993) and Francis and Philbrick (1993).

[8] With this short a sample period, there are a limited number of observations for added-to and removed-from pairs.

[9] Medians are presented rather than means in most cases, because right-skewed distributions for prices and PE ratios prevent the mean from being a useful summary statistic. Means are similar but larger, especially for PE ratios that are affected by a few extremely large values.

Table II

Financial Characteristics and Ratios for Recommendation Change Samples

This table lists financial characteristics and ratios of the samples described in Table I. Median values of the financial measures are presented in most cases. Means are similar but skewed right, especially for PE ratios. The 10%–90% range is given in some cases to describe the location of the central 80 percent of the values for that characteristic.

Sample Category	(1) Median Stock Price Per Share (Range)	(2) Median PE Ratio at Event Time Using I/B/E/S Ests. for Most Current Year	(3) Median PE Ratio at Event Time Using Trailing 12 Mos. (Realized) EPS	(4) Percent Change, Current Yr. Mean I/B/E/S EPS Est., Mo. Before to Mo. After Event	(5) Size-Adj. (Excess) Return for 6-Mo. Period Prior to Event (t-statistic)	(6) Median (Mean) Price-to-Book Value at First Prior EPS Date	(7) Median (Range) Dividend Yield at End of Event Date Month
Added-to-Buy-List changes	\$29.40 (10.5–63.4)	12.5x	13.6x	+2.7%	+1.2% (1.38)	1.8x (2.4x)	1.65% (0.0–4.6%)
Removed-from-Buy-List changes	\$34.20 (13.5–67.0)	13.0x	13.5x	−2.9%	+5.0% (4.64)	1.9x (2.6x)	1.89% (0.0–4.7%)
Added-to-Sell-List changes	\$25.00 (6.8–61.6)	12.9x	13.6x	−5.8%	−2.1% (−1.13)	1.6x (2.1x)	2.11% (0.0–6.6%)
Removed-from-Sell-List changes	\$30.20 (12.0–63.8)	12.0x	13.4x	+3.1%	−5.7% (−2.73)	1.5x (2.1x)	2.91% (0.0–7.0%)
Averages, All Observations	\$31.25	12.7x	13.5x	−0.3%	+0.3%	1.7x (2.4x)	.50%

The valuation differences between changes in added-to and removed-from recommendations changes are apparent, but weaker, for the price-to-book-value ratio and for dividend yield. The accumulated evidence suggests that analysts initiate recommendations for stocks when they are ostensibly less expensive (for buys) or more expensive (for sells) according to traditional financial ratios.

Prior short-term stock price performance is another momentum factor that analysts might consider. Abnormal size-adjusted returns in a six-month period preceding the recommendation changes therefore also appear in Table II.[10] However, the prior six-month size-adjusted returns for stocks added to the buy list (+1.2 percent) or stocks added to the sell list (−2.1 percent) are not significantly different from zero.

Returns for the six months immediately preceding *removals* from both buy and sell lists are consistent with the analysts' prior added-to recommendations. After adjusting for size, stocks removed from the buy list have increased 5.0 percent on average in the six months immediately before removal, whereas stocks removed from the sell list have decreased 5.7 percent in value. Both of these prior return measures are significantly different from zero, economically and statistically, which is indirect (but inconclusive) evidence of the predictive ability of analysts.

II. The Event-Period Market Reactions to Recommendation Changes

Most additions to broker recommendation lists are deliberate, planned actions that have first been researched and proposed by an analyst, then reviewed and approved by an internal investment committee, and finally prepared for publication and dissemination. These decisions are rarely made in haste. Analysts usually have more latitude to remove firms from recommended lists without formal approval or extensive review when the reasons for recommending the stocks are no longer tenable.

These differences are reflected in the timing of recommendation changes. While it is difficult to ascertain all material types of information that analysts might use in making a quick judgment to change a recommendation, one of the most important sources of new information is earnings releases. Yet, only a small percentage of new buy recommendations happen to coincide with quarterly earnings reporting dates (9 percent).[11] More *removals* from buy lists (14 percent) occur within one day of quarterly earnings releases. It appears that

[10] The excess return calculated in Table II is the size-adjusted return using CRSP return deciles. Excess or abnormal returns are also calculated using industry-adjusted and Fama and French (1993) three-factor models (Table III). The three methods produce quite similar results. A limitation of the Fama and French procedure is that calendar months are used as the measurement interval, limiting exact comparability.

[11] There are approximately 63 trading days in each calendar quarter for each firm. Since the revision event window is 3 trading days, then by random chance an earnings report date would fall in a revision event window 4.8 percent of the time (3 ÷ 63). A cross-sectional analysis (available

added-to recommendation changes by analysts are not inordinately "information-driven"; that is, they are not responses to the latest news or earnings release, but rather are "price-driven," relating to the stock price in terms of market and industry valuation models.[12]

In an additional test, an independent reader of the text of the added-to-buy recommendation changes was asked to note whether he could discern any private information in the comment, that is, whether a recommendation appeared to be based on facts not publicly available elsewhere. (Sometimes a recommending analyst states or implies knowledge of new information from company or outside sources.) Only 24 of 694 added-to-the-buy-list recommendations discuss facts deemed private or "new" revelations by the independent reader.

One could quibble about this additional test for two reasons. First, what an independent reader assumes is known and what is actually known by the market are not easily observable. Second, an analyst may not want to admit to possession of private information.[13] At the same time, the absence of *reported* new information does suggest that recommendation additions are not *primarily* the result of useful private or "hot" news.

A. The Recommendation Event-Period Reaction

The market response to the most extreme recommendation changes is considerable, despite evidence that the majority of recommendation changes are not issued at the time of any other private or important news. Table III shows the event-period response in terms of stock price movement, and Figure 1 also shows abnormal volume. The mean unadjusted three-day return for added-to-buy recommendations is +3.3 percent and the return for added-to-sell recommendations is −4.3 percent. The corresponding size-adjusted mean returns of +3.0 percent and −4.7 percent are both significantly different from zero at $\alpha = 0.01$. (The corresponding size-adjusted median returns are +2.0 percent and −2.8 percent.)

Excess returns are calculated using three different return-generating models. Size-adjusted model returns, ER^{size}, subtract the appropriate CRSP market capitalization decile returns from the sample firm's raw returns given on the appropriate CRSP NYSE/AMEX or Nasdaq tape, similar to market model returns as in Brown and Warner (1985). The three-day buy-and-hold event

from the author) shows that event returns at the time of added-to-buy changes are 1.5 percent higher when the recommendation coincides with an earnings report.

[12] In at least one brokerage firm, analysts occasionally prepare recommendation reports in advance, and then wait for what they believe to be an attractive price to issue the recommendation. Some planned recommendations are thus never disseminated.

[13] On the other hand, the credibility of new recommendations could be enhanced by reference to or suggestion of private information. By "private" information I do not mean illegal or insider information, but rather information that is not part of market consensus information (French and Roll, 1986).

return for each sample firm is calculated as:

$$ER^{\text{size},i}_{\text{event}} = \left[\prod_{t=-1}^{+1} (1 + r^i_t) - \prod_{t=-1}^{+1} (1 + r^{\text{size}}_t)\right] \tag{1}$$

where t is the market trading day relative to the recommendation day (t = 0), r^i_t is the raw return on stock i on day t, and r^{size}_t is the return on the matching CRSP market capitalization size decile for day t. Then, the portfolio excess return, PER^{size}, is the mean of the $ER^{\text{size},i}$:

$$PER^{\text{size}}_{\text{event}} = \frac{1}{n}\left(\sum_{i=1}^{n} ER^{\text{size},i}_{\text{event}}\right) \tag{2}$$

where n equals the number of sample firms in the event period with available returns. Returns are calculated similarly for one-month periods (21 trading days) before and after the three-day recommendation event period.

The third set of columns in Table III shows industry-adjusted returns computed as follows: first, the size-adjusted return, $ER^{\text{size},i}_t$, is computed for each sample firm and all other firms on the CRSP NYSE/AMEX and Nasdaq tapes with the same four-digit SIC code. The SIC code is taken from the COMPUSTAT annual or research tapes. The industry-adjusted returns are then calculated for each sample firm if there are at least five additional firms with the same SIC code on the CRSP tapes. Industry-matched returns for each firm are then calculated as the difference between the ER^{size} for the firm and the mean of the ER^{size} for the industry-matched firms.

For example:

$$ER^{\text{industry},i}_{\text{event}} = ER^{\text{size},i}_{\text{event}} - \frac{1}{m}\left(\sum^{m} ER^{\text{size},j}_{\text{event}}\right) \tag{3}$$

where m is more than 4 and equals the number of all other firms, j, with the same SIC code and available returns. The portfolio excess return is then the mean of all $ER^{\text{industry},i}$, as calculated in Equation 2. Given the requirement for at least five matching firms, industry-adjusted returns are available for approximately 66 percent of corresponding size-adjusted firm returns.

The last set of columns in Table III shows the excess returns computed using the Fama and French (1993) three-factor model.[14] Calculations of firm-specific factor coefficients are first made by regressing firm returns on 1) value-weighted market returns, r^{vwmkt}, 2) returns measuring returns to relative size (market capitalization), r^{size}, and 3) returns to the relative price-to-book ratio, $r^{\text{P/B}}$. An estimation period of 60 calendar months immediately prior to the month including the recommendation is used. A minimum of 24 months of contiguous returns is required to calculate the factor coefficients. These factor

[14] The historical factor (calendar month) returns were provided by Kenneth French.

Table III

Cumulative Returns Associated with Buy and Sell Recommendation Change Events

Actual, size-adjusted (using Center for Research in Security Prices (CRSP) value-weighted index deciles), industry-adjusted, and Fama/French model returns for various periods surrounding buy and sell recommendation changes. For the first three column sets, the event is the three-day window centered on the First Call database event date. For the Fama and French (1993) three-factor model, the event is the calendar month in which the recommendation takes place. Standard deviations (SDs) and t-statistics are cross-sectional, calculated from all companies with returns in that period.

	Actual Returns (unadjusted)		**Size-Adjusted Returns** (CRSP VW Index Deciles)			**Industry-Adjusted Returns** (4-Digit SIC & CRSP VW Deciles)			**Excess Returns** (Fama-French 3-Factor Model)		
Measurement Periods Relative to 3-Day Event Window	Mean	S.D.	Mean	S.D.	*t*-stat.	Mean	S.D.	*t*-stat.	Mean	S.D.	*t*-stat.
									***Relative to Calendar Event Month**		
Panel A: Added to-Buy-List Recommendation Changes											
			(N=694)			(N=464)					
6-Month Period Before Event	6.24	23.75	1.21	22.00	1.38	2.84	24.30	2.47	-Not Available-		
1-Month Period Before Event	0.65	10.64	0.04	9.46	0.12	0.29	9.61	0.66	-Not Available-		
Recommendation 3-Day Event	**3.27**	5.64	**2.98**	5.47	14.06	**2.84**	5.41	11.31	**4.00***	9.94	9.77
1st Month After Event	**4.57**	8.40	**2.38**	7.91	7.75	**2.33**	9.45	5.32	**1.87***	8.23	5.52
3-Month Period After Event	4.28	16.93	1.75	15.41	2.92	2.44	16.22	3.24	2.12*	15.73	3.27
6-Month Period After Event	−0.86	26.35	0.09	24.80	0.09	3.73	26.16	3.07	2.42*	25.62	2.28
Total Mkt. Impact/Event+1 Mo.	**7.97**	10.22	**5.42**	9.68	14.43	**5.23**	11.01	10.23	**5.93***	13.11	10.96
Panel B: Removed-from-Buy-List Recommendation Changes											
			(N=570)			(N=383)					
6-Month Period Before Event	**12.30**	27.21	**5.02**	25.31	4.64	**4.58**	24.72	3.62	-Not Available-		
1-Month Period Before Event	3.65	10.52	1.54	9.97	3.64	1.25	11.28	2.18	-Not Available-		
Recommendation 3-Day Event	**−1.62**	6.00	**−1.94**	5.58	−8.17	**−2.08**	5.97	−6.82	**−1.61***	10.33	−3.52
1st Month After Event	0.82	8.92	−1.02	8.20	−2.93	−0.93	9.03	−2.02	−0.01*	9.18	−0.01
3-Month Period After Event	−0.68	16.75	−2.58	14.51	−4.17	−1.31	15.35	−1.67	−0.64*	15.00	−0.96
6-Month Period After Event	**−4.36**	25.01	**−5.50**	21.78	−5.91	**−2.19**	21.96	−1.95	**−2.28***	22.89	−2.24
Total Mkt. Impact/Event+6 Mo.	**−5.70**	25.45	**−7.15**	22.24	−7.52	**−4.03**	22.60	−3.48	**−3.37***	26.29	−2.88

Panel C: Added-to-Sell-List Recommendation Changes											
			(N=209)			(N=139)					
6-Month Period Before Event	**4.38**	31.85	**−2.13**	26.91	−1.13	**−4.85**	24.42	−2.31	-Not Available-		
1-Month Period Before Event	0.76	14.53	−0.32	13.87	−0.33	−0.23	14.71	−0.18	-Not Available-		
Recommendation 3-Day Event	**−4.32**	10.01	**−4.69**	9.96	−6.78	**−4.99**	10.63	−5.53	**−3.87***	15.03	−3.63
1st Month After Event	0.45	13.12	−0.73	12.17	−0.87	0.38	11.46	0.39	−1.51*	12.99	−1.64
3-Month Period After Event	**−2.32**	21.42	**−5.41**	19.46	−4.00	**−4.15**	17.34	−2.81	**−5.91***	19.93	−4.15
6-Month Period After Event	**−4.43**	30.13	**−9.15**	25.24	−5.14	**−5.65**	24.79	−2.65	**−6.42***	28.02	−3.16
Total Mkt. Impact/Event+6 Mo.	**−8.39**	30.69	**−13.71**	26.21	−7.41	**−10.38**	27.29	−4.41	**−11.14***	28.43	−5.40
Panel D: Removed-from-Sell-List Recommendation Changes											
			(N=100)			(N=62)					
6-Month Period Before Event	**−0.02**	22.39	**−5.69**	20.29	−2.73	**−9.69**	20.16	−3.75	-Not Available-		
1-Month Period Before Event	0.28	11.99	−1.24	10.76	−1.13	−0.82	12.58	−0.51	-Not Available-		
Recommendation 3-Day Event	**0.71**	6.45	**0.32**	6.43	0.50	**−0.37**	7.48	−0.39	**1.42***	11.15	1.22
1st Month After Event	2.82	10.36	1.02	9.99	1.00	−0.40	9.68	−0.32	0.93*	8.00	1.12
3-Month Period After Event	−0.56	16.21	−1.50	15.13	−0.97	−4.04	26.11	−1.21	−1.82*	14.27	−1.21
6-Month Period After Event	**−8.15**	23.49	**−5.57**	21.39	−2.54	**−3.27**	30.48	−0.84	**−4.78***	19.98	−2.25
Total Mkt. Impact/Event+6 Mo.	**−7.66**	23.89	**−5.35**	21.79	−2.39	**−3.68**	30.58	−0.94	**−2.94***	22.73	−1.21

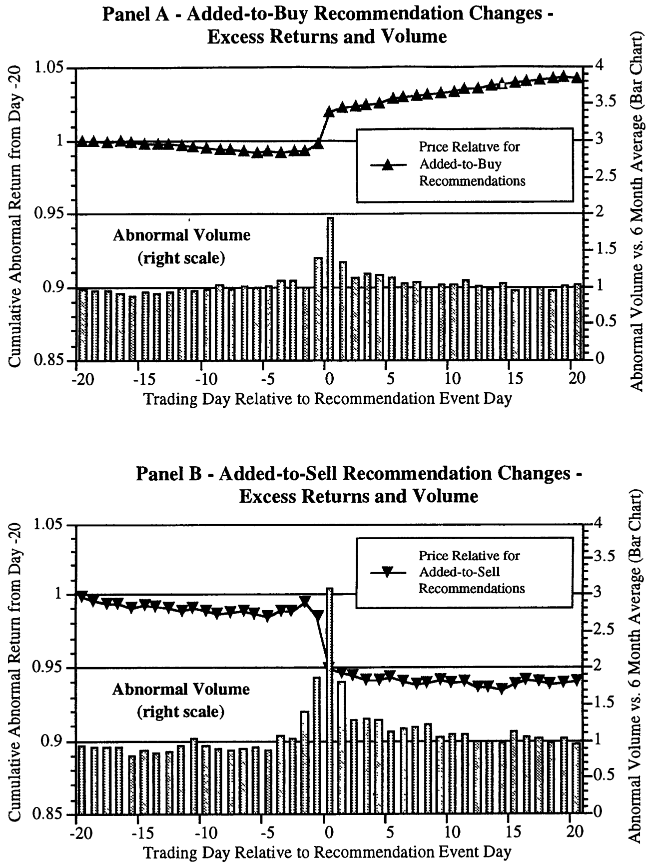

Figure 1. Short-run average excess returns and volume for buy and sell recommendation changes. Average market-adjusted excess returns for stocks added-to-buy (Panel A) and stocks added-to-sell (Panel B) for 41 days centered on the recommendation event date ($t = -20$ to $+20$). Excess returns are calculated using the market model (Brown and Warner (1985)): $ER_t = (1/n_t) \sum_{i=1}^{n_t} (r_{it} - r_{mt})$, where n_t is the number of stock returns available for each day t, r_{it} is the return on day t of recommended stock i, and the value-weighted CRSP daily index is used as the market return, r_{mt}. The CRSP value-weighted index is used because the portfolios consist of predominantly recommendations on large-capitalization stocks (see Table I). The excess returns are converted to price relatives in the graphs. Average excess volumes for each day are calculated as follows: $\mathrm{EV}_t = (1/n_t) \sum_{i=1}^{n_t} (\mathrm{vol}_{it}/\mathrm{vol}_{avgi})$ where vol_{it} is the volume for each recommended stock for each day t, and vol_{avgi} is the average volume for stock i over the three months (63 trading days) before and three months (63 trading days) after the 41-day period. Average volume (adjusted for splits) rather than average turnover is used because of significant cross-sectional differences in turnover among similarly capitalized stocks.

coefficients are then applied in the forecast period to calculate excess returns for the event month and the following 12 calendar months.

The Fama-French excess return for stock i in calendar month t is:

$$ER_t^{\mathrm{FF},i} = r_t^i - r_t^f - \hat{\beta}_1^i(r_t^{\mathrm{vwmkt}} - r_t^f) - \hat{\beta}_2^i(r_t^{\mathrm{size}}) - \hat{\beta}_3^i(r_t^{\mathrm{P/B}}) \tag{4}$$

The limitation of the Fama-French procedure is that calendar months are used as the measurement period, which limits comparison with the more precise results of the size- and industry-adjusted models (using daily returns), and thus prevents precise measurement of a shorter three-day event window. The mean Fama-French excess returns for the calendar month of added-to-buy and added-to-sell recommendations are +4.0 percent and −3.9 percent, which are both statistically significant at $\alpha = 0.01$. Although these mean returns differ slightly from the three-day market-adjusted returns above, the two methods produce consistent results, given the timing difference between the return on the first post-event 21-day return beginning on the second day after the event and the return on the first post-event calendar trading month.

For measurement periods longer than one month, the monthly returns for each stock are geometrically compounded, as in Equation 1. For example, the six-month postevent Fama-French method portfolio return is:

$$PER^{\mathrm{FF}}_{6\ \mathrm{months}} = \frac{1}{n}\left(\sum_{i=1}^{n}\left[\prod_{t=+1}^{+6}\left(1 + ER_t^{\mathrm{FF},i}\right) - 1\right]\right) \tag{5}$$

Abnormal volume, AV, for each firm in a sample portfolio is calculated as a ratio of the volume, V_t, for each relative event day to the average volume from three months (60 trading days) before to three months after the event (excluding the three-day event period):

$$AV_t^i = \frac{V_t^i}{\left(\sum_{t=-2}^{-61} V_t^i + \sum_{t=2}^{61} V_t^i\right) * 1/120} \tag{6}$$

Adjustments are made for stock splits by dividing post-split volumes, V_t^i, by the split ratio. The portfolio mean abnormal volume for "buy" and "sell" portfolios is again calculated as the mean of individual firm abnormal volumes for each event day.

Figure 1 shows abnormal volume surrounding event days when average (normalized) volume is 1.0. The average abnormal portfolio volume on the reported day of these recommendations is about 190 percent of normal for added-to-buy and about 300 percent of normal for added-to-sell recommendation changes. Each of these event-day abnormal volume percentages is statistically different from normal.

The mean event-period size-adjusted returns for stocks removed-from-buy are smaller than added-to-buy returns shown above, but still significant both statistically and economically. The mean three-day return is −1.9 percent ($t = -8.17$), whereas the corresponding statistic for stocks removed-from-sell is +0.3 percent ($t = 0.50$). The corresponding abnormal volume increases for the removed-from events are smaller than those of added-to changes.

B. Comparison with Other Events

The direction of the event-period returns shown in Table III is not surprising or unprecedented, but the magnitude of the changes is quite large compared with other events previously studied. Average event returns to one-time events like mergers, takeovers, and dividend omissions are larger than the mean portfolio returns shown here, but for repetitive events, these recommendation-change returns appear to be among the largest. Compared to my average size-adjusted three-day event returns of +3.0 percent (added-to-buy) and −4.7 percent (added-to-sell), Elton, Gruber, and Grossman (1986), in a similar study, find smaller calendar-event-month excess returns of +1.9 percent for added-to-buys and −0.4 percent for added-to-sells. Stickel (1995) finds returns of +1.1 percent and −1.23 percent for 11 day event windows using a larger sample (more brokerage firms and more observations) but less precise event times.

The Value Line Investment Survey is another type of recommendation event that has been widely studied. Stickel (1985) finds abnormal event-period returns of +2.4 percent for firms added to Value Line rank 1 (the highest rank, a buy recommendation) but only −0.3 percent for firms added to rank 5 (the lowest rank, a sell recommendation). It is interesting that Stickel finds a larger negative return for changes from 1 to 2 (−0.7 percent) than for firms being newly ranked 5 (−0.3 percent). Lloyd Davies and Canes (1978) and Beneish (1991) document price reactions concurrent with (possibly) second-hand recommendations printed in the *Wall Street Journal*'s "Heard on the Street" column of about +2.0 percent for buys and about −3.0 percent for sells. Brokerage recommendation event returns are also larger than even the average abnormal returns to the most positive and most negative deciles of standardized unexpected earnings documented by Foster, Olsen, and Shevlin (1984).

A more recent (and easily available) recommendation phenomenon is the "Dartboard" column published regularly by the *Wall Street Journal*. In this column, four investment analysts recommend one stock each, and their picks are compared to a portfolio of four randomly chosen stocks selected by the staff of the *Journal*. Barber and Loeffler (1993) and Greene and Smart (1993) show average event reactions of +3.4 percent to +4.0 percent for the recommended stocks, despite evidence they develop that the cumulative returns are essentially mean-reverting after the initial "price pressure."[15]

[15] On average, the stocks recommended for the "Dartboard" column are smaller in capitalization and higher in volatility than the stocks recommended by the major U.S. brokerage firms in this study. This is not surprising, given the format of the game (the winner returns for another contest) and the objective of the column's players (essentially placing a winner-take-all bet). Greene and Smart (1993) calculate the average beta of the Dartboard stocks as 1.7, while the average beta for stocks in this study is 0.98.

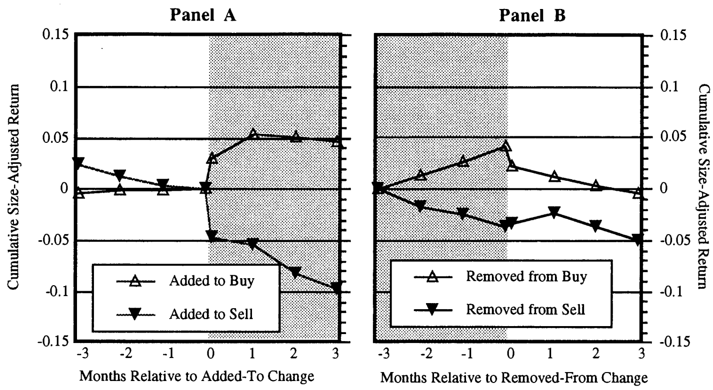

Figure 2. Long-run average size-adjusted returns for buy and sell recommendation changes. Average cumulative size-adjusted returns for the four types of recommendation changes. Returns are computed by compounding cumulative one month (21-day trading-day) size-adjusted returns and the three-day event return (shown in Table III, second column-set) and normalizing the return sequence to 0 for the day prior to the three-day event window. Size-adjusted returns are calculated as: $ER_t = (1/n_t) \sum_{i=1}^{n_t} (r_{it} - r_{\text{size decile},t})$, where n_t is the number of stock returns available for each month t and for the three-day event period, t_0, r_{it} is the return in month t of recommended stock i, and the value-weighted CRSP daily size-adjusted return is used as the "market" return, $r_{\text{size decile},t}$. Returns are not substantially different using calendar month excess returns derived from the three-factor model of Fama and French (1993). Outliers do not noticeably affect these price graphs; returns based on the median monthly returns for each time period are essentially identical. The shaded areas of Panels A and B represent a period during which most recommendations remain in effect after or before the recommendation change day.

III. Post-Recommendation Drift

An analysis of only the event-period returns might lead a researcher to conclude that brokerage recommendations have considerable information content and that stock prices respond quickly and rationally to the dissemination of costly information by analysts. This would particularly be the case if the postevent excess returns were modest and systematically close to zero as is found in the Value Line and "Heard on the Street" studies.[16] But, excess or market-adjusted postevent returns associated with samples of added-to-buy, added-to-sell, and removed-from-buy revisions are neither nonzero nor mean-reverting; they are incomplete. There is post-event price "drift" documented in Table III and Figure 2 that is statistically and economically significant for these three recommendation change types. Table IV reports the consistency of the event and post-event returns for added-to changes over three subperiods.

The average one-month post-event size-adjusted mean return beginning two days after added-to-buy recommendations is +2.4 percent. The one-month postevent return is statistically significant for all three excess return method-

[16] There are some exceptions to this. Copeland and Mayers (1982), for example, find a lag of up to two weeks in the market's adjustment to most Value Line recommendations and excess returns spread over about 13 weeks for changes to rank 5 (the lowest rank). Both of these lagged adjustments have modest statistical significance.

Table IV

Consistency of the Event and Post-Event Returns: Means, Medians, and Subperiod Returns

Mean size-adjusted returns are presented for overall samples and for the three subperiods of the sample time frame. Overall median returns are also shown. Asterisks denote significance at $\alpha = 0.05$.

	Three-Day Event Return	One Month Postevent Return	Six-Month Postevent Return
Panel A: Added-to-Buy-List Recommendation Changes			
Mean, all observations	3.0*	2.4*	1.8
Jan/89–Jun/89	2.7*	1.6*	4.3
Jul/89–Dec/89	3.3*	2.1*	3.3
Jan/90–Jun/90	2.7*	2.8*	−3.9
Median, all observations	2.0	1.8	0.2
Panel B: Added-to-Sell-List Recommendation Changes			
Mean, all observations	−4.7*	−0.7	−9.1*
Jan/89–Dec/89	−2.7*	−0.3	−11.4*
Jan/90–Dec/90	−5.6*	−1.7	−11.6*
Jan/91–Dec/91	−5.3*	0.1	−4.2 (t = −1.8)
Median, all observations	−2.8	−0.6	−7.3

ologies. The size-adjusted median return is 1.8 percent, and the drift is consistent and significant in all three subperiods. After the one-month drift, however, additional excess returns for added-to-buy revisions are not statistically different from zero.[17] For two other types of changes conveying unfavorable news, the excess returns continue over longer intervals. For added-to-sell revisions, the first postevent month average return is not significant, but over the six-month period, the mean return is between −5.6 percent and −9.1 percent (see Table III). The benchmark size-adjusted mean return is −9.1 percent and the median size-adjusted return is −7.3 percent. These results are also consistent for all three sub-periods. For removed-from-buy revisions, a negative drift of more than 5 percent occurs over the first six post-event months and is not concentrated in the first postevent month (as is the added-to-buy return).

Excess returns associated with the fourth type, removed-from-sell revisions, are not significantly different from zero for the event period and month thereafter, but are negative for the six-month postevent period. This result is asymmetric compared to the other three postevent results because the removed-from-sell reaction is ostensibly positive. One explanation for the asymmetry is that the typical rating after a removed-from-sell revision is "weak hold," which may be construed negatively as suggested by Francis and Soffer

[17] Roughly half of the event and postevent excess return has mean-reverted in post-event *months* five and six (for buy recommendations). This is in contrast to rapid and total mean reversion (within two weeks) in the Greene and Smart (1993) "Dartboard" results.

(1994). Another hypothesis is that analysts withdraw their sell recommendations too early because of "cost" considerations discussed in Section IV and thus fail to capture further significant negative excess returns. Note that this sample type is the smallest of all types examined ($N = 100$), and conclusions about it should be made with caution.

Another interesting way of looking at returns coincident with and following recommendation revisions is to measure the total market impact (event return plus drift) of the various types of recommendation revisions. Returns for the first three types are significantly different from zero when measured by size-adjusted, industry-adjusted, or Fama-French excess-return methodologies. The mean size-adjusted total market impact for added-to-buy revisions is +5.4 percent (event plus one month) and −13.7 percent (event plus six months) for added-to-sell revisions (Table III). For removed-from-buy revisions, the total market impact is −7.1 percent over the event plus six months. While we can debate the interpretation of these results as "predictive," these returns at the time of and following extreme recommendation changes are very significant economically.

While Table III and Figure 3 show excess returns beyond the six-month period after the recommendation events, these post-six-month returns should not be interpreted as strictly "buy-list" or "sell-list" returns because many firms are removed after several weeks or months on a list. Hence, the excess returns calculated for postevent periods shown in Table III and Figure 3 include firms for which the opinion may have changed before the end of the measurement periods. One limitation of the sample for added-to recommendation changes is that complete data on corresponding removed-from dates are not available because of the duration of recommendations and the length of the sample period. Furthermore, this limitation does not preclude a naive investment strategy such as buying and holding added-to-buy recommendations for a certain number of months. According to industry sources, more than 80 percent of new recommendations remain recommended for at least six months, and the average duration for new recommendations is approximately one year.

A. *Validating the Post-Recommendation Drift*

Because the postrecommendation excess returns are reasonably large and unexpected, I perform additional tests. Again, the two benchmark findings are the one-month excess return after added-to-buy changes of +2.4 percent and the longer six-month excess return of about −9 percent for added-to-sell changes.

These added-to samples are chosen for further analysis for two reasons: First, added-to-a-list revisions suggest an unambiguous, naive, and implementable investment strategy. That is, an investor is encouraged to take action, i.e., to purchase stocks being added to a buy list, and to sell or sell short stocks being added to a sell list. Removed-from-a-list revisions do not necessarily imply action. That is, removed-from-buy and removed-from-sell recommendation changes usually do not encourage active transacting. Most existing

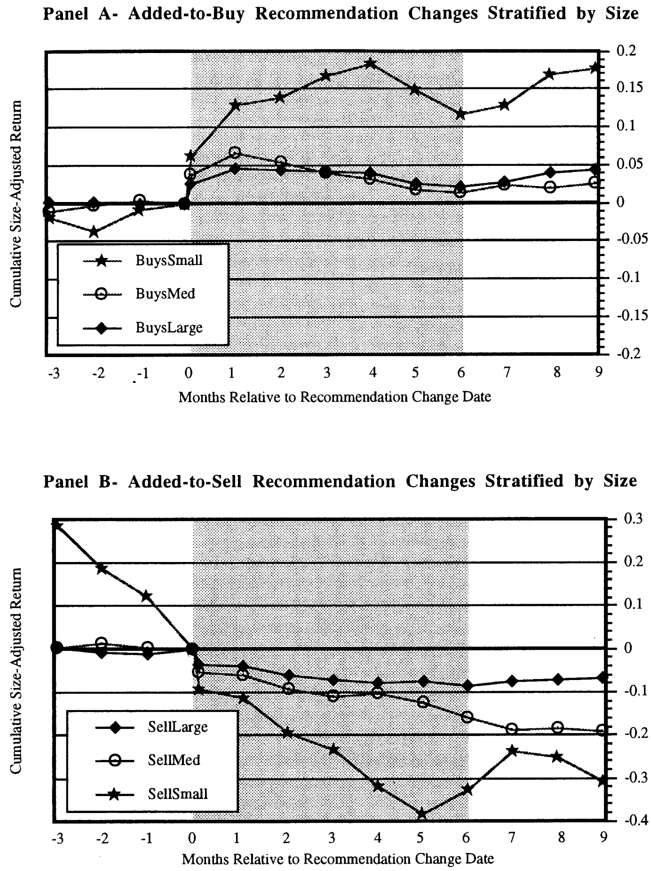

Figure 3. Long-run average size-adjusted returns for buy and sell recommendation changes stratified by size (market capitalization decile). Average cumulative size-adjusted returns for the added-to-buy and added-to-sell recommendation changes stratified by market capitalization of stock recommended. "Large" denotes firms in the ninth and tenth (largest) CRSP market capitalization deciles. "Medium" denotes deciles 6, 7, and 8. "Small" denotes deciles 1 through 5. Returns are computed by compounding cumulative one month (21 trading-day) size-adjusted returns and the three-day event return (shown in Table III, second column-set) and normalizing the return sequence to 0 for the day prior to the three-day event window. Size-adjusted returns are calculated as: $ER_t = (1/n_t)\sum_{i=1}^{n_t}(r_{it} - r_{\text{size decile},t})$, where n_t is the number of stock returns available for each month t and for the three-day event period, t_0, r_{it} is the return in month t of recommended stock i, and the value-weighted CRSP daily size-adjusted return is used as the "market" return, $r_{\text{size decile},t}$. The shaded areas of Panels A and B represent a period during which most recommendations remain in effect after the event (recommendation) day.

buy recommendations are changed to "strong hold" recommendations, and sell recommendations mostly become "weak hold" recommendations.[18]

[18] Although Francis and Soffer (1994) claim that "hold" recommendations (which would be the outcome of most "removed from" revisions) are tantamount to a "sell" recommendation, this is not the direct intention of analysts.

Second, each set of returns represents the apparent length of time the market takes to complete its reaction to the average recommendation as reported in Tables III and IV. The effect of added-to-sell revisions persists longer than added-to-buy revisions over all three subperiods. In Table III, these returns are in bold to denote their importance. All these returns are significant and profitable after transaction costs (at least by institutional investors with relatively low transaction costs) for the period analyzed.

Calculations of excess or unexpected returns suffer from the joint hypothesis problem pointed out by Fama (1976) that computation of *excess* returns proceeds from some model of expected returns. Evidence on excess returns *is* questionable if the expected return model is deemed inappropriate.

The size-adjusted model, the industry-adjusted model, and the Fama-French three-factor model are conventional and parsimonious. Several factors also suggest that they may be *appropriate* return-generating models for the portfolios evaluated here: 1) the periods of time analyzed are reasonably short (one month and six months), 2) the samples are large (694 and 208) and well-diversified across industry and across time, 3) the results of the three models are consistent over the four portfolio types, and 4) the cumulative excess returns level off after a period of one to six months.

Nevertheless, four diagnostic tests are performed to identify possible risk factors that could go undetected using these models and to answer several questions:

First, do analysts exhibit herd behavior? That is, could portfolio mean returns be biased by multiple recommendations of the same stock within the measurement periods? The returns shown in Table III are simple averages of the returns around recommendation change events. If several analysts had recommended the same stock simultaneously or a few days or weeks apart, one stock price movement might be double- or triple-counted in the returns presented. This bias would not affect the naive trading strategy of purchasing or selling equal dollar amounts of stock for each recommendation, but it could result in an overstated measurement of the true stock price movement associated with recommendation changes.

The 694 added-to-buy recommendation changes were made on 528 separate companies, and the 209 added-to-sell changes were made on 185 separate companies. Thus, while multiple recommendations exist, they do not predominate. There are only 16 occurrences of multiple added-to-buy recommendations (on the same stock within a one-month period) and six occurrences of multiple added-to-sells (within a six-month period). When I eliminate the 16 pairs of overlapping observations, added-to-buy list size-adjusted event period returns are +3.0 percent and first-month returns +2.3 percent, insignificantly different from the original benchmarks. When the six pairs of overlapping observations are eliminated for the added-to-sell changes, the event period returns are −4.2 percent and the six-month post returns −9.0 percent, not significantly different, economically or statistically, from −4.7 percent and −9.1 percent. Thus, while herd behavior is common for earnings estimate revisions, it is relatively rare in the case of recommendation changes.

Second, do the primary expected return models misspecify the absolute level of risk of the sample? It is possible that the three expected return models used in Table III systematically miss some important risk factor. That is, the postevent excess returns for the added-to-buy sample could be mitigated or eliminated if the sample assumed more risk than the employed expected-return models predicted. Similarly, the excess returns for the added-to-sell sample might be explained if the firms were less risky than the models predict.[19] A Monte Carlo randomization test shown in Table V addresses this possibility. This test assumes only that the firms included in the added-to-buy and added-to-sell samples do not exhibit time-varying risk over the periods of observation, one and a half year (for buys) and three years (for sells).[20]

The null hypothesis of the randomization test is that the mean return in the actual postevent period is independent of the dates chosen by the analysts. The test for added-to-buy recommendations proceeds as follows. First, the mean one-month postevent raw return after the actual dates chosen by the analysts is +4.57 percent (Table V, Panel A, Line 1). Second, holding the 694 firms constant, the 694 dates are randomly shuffled, and the mean postevent return is recalculated. This mean return is compared to the actual mean return of +4.57 percent. This random shuffling of dates and recalculation is repeated 300 times. Line 2, Column 3, of Panel A shows that the mean of the 300 postevent mean returns using randomly shuffled dates is +3.27 percent. In 300 repetitions of this randomization procedure, there are zero mean returns greater than or equal to the original test statistic of +4.57 percent. Therefore, the hypothesis that the mean return is independent of the dates chosen by the analysts is rejected at $\alpha = 0.01$.

A similar procedure shown in Line 3 of Panel A chooses random dates from the sampled time period of all recommendations rather than randomly shuffling and repetitively reusing the event dates. Once again, Line 3, Column 4, shows that no sample mean (0 of 300) using randomly selected dates from the period is greater than or equal to the original mean of +4.57 percent.

The comparison and significance in Line 2 using shuffled dates is theoretically most correct in showing the dependence of the actual mean on the chosen dates. Lines 3 and 4 in Panel A compare the average postevent mean return for the actual sample firms using random dates (+1.41 percent) and the mean return obtained using the value-weighted market index return and random dates (+1.46 percent). The similarity of these returns shows that average returns of the firms recommended by analysts over the one and one-half year period of the study were virtually identical to the market's return during the same period, despite the significant, systematic postevent excess returns over the analysts' selected part of the sampled period as shown in Table III.

[19] It appears quite unlikely, however, that any level of risk or covariance with other market returns could explain the large negative returns for this sample.

[20] The periods of time are different for buys and sells because the samples are from periods of different length, as described in Table I.

Table V

Approximate Randomization Testing for Significance and Timing of Post-Event Returns

Description of the Testing Procedure: First, the post-event returns (the "test statistic") for the actual added-to-buy list ("buy") and added-to-sell list ("sell") samples are calculated. For "buy" recommendations, it is the one-month (21 trading days) unadjusted buy-and-hold return, commencing two days after the recommendation. For "sell" recommendations, it is the six-month unadjusted return, also beginning two days after the recommendation. These actual post-event returns are shown in Panels A and B, Line 1. Second, using the same "buy" and "sell" sample firms, the event dates are randomly shuffled and the mean postevent (pseudo) return is compared to the actual post-event return. Column 3 of Line 2 in each panel represents the mean of 300 random sample mean returns generated in this way. Column 4 of Line 2 in each panel shows the number of random trials that exceeds the test statistic (NGE) shown in Line 1 in each panel. NGE means the Number Greater or Equal to the test statistic (the mean return in Line 1). For example, in Panel A, zero of 300 randomly generated (shuffled or randomly picked) mean returns exceeded the actual postevent return of +4.57 percent. However, in Panel B, 2 of 300 randomly shuffled sample means were less than the actual post-event "sell" return of −4.78 percent. Randomly generated dates (Lines 3 and 4) from the entire sample period are used to compare an average one-month or six-month return in the entire period sampled for the buy and sell samples and the average value-weighted market return over the same periods. Line 5 in each panel shows the mean of value-weighted market returns beginning two days after the actual event dates.
Calculation of Significance Levels: The ratio of the NGE to the number of simulations (300) shows the frequency with which the randomly generated portfolio mean return is greater (less) than the original buy (sell) test statistic. The significance level of the test, however, is the ratio (NGE + 1)/(300 + 1). This minor adjustment insures that the test is valid (see Noreen, 1989). In the table headings, α is the rejection level of the test, and β is the confidence level of the test that is $\beta = \text{prob}(\phi <= \alpha \mid \text{NGE, NS} \mid \text{uniform prior})$ where ϕ is the limit of (NGE + 1)/(NS + 1) as NS approaches infinity. Panels A and B show that the null hypothesis that the postevent returns for recommendations are independent of the dates of the recommendations is rejected at $\alpha = .01$ for "buys" and $\alpha = .05$ for "sells."

(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Mean Port. Return	NGE/ Repli-cations	Signifi-ance Ratio	β Confidence Level	
Sample Tested	Evaluated From				@ $\alpha = 0.01$	$\alpha = 0.05$
Panel A: One-Month Post-Event Mean Return for Added-to-Buy-List Changes (N = 694)						
1. "Buy" changes	"Buy" Dates	+4.57%	NM			
2. "Buy" changes	"Buy" Dates Shuffled	+3.27%	0 of 300	0.0033	0.951	1.000
3. "Buy" changes	Random Dates in Period	+1.41%	0 of 300	0.0033	0.951	1.000
4. Market (Value-Weighted CRSP Index)	Random Dates in Period	+1.46%	0 of 300	0.0033	0.951	1.000
5. Market (VW average)	"Buy" Dates	+2.60%	NM			
Panel B: Six-Month Post-Event Mean Return for Added-to-Sell-List Changes (N = 201)						
1. "Sell" changes	"Sell" Dates	−4.78%	NM			
2. "Sell" changes	"Sell" Dates Shuffled	−0.48%	2 of 300	0.0099	0.578	1.000
3. "Sell" changes	Random Dates in Period	+3.05%	0 of 300	0.0033	0.951	1.000
4. Market (Value-Weighted CRSP Index)	Random Dates in Period	+6.99%	0 of 300	0.0033	0.951	1.000
5. Market (VW average)	"Sell" Dates	+4.32%	NM			

NGE = the Number Greater or Equal to the test statistic. NM = portfolio returns evaluated from recommendation dates (Lines 1 and 5) are a single mean return, not averages of 300 mean-return replications. NS = the Number of Simulations.

For added-to-sell recommendation changes, the original six-month mean unadjusted return of -4.78 percent (Table V, Panel B, Line 1) using recommended dates compares with a mean over 300 replications of -0.48 percent (Panel B, Line 2) for the same companies when randomly shuffled dates are used. For the "sell" recommendations, 2 of 300 means were less than the actual test statistic of -4.78 percent. This test rejects the null hypothesis of independent dates and postevent returns at $\alpha = 0.05$.[21] Lines 3 and 4 of Panel B show that firms given sell recommendations by analysts return an average $+3.05$ percent in a six-month period in the three years sampled versus the market index average of $+6.99$ percent in a random six-month period during the three years. The difference in these two mean returns suggests that the firms given sell recommendations are relative losers over the three-year time frame of the study, but especially so in the precise six-month period after the "sell" recommendations (Panel B, Line 1).

Under this randomization procedure, the absolute level of risk of the replicated samples remains constant because the firms considered remain constant over all replications (unless the risk of the firms varies across time). Because raw returns are compared, this test is robust to virtually *any* misspecification of expected returns other than a time-varying one.

Could the post-recommendation drift be explained by time-varying beta risk? That is, do analysts recommend firms because they can anticipate a changing level of risk and, hence, expected return in the stocks? A skeptic would ask why security analysts might be more capable of predicting risk changes than return changes, but the possibility exists. To explain the postrecommendation drift documented by time-varying risk, the "buy" sample firms would have to become, on average, more risky and the "sell" sample firms less risky.[22]

Calculations of average sample betas (using daily returns for one, two, or three months) for the "buy" and "sell" samples, however, show no significant change in beta between the preevent and postevent periods. Pairwise t-tests do not reject the hypothesis that the mean portfolio betas (where beta is a proxy for the level of risk) are identical in the pre- and postevent periods. Specifically, the sample betas increase nominally but insignificantly from the preevent to the postevent periods for *both* the added-to-buy (0.95 versus 0.98) and added-to-sell (0.93 versus 0.96) samples. Even if these changes were statistically significant, they would have essentially no effect on one-month and six-month returns in the time periods sampled.

In addition, the excess returns for the "buy" and "sell" samples are calculated using the ordinary least squares (OLS) market model with individual firm

[21] It should be noted that, in the case of added-to-sell changes, the six-month postevent period is a larger percentage of the actual three-year time frame sampled (one-sixth of the total time) versus one-eighteenth for added-to-buy changes (one month of 18 months). It is thus natural for the significance of the test procedure to be lower for added-to-sell changes.

[22] This, for example, is a criticism level against the overreaction results of De Bondt and Thaler (1985) by Ball and Kothari (1989).

betas calculated from both preevent and postevent periods. The results using either the preevent or postevent betas, which are not reported, are essentially identical to the size-adjusted results shown in Table III.

Could the drift be eliminated by adjusting for cross-sectional dependence or autocorrelation in time series patterns of sampled returns? Bernard (1987) identifies three factors that increase the degree of cross-sectional dependence among sampled firms and, hence, the reliability of the variance estimator used in t-statistics assuming cross-sectional independence. They are 1) sample size, 2) the degree of (industry) diversification, and 3) the length of the measurement period. While the sample portfolios are large, which may increase cross-sectional dependence, the firms included in the portfolios are well-diversified by industry. The length of the measurement period is a more significant problem. The shorter three-day and one-month returns are probably not seriously affected by the number of overlapping observations, but the results of longer-period measurements should be viewed with more caution. Brown and Warner (1985) and Christie (1987) conclude that adjustments for cross-sectional dependence are unnecessary except in extreme cases.

B. A Decomposition of Post-Recommendation Drift

The important conclusion of Section III is that not only are event-period returns large and significant for both added-to-buy and added-to-sell recommendations, but *post*event returns are also significant and in the direction predicted by the analysts. For added-to-buy recommendations, this drift appears to last only one month. For added-to-sell recommendations, it accrues over a six-month period. Before concluding that this postrecommendation drift is evidence of analysts' predictive ability, we might logically ask: "What specific abilities of analysts do these results suggest?"

An important paradigm in the performance evaluation literature, especially with regard to the performance of investment managers, is the separation of portfolio returns into components of stock selection and market timing.[23] Approximate randomization techniques described in Table V provide a decomposition of the selection and timing aspects of analysts' recommendation choices for individual stocks. For purposes of this analysis, stock selection is defined as an analyst's ability to recommend stocks that provide excess (market or size-adjusted) returns in the immediate postevent period. Market timing is defined as the ability to choose dates for added-to-buy (or, sell) recommendations when the overall value-weighted market return in the immediate postevent period will be greater (less) than average. In other words, stock

[23] Coggin, Fabozzi, and Rahman (1993) present an excellent survey of stock selection and market timing models. Treynor and Mazuy (1966) and Jensen (1972) offer models of market timing, and Bhattacharya and Pfleiderer (1983), Grinblatt and Titman (1988), and Henriksson and Merton (1981) provide models that attempt to distinguish between market timing and stock selection.

selection is viewed as an analyst's ability to be right on the individual stocks; market timing may be viewed as the analyst's ability to take advantage of favorable marketwide movements.

The simulation techniques compare the actual postevent returns on portfolios of added-to-buy and added-to-sell revision stocks to the returns after shuffling or randomizing dates and/or average market returns. This corresponds to the differences between Line 1 and Lines 2 through 5 in Table V, Panels A and B. As discussed in Section III.*A*, the first conclusion is that the returns following the actual dates (Line 1 in Panels A and B) are significantly different from returns following random dates or shuffled dates (Lines 2 and 3). This corroborates the evidence in Table III showing stock selection excess returns by the three expected return-generating models.

Of greater interest for the market timing question is a comparison of Lines 4 and 5 of Table V, which shows that overall market returns in the period directly after added-to-buy recommendation dates are significantly better than average. Similarly, overall market returns in the period directly after added-to-sell recommendation changes are significantly worse than average. That is, regardless of what firm they recommend, analysts appear to predict subsequent stock market movements; they have market timing ability. The value-weighted market returned +2.60 percent in the month after added-to-buy dates, versus +1.46 percent in the month after randomly selected dates. For added-to-sell events, the market increased +6.99 percent on average in six months, versus +4.32 percent for periods directly after added-to-sell changes. These differences of 1.14 percentage points for "buys" and 2.67 percentage points for "sells" are significant at $\alpha = 0.05$.

Most brokerage analysts concentrate on one or a small number of industries. They are usually industry specialists rather than stock market generalists. Therefore, it is logical to consider whether the apparent stock selection abilities evidenced in Tables III, IV, and V are stock-specific, industry-related or a combination. A comparison of the size-adjusted returns and the industry-adjusted returns in Table VI provides some evidence on industry selection abilities.

This industry decomposition analysis depends on three assumptions. First, the size-adjusted portfolio returns given in Table III are assumed to be the true and full excess returns associated with the recommendation change events. Second, these full excess returns (for which size-adjusted returns are a proxy) are composed of an industry selection component and a separate stock selection component. The industry-adjusted portfolio returns shown in Table III are assumed to be a proxy for the stock selection component, because these returns have eliminated the industry-related excess return. Therefore, the difference between the size-adjusted returns and the industry-adjusted returns can be seen as the industry selection component.

The results in Table VI show that the industry selection component of added-to-sell and removed-from-buy recommendation changes is significantly negative, in the direction forecast by these pessimistic revisions.

Table VI

Decomposition of Excess Returns into Stock Selection and Industry Selection Components

Industry-adjusted, size-adjusted, and the difference between size- and industry-adjusted returns for all recommendation change observations with available industry-adjusted returns. Industry-adjusted returns (Column 1) are available for approximately 66 percent of sample observations (see Section II.*A*). Therefore, size-adjusted returns (Column 3) are similar but not identical to mean returns in Table III due to different sample sizes. Cross-sectional standard deviations and *t*-statistics are shown in Table III.

	Column 1 Industry-Adj. Rets. (4-Digit SIC & CRSP Deciles) "Stock Selection" Mean	+	Column 2 The Difference "Industry Selection" Mean	=	Column 3 Size-Adjusted Rets. (CRSP Size Adj. Returns) = Total Excess Return Mean
Panel A: Added-to-Buy-List Changes (N = 464)					
Recommendation 3-Day Event	2.84*		0.07		2.91*
1st Month After Event	2.33*		−0.29		2.04*
6-Month Period After Event**	3.73*		−4.26*-Inaccurate		−0.62
Panel B: Removed-from-Buy-List Changes (N = 383)					
Recommendation 3-Day Event	−2.08*		0.11		−1.96*
1st Month After Event	−0.93		−0.64		−1.58*
6-Month Period After Event	−2.19*		−4.22*-Accurate		−6.20*
Panel C: Added-to-Sell-List Changes (N = 139)					
Recommendation 3-Day Event	−5.00*		−0.25		−5.25*
1st Month After Event	0.38		−0.39		−0.01
6-Month Period After Event	−5.65*		−4.83*-Accurate		−10.23*
Panel D: Removed-from-Sell-List Changes (N = 62)					
Recommendation 3-Day Event	−0.37		0.17		−0.19
1st Month After Event	−0.79		−0.15		−0.55
6-Month Period After Event	−3.27		−2.22-Inaccurate,NS		−5.46

* Asterisk denotes significance (adjusted return $\neq 0$) at $\alpha = 0.01$.

** The 6-month period after event includes the first month after event.

"Accurate" denotes an "industry selection" component in the direction predicted by the analyst's recommendation.

NS = Not significant at $\alpha = 0.01$.

Thus, the apparent predictive ability of analysts for these pessimistic recommendations is partly accurate stock picking and partly accurate industry selection. For added-to-buy and removed-from-sell recommendations, the "industry selection" component of the excess returns is negative (sometimes insignificant), which is opposite from the direction implied by the optimistic recommendations.

IV. Summary and Conclusions

Brokerage recommendations offer a particularly visible context for looking at information returns. In effect, an analyst's recommendation revision means, "I have analyzed the publicly available information, and the current stock price is not 'right.'" Then, on average, the stock price adjusts either up 5 percent (for added-to-buy changes) or down 11 percent (for added-to-sell changes) over the next several months.[24] Changes in buy and sell recommendations by brokerage security analysts may be summarized as follows:

1) Recommendations by the large nationally known brokerage firms are predominantly issued on well-followed, large-capitalization stocks. The ratio of new buy to new sell recommendations issued by the 14 major U.S. brokerage firms is approximately 7:1 in the 1989–1991 period.
2) The six-month mean return prior to a new recommendation (for both added-to-buy and added-to-sell stocks) is not significantly different from zero, but for stocks that are being withdrawn from recommended lists, the prior six-month return is significantly different from zero, in the direction previously forecast by the analysts.
3) The three-day recommendation-period returns are large and in the direction forecast by the analysts.
4) Postrecommendation excess returns are not mean-reverting, but are significant and in the direction forecast by the analysts. For added-to-buy recommendation changes, the excess return occurs predominantly in the first postrecommendation month. For added-to-sell changes, the excess return accrues over about six months.
5) The market reaction to added-to-buy and added-to-sell recommendations is significantly asymmetric. Market responses to new sell recommendations are of greater magnitude both in the three-day event period and in the postrecommendation period.
6) The longer-term (six-month) returns following unfavorable recommendations (added-to-sell and removed-from-buy) appear to include both accurate stock selection and industry selection components. This differs from the reaction to favorable recommendations (added-to-buy and removed-from-sell), where the industry selection component appears to be inaccurate or insignificant.
7) The market reaction associated with smaller-capitalization firms is significantly larger than that associated with larger-capitalization firms, both in the recommendation period and in the postevent periods. (See Figure 3.)

Thus, there is strong evidence that stock prices are significantly influenced by analysts' recommendation changes, not only at the immediate time of the announcement but also in subsequent months. The most puzzling finding is that, even though event reactions are large, they appear to be incomplete,

[24] These returns are taken from Table III and are the mean total impact of added-to-buy and added-to-sell recommendation changes (event return plus postevent drift).

showing considerable postrecommendation drift. On first examination, this appears to indicate a failure of information to flow fully into security prices along the lines of the well-known postearnings announcement (PEA) drift.[25] A difference between postearnings drift and postrecommendation drift, however, is the information signal involved. Postrecommendation drift begins after a simple, disseminated change of *opinion* by a market participant, while the cue for PEA drift is a quarterly earnings announcement, a new public *fact*.

An important finding is that new added-to-sell recommendations are less frequent but more predictive than new added-to-buy recommendations. Analysts are well aware that there can be substantial costs or risks in disseminating sell recommendations to the investment community. Pratt (1993) describes several costs. First, sell recommendations can harm a brokerage firm's present and potential investment banking relationships, and thus are discouraged by the firm's investment bankers. Second, top management and investment contacts may limit or cut off the flow of information if an analyst issues unfavorable ratings.

Issuing sell recommendations presents more risk to analysts because sell recommendations are more visible and less frequent. An incorrect judgment on a sell recommendation is likely to be more costly for an analyst's reputation than an incorrect buy recommendation made when other analysts are more likely to be making the same recommendation concurrently. That the implicit costs of disseminating unfavorable sell opinions are greater than offering favorable ones can explain the larger magnitude of returns at and after sell recommendations. That is, if the costs of issuing a "sell" are greater, the analyst's expected compensation must be greater as well.

In summary, issuance of buy or sell recommendations has a substantial impact on stock prices immediately and in subsequent months. The returns I document for subsequent months differ from the conclusions of many previous examinations of the investment value of brokerage research. The results are consistent with the expanded view of market efficiency suggested by Grossman and Stiglitz (1980): that there must be returns to information search costs. These information search costs are often assumed to be zero when considering the efficient market hypothesis.[26] The nontrivial magnitude of the returns reported here challenges the innocence of that assumption.

[25] Ball and Brown (1968) were the first to demonstrate this drift, and many such investigations followed. Probably the most well-known studies are those by Bernard and Thomas (1989, 1990). Bernard (1993) rejects possible explanations of the PEA drift anomaly as a failure to control adequately for risk or research design flaws. Ball (1990) suggests that the evidence "points to the delayed reaction hypothesis."

[26] Fama (1991, p. 1575) points out that there are surely positive information costs, but assuming they are zero sidesteps "the messy problem of deciding what are reasonable information . . . costs."

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