

Analysts Recommendations and Insider Trading

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Analysts Recommendations and Insider Trading

Abstract

This paper studies interactions between analyst stock recommendations and insider trading activities as well as the investment value of these two important information signals. We find that these two sources of information are often contradictory. Insiders in aggregate buy more shares when their firm's stock is unfavorably recommended or downgraded by analysts than when it is favorably recommended or upgraded. This evidence is robust to various controls such as firm size, book-to-market ratios, and stock price momentum. We also show that analyst recommendations affect insider trading decisions, but not vice versa. Further evidence reveals that insiders' trades or analysts' recommendations can be informative: insiders' buying activities contain positive information when analysts do not view the stocks negatively, and analysts' downgrades contain negative information when there is little insider trading. The last result is at least partially attributed to analyst bias and regulations on insider trading.

Insider trades and analyst stock recommendations are two important sources of information in the financial market. The conventional wisdom is that insiders have private information about the value of their firms that outsiders do not have. Indeed, a large literature on insider trading has provided robust evidence that insiders are better informed and earn abnormal returns (See Jaffe (1974), Finnerty (1976), Seyhun (1986), Rozeff and Zaman (1998), Jeng, Metrick, and Zeckhauser (1999), and Lakonishok and Lee (2001) among others). Similarly, financial analysts are the most important information intermediaries in the financial market, and they are generally viewed to be knowledgeable about the firms and industries they follow. Recent empirical studies such as Stickel (1995), Womack (1996), Barber et al. (2001), and Jegadeesh et al. (2004) show that these financial analysts' stock recommendations have (short-term) investment value.

In this paper, we jointly examine insider trading activity and analyst stock recommendations. Our objective is to evaluate the information content of the two market activities and investigate the relative and combined investment value from the two sources of information. While both insider trading and analyst recommendations have been studied extensively in the literature (and are widely followed by market participants), the two strands of empirical literature have remained largely detached. Our study fills the gap by jointly studying the information contents from the two sources. In addition to providing evidence on the relation between these two information sources and on the investment value of the combined information signals, our study makes several contributions to the literature.

First, we offer a new approach to assessing the investment value of analysts' stock recommendations. We examine how one group of market participants – the corporate insiders – trade on their firm's stock vis-à-vis the recommendations issued by financial analysts. The trading activity of corporate insiders and the direction of their trades relative to the recommendations reveal insiders' implicit assessment of the investment value of their firm's stock and, to certain extent, reveal insiders' implicit evaluation on the quality of information in the analysts' recommendations. Our approach provides direct evidence on whether one group of investors agrees with the opinions of financial analysts and how this group of investors incorporates information

produced by financial analysts in their investment decisions.

Second, by directly comparing the information contents from insider trading and analyst recommendations, we examine whether and how the information from the two sources differs. This helps us to better understand not only the information contained in the two market activities but also the causes of such difference. While both corporate insiders and financial analysts are viewed as informed, they obtain their information through different channels. Corporate insiders have ready access to corporate-specific inside information. In comparison, financial analysts gather and process firm-specific, industry, as well as macroeconomic information, most of which are obtained from public sources. Insiders and analysts also face various constraints in conveying their information to the market place. For example, regulation of insider trading could prevent insiders from revealing their information through their trading activities. Both academic studies (see Michaely and Womack (1999)) and the popular press have argued that analyst recommendations seem to be tainted by conflicts of interest or bias. The different source of information and the constraints insiders and analysts face could lead to significant differences in their respective information signals. We explore the causes of such differences and examine when and how the two information signals add value to investment analysis.

Lastly, our investigation contributes to the literature that examines how information dissemination structure in general and insider trading in particular affect information acquisition by information intermediaries and outside investors and ultimately the efficiency of financial market. Theoretical research (e.g., Fishman and Hagerty (1992) and Khanna, Sleza, and Bradley (1994)) has argued that insider trading crowds out information acquisition by outside investors and compromises the efficiency of the capital market. In contrast, critics of insider trading regulation point out that permitting insiders to benefit from their information advantage through trading allows information to reach market quickly and thus improve market efficiency. While the United States has the most rigorously enforced insider trading regulation, insider trading activities (both legal and illegal) are still found to be informative. By comparing information in insider trades and information obtained by intermediaries, we are able to examine whether information provided by insiders substitutes outside information acquisi-

tion, or vice versa. Correspondingly, we can provide evidence on whether regulation of insider trading has direct impact on the information contained in observed insider trading activities.

Using data on insider trading and analyst recommendations from 1994 through 2003, we show that insiders' trading activities and analysts' recommendations produce contradictory information signals: insiders trade against the recommendation of financial analysts. Insiders in aggregate tend to buy more when their firm's stock is unfavorably recommended or is being downgraded by analysts than when it is favorably recommended or is being upgraded. In fact, the insider-trading patterns relative to the levels of and changes in the consensus analyst recommendation persist beyond the current quarter in which the consensus recommendation is determined. This is evidence that insiders and financial analysts differ in their opinions about the future prospects of the firm. Importantly, the overall results are robust to stocks with varying sizes, varying degrees of analyst coverage, and to stock characteristics such as book-to-market equity ratios and stock price momentum that have been shown to affect both insider trading and analyst recommendations.

We further find that analyst recommendations play a role in insiders' trading decisions. Insiders are more likely to buy more of their own firm's stock after than before the announcement of an analyst's downgrade-recommendation and also are more likely to sell their firm's stock after than before the announcement of an analyst's upgrade-recommendation. In contrast, however, how insiders trade exhibits no significant influence on the revision of analysts' stock recommendations. In other words, financial analysts do not incorporate the information implicitly contained in insider trades when revising their recommendations on a stock.

We further investigate the investment value of the two contradictory information signals by examining the return performance of portfolios formed based on the two signals separately and jointly. We find that insider trades are informative only when insiders are actively buying their company's stock, and analyst recommendations hold investment value only when they downgrade stocks that have no insider trading. The finding suggests that insider trading is informative when conveying positive information and analyst recommendations are informative when conveying negative information. Taken together, the results support the view that while

the information contents of the two sources differ, they are complements. The combination of insider trading regulation and analysts bias contribute, at least partially, to the observed difference in the two information signals.

The paper is organized as follows. Section I describes the various databases we use in this study. In particular, we provide a detailed description of the data on analyst stock recommendations and insider transactions, together with their summary statistics. Section II investigates how insiders trade vis-à-vis financial analysts' recommendations and also evaluates the opinions of corporate insiders and financial analysts on the investment value of the firm, as expressed implicitly in their trading behavior and stock recommendations, respectively. Section III employs an event-time analysis to study the interactions between insider trades and analyst recommendations. Particularly, it determines whether analyst recommendations have any influence on insiders' trading decisions, or whether insider trading activity has any impact on the analysts' recommendations, or both. Section IV evaluates the predictive power of insider trading activities and analyst stock recommendations for future returns. The final section summarizes the study.

I. Data Description

The data we employ in this study come from four different sources: (i) stock returns from the Center for Research in Security Prices (CRSP), (ii) firms' financial information from Compustat, (iii) analyst recommendations data from I/B/E/S, and (iv) insider transactions data from Thomson Financial. The sample period is from 1994 to 2003. Below we provide a detailed description of the latter two databases and how we construct variables measuring analyst recommendations and insider trading activity.

A. Analyst Recommendations

I/B/E/S compiles individual analyst recommendations data from hundreds of brokerage houses. The "Detail" recommendation file contains the name of the firm covered by the analyst, the

brokerage house, the analyst issuing the report, and a five-point recommendation rating scale of 1 to 5, along with the issue date of the recommendation. A rating of ‘1’ indicates a strong buy recommendation, ‘2’ a buy, ‘3’ a hold, ‘4’ a sell, and ‘5’ a strong sell.¹ To conform with the rating scale of I/B/E/S, we follow, throughout the paper, the notation that a higher rating indicates a less favorable opinion from financial analysts. The “Summary” recommendation file contains the consensus recommendation for each stock. I/B/E/S calculates the consensus recommendation on the third Thursday of each month, using all outstanding recommendations for the stock. We limit our study to stocks that are covered by at least one analyst and that have returns data available from CRSP. We further delete stocks with share codes other than 10 and 11, and hence foreign stocks, closed-end funds, and REITs are excluded.

Table 1 presents descriptive statistics on the sample firms and analyst coverage. It shows, by year, the number of firms that have analyst coverage, the mean consensus rating of a firm, and the percentage of these firms that analysts recommend to buy. It also reports the distribution of analyst coverage and analyst recommendations. The annual mean consensus rating across covered firms does not fluctuate much for the period between 1994 and 2000. On average, the mean consensus level is slightly larger than 2. Given the recommendation rating scale, this translates to an average buy recommendation. As seen from column 4 of the table, on average above 55 percent of the covered firms receive a buy recommendation in the first eight year period (i.e., with consensus recommendation rating of 2 or lower). This is consistent with the observation that analysts tend to make more favorable than unfavorable recommendations for stocks. The average recommendation rating noticeably dropped to 2.4 in the last two years of the sample. This drop is related to the implementation of Rule NSAD 2711, which exerts pressure on brokerage research. During the last two year period, only about 30 percent of covered firms receive rating of 2 or 1. Consistent with the stock level data, the summary characteristics of analyst coverage shows that more than 60 percent of total recommendations by analysts are buys (a buy (2) or a strong buy (1) recommendation) for the first eight years and the percentage dropped to below 50 percent for the last two years.

¹Analysts typically use this five-point scale to rate a firm that they follow. If an analyst uses a different scale, I/B/E/S converts the analyst’s rating to its five-point scale.

Table 1 shows that while the level of analyst coverage increased slightly over the sample period, coverage varies substantially across firms. For the entire sample period, the number of analysts covering a firm ranges from one to as high as 48 in 2003. Bushan (1989) and Womack (1996) document that the number of analysts covering a firm is strongly associated with a firm's market capitalization. Both authors find a greater number of analysts following firms with larger than smaller market capitalizations. The preference towards larger firms is mainly driven by research demand on firms that financial analysts provide to investors, especially institutional investors.

The variation in the number of analysts covering a firm, its strong association with firm size and the correlation between firm size and insider trading activity (see Lakonishok and Lee (2001) motivate us to construct size portfolios of stocks based on a firm's analyst coverage as opposed to its market capitalization. The reasons are twofold. First, as shown in Table 2 below, coverage-based portfolios are still able to capture the cross-sectional variation in firm size, thus enable us to examine different insider trading patterns across different size portfolios. Second, coverage-based portfolios provide a better measure of analyst opinions. The second reason is important for our study. For example, it is quite common for a firm with only one financial analyst following to receive a strong buy or sell recommendation issued by the single analyst. In contrast, it is highly unlikely for a firm with ten analysts following to receive a consensus strong buy or sell recommendation on its stock. As shown in Table 2 below, stocks with one or two analysts covering have more extreme consensus recommendation ratings than do those with a greater number of analysts following. Thus, using a simple ranking of consensus recommendation ratings to group stocks into portfolios, without controlling for the impact of the number of analysts, would inevitably result in the most favored and the least favored portfolios having low-coverage stocks, i.e., small stocks. Our approach therefore eliminates such a problem.

Our five coverage-portfolios are formed in a way that not only captures the cross-sectional variation in firm size, but also gives consideration to both the differences in coverage level and the number of stocks in each portfolio. The five portfolios are constructed as follows.

At the end of each quarter, we sort stocks into quintiles based on the number of analysts covering the stocks. The bottom (‘Least Coverage’) quintile contains stocks with only one analyst following, quintile 2 stocks with two analysts following, quintile 3 stocks with three to five analysts following, quintile 4 stocks with six to 10 analysts following, and finally, the top (‘Most Coverage’) quintile stocks with more than 10 analysts following. Then, within each coverage-quintile, we rank stocks based on the analysts’ consensus recommendation rating for a firm and further divide them into three groups. For ease of discussion, we refer to the latter as recommendation-portfolios. The ‘Favorable’ group consists of stocks with the lowest consensus recommendation ratings, while the ‘Unfavorable’ contains stocks with the highest. As discussed earlier, in the I/B/E/S recommendation rating scale, a lower recommendation rating denotes a more favorable recommendation.

For each recommendation-portfolio, we compute its average size and book-to-market ranking ratios.² Table 2 presents the number of firm-year observations, mean consensus recommendation rating, mean size ranking, and mean book-to-market (BM) ranking for the five coverage-quintiles as well as for the three recommendation-portfolios within each quintile. For the entire sample period, a large number of firms have only one or two analysts following, with more than 15,000 firm-year observations (Least-Coverage quintile and Quintile 2). Firms with three to five analysts following (Quintile 3) have the largest number of firm observations of 11,940. Still, a significant number of firms have more than ten analysts following, with 7,275 firm-year observations. We also checked the number of observations across the five coverage-quintiles for each year. Their yearly distribution is similar to the overall pattern for the whole sample period.

While the number of observations varies across coverage-quintiles, the mean consensus recommendation ratings remain fairly stable, with a value of slightly above 2. In contrast, the

²The value of size and BM ranking variables are determined as follows. At the beginning of each year, we sort NYSE, AMEX, and NASDAQ stocks into ten size-formed deciles according to the breakpoints of the market capitalization of NYSE stocks. We then use a scale of 1 to 10 to capture the varying sizes of stocks, with a value of ‘1’ assigned to stocks in the smallest size-decile, a value of ‘2’ to stocks in the next decile, and so on. We use the same procedure to assign a BM ranking to each stock, but based on the breakpoints of the BM’s of all AMEX, NASDAQ, and NYSE stocks. We calculate the mean size-ranking (BM ranking) value of each portfolio by taking the average of all size-rankings (BM rankings) of the stocks within the portfolio.

average recommendation rating differs significantly for portfolios of the same recommendation level ranking, but with varying degrees of coverage. For firms with a larger number of analysts following, the consensus rating is less extreme. For example, the favorably recommended stocks in the Most-Coverage portfolios on average receive a 1.75 rating, compared to the favorably recommended stocks in the Least-Coverage portfolios where the average rating is 1.0. Similarly, the unfavorably recommended stocks in the Most-Coverage portfolios on average receive a 2.65 rating, compared to the unfavorably recommended stocks in the Least-Coverage portfolios where the average rating is 3.11. By forming portfolios first based on analyst coverage and next, within each coverage-quintile, on consensus recommendation ratings, we are able to control for the impact of number analysts on consensus ratings.

Table 2 also shows that size and BM rankings across coverage-quintiles exhibit systematic patterns that are consistent with those of market-capitalization formed portfolios employed in previous studies. This finding suggests that analyst coverage provides a reasonably good proxy for firm size. As expected, firms with the least analyst coverage are generally smaller firms, while those with the most analyst coverage are larger firms. In addition, the results show that analysts' stock recommendations are associated with the BM's of the stocks. The mean BM ranking decreases monotonically with recommendation levels. This pattern is evident in all five coverage quintiles, implying that analysts tend to recommend stocks with low BM more favorably than stocks with high BM.³

In general, the five coverage-quintiles based on the number of analysts following help reduce the impact of return and trading differentials associated with size and coverage. For the remaining empirical analyses of this study, we shall use these five quintiles of stocks as our base portfolios, unless otherwise indicated.

³Jegadeesh et al. (2004) also find that analysts prefer "glamour" (typically with low BM) to "value" stocks (typically with high BM).

B. Insider Transactions

We use data on insider trading transactions that are filed with the SEC. The data are contained in Form 4 that insiders file with the SEC when there is a change in insider ownership. The data items include the date of each transaction, the classification of the insider, the type of transaction, and the number of shares transacted. In this study, we classify high level corporate officers and directors as corporate insiders.⁴ Our choice of insiders is consistent with the past literature that trading gains exist primarily in the upper level of management. We restrict our study to insider open-market transactions of equity shares. Other transactions such as those related to employee option exercises are excluded because they are more likely to be motivated by liquidity and portfolio diversification considerations than by information. We delete duplicate records reported by insiders and trading records with no transaction prices. Following Lakonishok and Lee (2001), we also delete all transactions with less than 100 shares.

Here we use the percentage of the value of insider buys to the total value of insider buys and sells (denoted by PVA) and the percentage of the number of insider buy transactions to the total number of insider transactions (denoted by PNA) as measures of insider trading activities. The definition of our PNA follows Rozeff and Zaman's (1998), and also is a variation of the net purchase ratio employed by Lakonishok and Lee (2001).⁵ Most of the existing studies employ the number of insider transactions as a measure of insider trading activity. To ensure robustness of our results, we use both the value and number of insider transactions as measures of insider trading activities.

Table 3 provides the total values of insider buys and sells, the numbers of insider buys and sells, PVA and PNA, by year. Consistent with past literature on insider trading, the value of sell transactions far outweighs the value of buy transactions. Insider purchases vary from \$1.52 billion in 2002 to \$6.48 billion in 1999. These values pale in comparison with their counterpart

⁴The classification includes officer, officer and beneficial owner, officer and director, officer and treasurer, president, chairman of the board, chief executive officer, chief financial officer, director, director and beneficial owner, and officer, director and beneficial owner as specified in the database.

⁵Lakonishok and Lee (2001) employ the number of buys minus the number of sells divided by the total number of insider transactions. Our results are robust to this alternative measure.

sales of \$12.98 billion in 1994 and of approximately \$45.97 billion in 2000. The value of insider purchases constitutes on average about 15 percent of the total value of all insider transactions from 1994 to 1999, but this ratio dropped to below 10 percent afterwards. Similarly, the number of insider buys is smaller than the number of insider sells, but the difference is substantially less as compared to that measured in terms of transaction value. On average, the fraction of insider buys ranges between 25 percent to 45 percent, with the only exception of 18.8 percent in 2003.

II. Insider Trades and Analyst Recommendations

While financial analysts provide unequivocal assessments of the investment prospect of a stock by issuing ‘buy’ or ‘sell’ recommendations, corporate insiders speak with their actions by buying or selling their company’s stock. In this section, we examine the information contents of insider trades and analyst recommendations to determine whether financial analysts and insiders concur in their opinions about the future prospects of the firm. Importantly, we are careful to control for firm characteristics that also influence insiders’ trades and analyst recommendations.

A. Directions of Insider Trades vs. Analyst Recommendations

Similar to existing studies, we employ our previously defined PVA and PNA variables as measures of insider trading activity. Following Lakonishok and Lee (2001), quarterly PVAs and PNAs are computed in order to capture a better picture of the insiders’ activities. Here we examine the trading activity of insiders relative to two measures of financial recommendations: one based on the level of consensus analyst recommendations and the other based on the change in the consensus analyst recommendations.

Table 4 reports time-series averages of the PVA and PNA for each of the recommendation-portfolios (Panel A) and the recommendation-change portfolios (Panel B), across all five coverage-quintiles for the quarter during which consensus recommendation levels and changes

are measured. For each coverage quintile, the table also shows the difference in the buy ratios between the Favorable and Unfavorable portfolios and between the Upgrade and Downgrade portfolios. All t -statistics are in parentheses. The construction of the recommendation-portfolios is discussed in Section I, whereas that of the recommendation-change portfolios is as follows. At the end of each quarter, we group firms from each coverage-quintile into three portfolios based on the change in consensus analyst recommendations of their stocks. The change in consensus recommendations for each stock is measured using the difference in the consensus recommendation levels as of the beginning and end of a calendar quarter. Hence the ‘Upgrade’ (‘Downgrade’) portfolio consists of stocks that have been upgraded (downgraded) in the quarter, and the ‘No-Change’ portfolio consists of stocks whose consensus analyst recommendations remain the same during the entire quarter.

Panel A of the table offers some striking patterns in insider trading activities associated with the directions of the consensus analyst recommendation. Most notably, insiders trade systematically against the consensus recommendations of the analysts. Across all five coverage-quintiles, we find that the Unfavorable portfolio consistently generates a higher average PVA than does the Favorable portfolio. Except for the Least-Coverage quintile, the insider-buy ratios for unfavorably recommended stocks are at least twice as large as those for favorably recommended stocks. These ratios vary between 0.17 and 0.42 for the former, as compared to 0.07 and 0.25 for the latter, with all buy-ratio differentials between the Favorable and Unfavorable portfolios statistically significant at conventional levels. The insider-buy ratios measured by the number of insider transactions exhibit the same pattern. For any given coverage-quintile, the average PNA decreases monotonically with the recommendation level. The difference in PNA’s between the Favorable and Unfavorable portfolios is between 9.4 and 27.4 percent, and the values are all highly significant at the five percent level.

The results of Panel B are consistent with those of Panel A. Insider buying activity increases monotonically with the downward-change in consensus recommendation ratings. Corporate insiders tend to buy substantially more when their firm’s stock is being downgraded than upgraded by financial analysts. Similar to those in Panel A, we find less evidence of any

significant difference in insider trading activities relating to upgrades and downgrades of stocks with only one analyst following. However, for stocks with more than one analyst following, it is clearly evident that insiders are likely to buy significantly more when analysts downgrade than upgrade their company's stock. Their differential PVA's and PNA's with more analyst coverage are all statistically significant at conventional levels.

We next examine patterns in insider trading activity subsequent to the quarter when consensus recommendation levels and changes are measured. Such a test provides robustness checks on whether the insider trading patterns we just found are affected by the way we measure level and change of recommendations. Because we measure level of recommendation at the end of each quarter and measure the change of recommendation during the quarter. It is possible trading activity occurred before recommendation changes are responsible for the patterns we just documented. Furthermore, the test can provide evidence on whether the insider trading patterns just documented persist beyond the current quarter.

The results are offered in Panels C and D in Table 4 for recommendation levels and changes respectively. The results in the two panels provide corroborating evidence that the trading patterns of insiders continue to persist even in the quarter following the analysts' stock recommendations. The directions of the PVAs and PNAs are the same as those reported in Panels A and B, with some changes in the magnitude of differences between the Favorable and Unfavorable, and between the Upgrade and Downgrade portfolios across the five coverage levels. As compared to those calculated in the current quarter for the level of and change in the consensus analyst recommendation, most of the differences computed in the PVAs and PNAs for the subsequent quarter have reduced slightly. For several cases, particularly for the stocks with more analyst coverage, the differences in PVAs become less significant although all measures based on the number of transactions still remain highly significant. The relatively weaker results, as compared with those from the current quarter (Panels A and B) may indicate that insider trading patterns, while persist, weaken in the long run.

B. Controlling for Book-to-Market and Momentum

Here we consider the possibility that the observed relation between insider trading activities and consensus analyst recommendations perhaps captures the impact of certain stock characteristics on both insider trades and analyst recommendations. Rozeff and Zaman (1998) provide evidence that insiders are more inclined to buy value stocks than growth stocks. They define value stocks as stocks with high cash flow to price ratios or high BM's. Lakonishok and Lee (2001) suggest that insiders are contrarian investors with respect to past stock returns. On the other hand, Jegadeesh et al. (2002) and our Table 2 show that analysts in general prefer growth stocks to value stocks. Jegadeesh et al. (2002) further find that financial analysts in general are momentum chasers in their recommendations. Taken together, the implication is that our results could merely reflect two coincident events that insiders tend to buy more value (loser) stocks and these stocks are typically least favored by analysts. If this is the case, insider trading may not contain much different information relative to analyst recommendations beyond their differing views on book-to-market and momentum.

To ensure that our findings are not driven by stock characteristics such as BM's and Momentum, we reexamine the results in Tables 4 by controlling for the impact of BM ratios and momentum. Within each coverage-quintile, we independently determine three breakpoints for the BM rankings of stocks, as earlier described, and three for the level of (or change in) the consensus analyst recommendation. Stocks are then assigned to each of the cells based on the analyst coverage, BM ranking, and level of (or change in) the consensus analyst recommendation. We then stratify these cells into nine groups of stocks – Low, Medium, and High BM portfolios, and Favorable, Medium, and Unfavorable (or Upgrade, No-Change, and Downgrade) portfolios, such that all nine groups of stocks have almost equal distribution of analyst coverage. We construct momentum portfolios similarly where we measure momentum using stock returns over the past six months.

Similar to the results in Tables 4, we compute time-series average buy ratios, PVA and PNA, for each of the recommendation-level and recommendation-change portfolios. We obtain

the results for both the current and subsequent quarters. Given that the qualitatively similar results from the two quarters, we only report those in the current quarter. Table 5 contains time-series average buy ratios, PVA and PNA, for the three portfolios formed on the level of (Panel A) and change in (Panel B) the consensus analyst recommendation, across all three BM groups. In general, the results show that our earlier findings are not driven by the BM effect. The trading patterns, while much more distinct, are similar to those depicted in Table 4. Consistent with the findings of Rozeff and Zaman (1998), insiders indeed are more active in buying high BM stocks (value stocks) than low BM stocks (growth stocks). Irrespective of the level of or change in the consensus analyst recommendation, both the PVA's and PNA's increase monotonically from low to high BM portfolios.

For any given BM portfolio, the two insider-buy ratios increase with the level of the consensus analyst recommendation. For example, the PVA's (PNA's) for favorably recommended stocks are between 8.3 (19.1) percent in the low BM group and 30.6 (47.8) percent in the high BM group, while their counterpart ratios for unfavorably recommended stocks are between 23.2 (37.2) percent and 42.5 (56.9) percent. For each BM group, both PVA and PNA differentials between the Favorable and Unfavorable portfolios and between the Upgrade and Downgrade portfolios are all statistically significant at the five percent level. Independent of the BM groups, insiders have a tendency to buy substantially more of unfavorably than of favorably recommended stocks, or buy more of those with downgrades than with upgrades.

Results for portfolios after controlling for stock price momentum are reported in Panels C and D. The results show findings in Table 4 are not driven by the momentum effect. Consistent with the evidence in the insider trading literature, insiders are much less active in buying high momentum stocks (stocks that have experienced high returns) than low momentum stocks. Irrespective of the level of or change in the consensus analyst recommendation, both the PVA's and PNA's increase monotonically from low to high Momentum portfolios.

In general, the evidence shows that insiders in aggregate do not agree with the financial analysts' recommendations on their company's stock. Insiders tend to buy more when their stock receives a less favorable consensus recommendation (or a downgrade) from analysts

and buy less when their stock receives a more favorable consensus recommendation (or an upgrade). While the evidence indicates that corporate insiders and financial analysts are producing conflicting information signals, the implications of the results are not obvious. It is plausible that the divergent signals simply reflect the differing opinions of insiders and financial analysts about the investment value of the firm. In the next section we follow insider trading activities after each recommendation change and examine whether insiders and analysts merely disagree or their actions interact.

III. Interactions between Insider Trades and Analyst Recommendations

Thus far, we have established that corporate insiders trade against the level of and the change in the consensus analyst recommendations during the quarter as well as subsequent to the quarter in which the consensus analyst recommendations are determined. In this section, we examine whether insiders take into account the analysts' recommendations when they make investment decisions and whether financial analysts incorporate the information content of insider trades when making their stock recommendations. To this end, we take a closer look at insider trading activity over a shorter event-window in which the announcement of a change in the analyst recommendation occurs and study whether there are any interactions between analyst stock recommendations and insider trading activities.

The current analysis is different from those of the previous section in several respects. One, we presently examine insider transactions at the firm level and study how insiders trade before and after financial analysts issue a change in their recommendation on their firm's stock. At the same time, we also investigate whether analysts revising their recommendations is influenced by how insiders trade. Using the recommendation-announcement dates at the stock level, we are able to investigate the trading behavior of insiders from each firm before and after the announcement date. Two, we separately analyze the buying and selling activities of insiders, thereby allowing us to differentiate the effects of a change in analyst recommendations on insiders' buying and selling decisions. Furthermore, we are able to examine for evidence

of any disparate buying/selling patterns relative to the positive/negative changes in recommendations. Such an approach will therefore help to shed light on the interactions between analysts' recommendations and insiders' trading decisions.

A. Insider Trades Conditioned on Analyst Recommendations

We determine whether insiders incorporate analysts' recommendations in their trading decisions by examining how they trade before and after the analysts issue their change in recommendations for their stock. Specifically, we study the insiders' trading activities over 60- and a 120-day windows. For the 60-day window, we first calculate insiders' buying and selling activities (using both the value and number of transactions) during the 30 days before and 30 days after the announcement of a change in recommendations and then compute the insiders' buy and sell ratios for each stock and for each announcement. The respective buy and sell ratios are defined as ratios of the value (number) of all insider purchases and sales during the 30 days after the recommendation-change announcement to the total value (number) of insider transactions during the 30 days before and 30 days after the announcement of the recommendation change. We calculate the 120-day ratios in the same manner. Notice that we only count a change in each analyst's recommendation once for a stock. Multiple analysts' recommendation changes on the same day are counted as one. For each coverage-quintile, we calculate the average insider-buy and sell ratios of all firms whose stock recommendations have been upgraded (Upgrade) and of those whose stock recommendations have been downgraded (Downgrade), separately. For convenience, we label the two ratios of insider trading activities based on the value and number of transactions VAL and NUM, respectively.

Table 6 reports average insider-buy (Panel A) and insider-sell ratios (Panel B) during the 30-day period following the announcements of a change in analyst recommendations, across firms sorted by analyst coverage and by type of change in the analyst recommendation. Their associated t -statistics are reported in parentheses. Except for those on differential buy or sell ratios between the Upgrade and Downgrade groups, all t -tests are a test of the null that the buy or sell ratio is 0.50, i.e. insider buys (sells) are equally likely to occur before and

after recommendation changes. The table highlights a couple of distinctive differences in the trading patterns of insiders across stocks that have been upgraded by financial analysts versus those that have been downgraded. Since VAL and NUM yield almost identical insider trading patterns, for the purpose of discussion, we focus mainly on the results of the buy/sell ratios calculated using VAL, unless otherwise stated.

The buy ratios show that the post-announcement insider buying activity is affected by the type of recommendation change. Insiders tend to buy substantially more of their firm's stock after than before the stock has been downgraded. The insider-buy ratios reported in Panel A are between 0.60 (Quintile 1) and 0.61 (Quintile 2) for the downgraded stocks and all the values are statistically different from 0.50. Comparatively, for stocks that have been upgraded, the counterpart ratios are between 0.53 and 0.48. The difference in insider-buy ratios between Upgrade and Downgrade reflect how differently insiders trade in the presence of analyst recommendation changes. As seen from Table VI, the differential insider-buy ratios are consistently negative and are especially large in Quintiles 2 to 4. Except for the Least-Coverage quintile, all the differences in buy ratios are all statistically significant at the five percent level. The difference in buy ratios indicates that insiders are more likely to buy their firm's stock following a recommendation downgrade than an recommendation upgrade.

We should point out that the buy ratios for both Upgrade and Downgrade portfolios suggest that insiders on average trade more actively after than before a change in analyst recommendations. Results based on sell ratios in Panel B also exhibit the same pattern. This evidence is somewhat expected. Very often, financial analysts revise their recommendations on a stock in response to some negative or positive news associated with the firm. But corporations generally restrict insider trading, especially, on firm-specific information prior to its release to the public. The observed increased insider trading activity after the change in the analysts' recommendation seems consistent with such restrictions.⁶ Our 120-day event window results support

⁶For general corporate policies restricting trading by insiders, see Bettis, Coles, and Lemmon (2000). A recent study by Roulstone (2003) shows that the percentage of insider trades occurring in the month after an earnings announcement is significantly higher after than before the Insider Trading and Securities Fraud Enforcement Act of 1988.

this conjecture. We obtain qualitatively similar, but stronger, results using the 120-day event window. To conserve space, we did not report these results. But the evidence suggests that using a longer window reduces the impact of insider trading restrictions. For example, the buy ratios after upgrades based on the 120-day event window in general are less than 0.5 across all the five coverage-quintiles.

Consistent with the results based on insider-buy ratios, the sell ratios show that corporate insiders are trading more actively after than before the stocks have been upgraded. As shown in Panel B, the VAL as well as NUM ratios for the Upgrades are mostly statistically different from 0.50, whereas those for the Downgrades are mainly not. On average, insiders sell about 9 percent more of their firm's stock in the month after the stock receives a favorable change in analyst recommendations than the month preceding it. Instead, they sell only about 3 percent for the same period after the firm's stock receives an unfavorable change in analyst recommendations. Except for the Least-Coverage quintile, the differential insider-sell ratios between Upgrade and Downgrade stocks are all significantly different from zero.

It is important to stress that our results are not driven by firm-specific announcements such as earnings announcements. We deleted any clustering of upgrades or downgrades in the three days surrounding the recommendation-announcement date, because such clustering might be driven by some confounding events. The results were materially the same as those reported here. In another robustness test, we examine whether the differential insider trading activities are triggered by the market reactions to analyst recommendation changes. For example, Womack (1996) reports that average return in the three-day period surrounding changes to "buy" recommendation is 3%, and average return is -4% for new "sell" recommendations. We find, but do not tabulate similar results on market reaction to analyst changes. While it is unlikely that insiders plan or time their transactions in advance of analyst recommendation changes, it is possible that insiders could take advantage of market reactions to analyst recommendations in their transactions. To investigate whether this "opportunistic behavior" has material impact on the results, we examine differences in insider transactions across portfolios based on the magnitude of market reactions. We only find very weak results for the single analyst coverage

case. Thus, we do not find strong evidence for this “opportunistic behavior” behavior.

The findings of Table 6 provide more compelling evidence that corporate insiders do not agree with financial analysts on the investment prospects of their firm’s stock; insiders trade in the opposite direction to the change in the analyst recommendation. Interestingly, the results show that insiders do incorporate the analysts’ recommendations in their investment decisions. Insiders are more likely to buy their firm’s stock after the stock has been downgraded and also are more likely to sell after their stock has been upgraded.

B. Analyst Recommendations Conditional on Insider Trades

We evaluate whether insiders’ trading activities have any impact on the financial analysts’ decision to revise their recommendation of the stock. Here we look at the market value of insider buys relative to the total market value of insider transactions as well as the number of insider buys relative to the total number of insider transactions. We compute buy ratios for the 30 and 60 days preceding (PRE) and following the change in the analyst recommendation (POST). Here we measure the PRE insider trading activity based on the file date with respect to analyst recommendation changes. Because only after insiders file their transactions with SEC, such information became available. During most of our sample period, there is considerable lag in the actual transaction date and the file date.⁷ If financial analysts incorporate insider trading information, we should observe significant PRE insider trading activity between analyst downgrade and upgrade.

The evidence is contained in Table VII. Given that the two different event windows yield qualitatively the same results, we report only those based on the 30-day ratios. Panel A of the table shows the PRE 30-day ratios and Panel B shows the POST ratios. The results from Panels A provide no evidence that financial analysts utilize the information from insider trades when revising their recommendations. Whether the financial analysts are making a favorable or an unfavorable change in their recommendations, the difference in the PRE ratios of insider

⁷For most of our sample period, insiders must file within ten days following the end of the month in which the transaction occurs.

buys to the total value of insider transactions associated with the upgrade and downgrade recommendations is small and statistically insignificant. In contrast, their POST counterpart ratios are larger in absolute terms and all yield statistically significant POST differential ratios at the five percent level. The POST differential ratios results further confirm our earlier finding that insiders do not agree with financial analyst recommendations.

In summary, this section provides evidence that the change in the analysts' recommendations does exert some influence on insiders' trading activities, but the information contained implicitly in the insider trading activities has virtually no impact on the analysts' revision of their recommendation on a stock.

IV. Investment Value of Analyst Recommendations and Insider Trades

The preceding sections shows that insiders speak with actions that are in disagreement with the recommendations issued by financial analysts. It should not be controversial to assert that insiders know more about their firm than financial analysts. Yet this does not necessarily imply that their trades are always informative, nor does it necessarily imply that analyst stock recommendations hold no investment value. While insider buying activity should primarily be motivated by their optimistic perception of the company's performance, their selling activity may reflect many possible reasons other than information. Furthermore, financial analysts in general have better access or pay more attention to macro-economic and industry wide information. As a result, analyst stock recommendations could offer different or incremental investment value to investors, when insider trades especially insider sales are less informative and more noisy, or when there is no insider trading. This section therefore tests these hypotheses by evaluating the joint predictive ability of analyst recommendations and insider trades for future stock returns. In particular, we examine whether the two information signals have investment value and the circumstances under which each type of activity has the ability to predict future returns.

A. Portfolio Analysis

We examine the return performance of three recommendation-change portfolios and also their performance in combination with insider activity. To do so, at the end of each quarter, we sort the stocks within each recommendation-change portfolio into three portfolios based on the value of insider transactions: stocks where insiders are net buyers ('Net Insider Buys'), stocks where insiders are net sellers ('Net Insider Sells'), and stocks with no insider-trading activity ('No Insider Trade').⁸ We then calculate monthly market-adjusted returns on each stock for various holding periods prior to and after the quarter of the change in the consensus recommendation. The market-adjusted stock return is defined as the return on a stock in excess of the equal-weighted return on a market portfolio consisting of all analyst-coverage stocks. Finally, we take an average of the market-adjusted returns of all stocks within each portfolio over one ($-1Q$), two ($-2Q$), and four ($-4Q$) quarters prior to and one ($+1Q$), two ($+2Q$), and four ($+4Q$) quarters following the quarter in which a change in analyst consensus recommendations occurs. The results are presented in Table 8, with corresponding t -statistics (in parentheses) calculated based on standard errors adjusted for heteroskedasticity and autocorrelation.

Table 8 reveals several interesting patterns. It is apparent from the full-sample results that revisions of analyst recommendations contain investment value, particularly for downgrade. While the information signal of a change in the analyst recommendation is consistent with the future stock return performance, upgrade does not seem to add much value. The one to two quarter excess returns are positive, but not significantly different from zero. This can be better illustrated by comparing with the portfolios in which stocks did not experience any recommendation changes. The average monthly returns for this portfolio for the one quarter to one year horizon are positive and are significant for the half year and one year horizons. Returns on the Downgrade portfolio, on the other hand, are all significantly negative, suggesting clear investment value. The results are consistent with earlier findings such as Womack (1996), Barber et al. (2001) and Jegadeesh et al. (2004).

⁸Results based on number of insider transactions are qualitatively similar.

After controlling for the type of insider trading activity, however, the analysts' recommendations seem to hold value only for Upgrade stocks with Net Insider Buys and for Downgrade stocks with No Insider Trade. The future return performance of the two groups of stocks are in line with the directions predicted by the analysts' change in their recommendations. The Downgrade stocks with No Insider trade significantly underperform the market, with monthly excess returns ranging from -0.27 (+4Q) to -0.47 (+1Q). Conversely, the Upgrade stocks with Net Insider Buys outperform the market by 0.45 (+4Q) to 0.75 (+1Q) percent per month and the monthly excess returns are all statistically significant at the 5% level. But it appears that upgrades of stocks recommended by financial analysts predict the right direction, because insiders are actively buying the stocks as well. As we will discuss below, irrespective of the type of analyst recommendation-change, when insiders are actively buying, the future return performance of stocks is consistent with the buy signal. This evidence therefore suggests that the value of analysts' upgrades is largely attributable to insider buying activity.

Furthermore, the return performance of the remaining groups of Upgrade and Downgrade stocks seems to suggest that financial analysts' recommendations are not always informative. For instance, Upgrade stocks with No Insider Trade or with Net Insider Sells produce small, statistically insignificant excess returns subsequent to the change in recommendations, as compared to their corresponding past excess returns. Conversely, excess returns on Downgrade stocks with Net Insider Buys and Sells are either positive and insignificant or negative and insignificant.

As compared to analyst recommendations, insider buys produce valuable information signals while insider sells do not provide much information. The return performance of Net Insider Buys suggests that corporate insiders may have timed their entrance points perfectly. Stocks with Net Insider Buys have underperformed the market significantly before but not after insider transactions, and the pattern has little bearing on the financial analysts' recommendation. The strong insider buy's information signal is especially evident in stocks with Upgrade and No-Change recommendations; they outperform the market by 0.45 to 0.75 percent per month and by 0.74 to 1.06 percent per month, respectively. The excess returns on Downgrade stocks

with Net Insider Buys, while insignificantly different from zero, do improve after the change in analyst recommendations. For Net Insider Sells, while it does not provide much investment value, it does indicate insiders timed their transaction perfectly. Stocks with Net Insider Sells performed much better the market before insider sell transactions, but excess returns become predominantly statistically insignificant from zero thereafter.

One other notable observation in Table 8 is also worth mentioning. Consistent with those documented in previous studies, the past-returns patterns suggest that insiders are contrarian investors with respect to past stock returns, while financial analysts are momentum chasers, in general. Based on the results of Net Insider Buys and Net Insider Sells, insiders tend to buy their own stock when it has performed poorly relative to the market and sell when it has performed well. Net Insider Buys have mainly underperformed, while their counterpart Net Insider Sells have generally outperformed the market substantially over the past one to four quarters. For instance, the past one to four quarters' market-adjusted returns on Net Insider Buys vary from -2.48 to -0.22 percent, compared to 1.23 to 2.55 percent on Net Insider-Sells. The contrarian strategies, while interesting, are unlikely to be the driving factor for the future return performance of insider transactions. Piotroski and Roulstone (2003) show that insider trades are positively associated with the firm's future earnings performance, and this relation is incremental to the book-to-market and to past return relations documented in Rozeff and Zaman (1998). Thus, insiders' superior knowledge of future firm performance also affects their trading decisions and, in turn, contributes to their overall performance.

Unlike corporate insiders, financial analysts tend to closely follow stock return momentum on their buy and sell recommendations. The Upgrade portfolios, except for that associated with Net Insider Buys, perform better than the market before recommendation changes. Similarly, Downgrade portfolios perform worse than the market except for the portfolio with net insider sells. The momentum-chasing behavior by financial analysts does not directly drive the performance of stock recommendations. For example, the returns of the Downgrade portfolio where insiders are much lower than the Downgrade portfolio where there is no insider transactions for all three horizons before downgrades, but the subsequent returns are all higher. In

the following, we conduct tests based on stock characteristics adjusted returns to control for factors such as momentum.

Table 9 presents average characteristic-adjusted monthly returns of all stocks within each recommendation-change portfolio over one (+1 Q), two (+2 Q), and four (+4 Q) quarters following the quarter in which a change in analyst consensus recommendations occurs. We use the methodology of Daniel and Titman (1997) to calculate the characteristic-adjusted monthly returns of all stocks with analyst coverage. Hence we form 27 characteristic-benchmark portfolios that capture three stock characteristics namely book-to-market equity, size, and momentum. These benchmark portfolios are formed as follows. At the beginning of each quarter, we employ the breakpoints of NYSE firms to sort all analyst-covered firms into three portfolios based on each firm's market capitalization. Firms in each size-portfolio are further sorted into three portfolios based on their book-to-market equity ratio. Finally, the firms in each of the nine size/book-to-market portfolios are sorted into three portfolios based on their prior-year return. The equal-weighted monthly returns on the 27 characteristic-benchmark portfolios are calculated. For a given quarter, a stock is assigned to a characteristic-benchmark portfolio according to its rank based on size, book-to-market, and past-year return performance. The characteristic-adjusted monthly returns of each stock are then computed by subtracting the stock's corresponding characteristic-benchmark portfolio's returns from the stock's returns.

The results based on characteristic-adjusted monthly returns are substantially similar to those of Table 8. For the full sample results, average characteristic-adjusted monthly return of the Upgrade portfolio indicates analyst upgrades predict significantly positive excess returns. In the case of market-adjusted returns, the predictive power of Upgrades are much weaker. The results in combination with insider trading show however that the significantly positive characteristic-adjusted return is largely driven by the portfolio of stocks in which insiders are net buyers. Similarly, the predictive power of analysts downgrades is driven by the portfolio where there is no insider trading.

Overall, the evidence based on both market-adjusted and characteristic-adjusted returns provides a picture that is much more complicated than the trading actions documented in the

previous sections. Consistent with studies in the insider trading literature, we find evidence that insider buys are informative. Furthermore, the buy signals have predictive power over and above the change of analyst recommendations for the stocks' future returns. In the case of no recommendation-change, the monthly market- and characteristic-adjusted returns of the insider net buy portfolios are both significantly positive. When insiders and financial analysts do not agree, the returns do not differ significantly from their respective benchmarks. For the case of insider sells, insider trading does not provide useful investment signal, regardless whether they agree or disagree with financial analysts. The evidence on insider trading, specifically in combination with analyst recommendation indicates that insider transactions are particularly useful in conveying positive information to the market place. Insider sells, on the other hand, could reflect various motivations other than insiders expectations of stock future performance. As a result, insider sells are not informative. However, returns of stock portfolios where there is no insider transaction taking place during a quarter indicate insider sells may not convey negative information at all. The portfolios with no insider transactions produce the lowest returns among the three insider trading portfolios. Insiders may refrain from selling their shares before negative news for fear of litigation risk, thus withholding negative information. This is particularly evident in the case where financial analysts downgrade the stocks.

We find evidence consistent with previous studies that on average analyst stock recommendations have value. However, analyst recommendations do not have incremental value when insider trading is active. The only time analysts provide useful buy signal is the time when insiders are also active buyers. Otherwise, recommendation upgrades are not informative. The most significant result on the investment value of analysts recommendations comes from analyst downgrades when there is a lack of insider trading activity. This could reflect the following two reasons: one, as discussed previously, when insiders are not trading, they could withhold negative information and analysts recommendation changes help convey negative information to the market. Two, as compared with recommendation upgrade, when analysts issue sell recommendations, there is more reason to expect such recommendations to truthfully reflect the analysts' assessment of the firm's equity value. As their compensation contracts typically link

their pay to winning investment-banking business for their firms, it is likely to be more costly for financial analysts to issue sell recommendations for fear of jeopardizing investment-banking ties with clients.⁹

Finally, it is important to emphasize that our findings are not driven by a specific time period that we have included in our sample. We check the robustness of our results by performing the same analysis on two equal subperiods: 1994-1999 and 2000-2003. The results, not reported, yield the same return patterns as those in Table 8.¹⁰ We should point out that while the patterns are consistent across the two subperiods, they are evidently more pronounced in the second subperiod.

B. Cross-Sectional Analysis

Here we employ an alternative approach, the cross-sectional regression analysis, to evaluate jointly the informativeness of insider trades and consensus analyst recommendations. This methodology allows us to carry out our tests, while controlling for several stock characteristics that previous studies have documented to be significant return predictors and provide robustness checks on the results based on stock portfolios.

We estimate 40 separate quarterly cross-sectional regressions of the six-month stock return against various combinations of financial analyst recommendations, insider trading activity, and three stock characteristics. The six-month returns are measured subsequent to the quarter of the consensus analyst recommendation. In our cross-sectional analysis, we assign a categorical value to the change in consensus analyst recommendations for a stock. We assign a value of '1' to a stock if the stock is in the Upgrade portfolio, '0' if it is in the No-Change portfolio, and '-1' if it is in the Downgrade portfolio. To separate the investment value from recommendation upgrades and downgrades, we further construct two dummy variables. Upgrade takes value of '1' if a stock is in the Upgrade portfolio, '0' otherwise. Downgrade takes value of '1' if a stock is in the Downgrade portfolio, '0' otherwise.

⁹See, for example, Der Hovanesian (2001) and Michaely and Womack (1999).

¹⁰These subperiod results are reported in an earlier draft of the paper and can be available from the authors upon request.

We measure insider trading activities using both the value of insider transactions and the number of transactions during a quarter. We also assign a categorical value to insider trading activity. We assign a value of ‘1’ if a stock experiences net insider buying as measured in transaction value (number), ‘0’ if there is no insider transaction and ‘−1’ if a stock experiences net insider selling. Similarly, to capture the different information from insider buying and selling activities, we create dummy variables for insider net buy and net sell. Net Buy takes a value of ‘1’ if a stock experiences net insider buying as measured in transaction value (number), ‘0’ otherwise. NetSell takes a value of ‘1’ if a stock experiences net insider selling as measured in transaction value (number), ‘0’ otherwise.

We use three firm characteristic variables in the regressions. Size is the market capitalization of the stock and is expressed in natural logarithm, and book-to-market is the book-to-market equity ratio. Momentum is measured using the firm’s past six-month return.¹¹ These variables have been widely documented to have predictive power for stock price movements. Fama and French (1992) show that size and book-to-market have the ability to explain the cross-sectional variation in stock returns. Jegadeesh and Titman (1993) document the profitability of momentum strategies. In addition, Jegadeesh et al. (2002) find that the marginal predictive power of the level of the consensus analyst recommendation largely stems from analysts’ preference for high momentum stocks.

Table 10 presents time-series average regression coefficients for seven different specification models, with t -statistics of the coefficients in parentheses calculated using heteroskedastic- and autocorrelation-consistent standard errors. We study, in the presence of the three firm-specific variables, the incremental predictive power of the change in the consensus analyst recommendations and measures of insider trading activity, both separately and together. In general, the results from the regression analysis are consistent with the results from the portfolio analysis.

As Models 1 to 3 indicate, both analyst recommendation changes and insider trading ac-

¹¹We also specify the three firm characteristic variables using category values, to be consistent with the specifications of the recommendation and insider trading variables. The results are similar to the results reported here.

tivity provide investment value when used separably. Models 4 and 5 further confirm that the two information signals have investment value even employed together in the regression, suggesting that the two signals provide incremental value relative to each other. Judging from the coefficient estimates and the T-statistics, the two variables do not affect their respective predictive power significantly. In the last two models, we use the dummy variables that separate the differential information contained in recommendation upgrade vs. downgrade, and the information contained in insider buying vs. insider selling. The results confirm our findings in the portfolio analysis. The predictive power of analyst upgrade is virtually zero while that of downgrade is highly significant. For insider trading activity, insider buying is highly significant and insider selling, while producing a wrong sign, is not significant. It is useful to point out in this regression analysis that the predictive powers from insider trading, measured by either value or number of transactions, are virtually the same. This is consistent with our unreported portfolio analysis based on number of transactions.

V. Summary

Using data on insider trading and analyst recommendations, we jointly examine the information contained in their activities. We find that insiders' trading activities and analysts' recommendations produce contradictory information signals: insiders trade against the recommendations from financial analysts. Insiders in aggregate tend to buy more when their firm's stock is unfavorably recommended or is being downgraded by analysts than when it is favorably recommended or is being upgraded. The overall results are robust to stocks with varying sizes, degrees of analyst coverage, and stock characteristics such as book-to-market equity ratios and stock price momentum. We further find that insiders are more likely to buy more of their own firm's stock after than before the announcement of an analyst's downgrade-recommendation and also are more likely to sell their firm's stock after than before the announcement of an analyst's upgrade-recommendation. In contrast, however, insider trades exhibit no significant influence on the revision of analysts' stock recommendations.

The evidence on the investment value of the information signals provides a picture that is much more complicated than the documented trading actions. Consistent with studies in the insider trading literature, we find evidence that insider buys are informative. However, only the buy signals have predictive power over and above the change of analyst recommendations for the stocks' future returns. We find evidence consistent with previous studies that on average analyst stock recommendations have value. However, analyst recommendations do not have incremental value when insider trading is active. The only time analysts provide useful buy signal is the time when insiders are also active buyers. Otherwise, recommendation upgrades are not informative. The most significant result on the investment value of analysts recommendations comes from analyst downgrades when there is a lack of insider trading activity.

The evidence on insider trading, specifically in combination with analyst recommendation indicates that insider transactions are particularly useful in conveying positive information to the market place. On the other hand, analyst downgrades, in which analyst are more likely to truthfully reveal their assessment of a firm's investment value, and when insiders are less likely to act on their private information, represent the investment value of overall analyst recommendations. Combining the two information signals adds value to investment decisions.

Our finding has important implications in understanding not only the information contained in the two market activities but also the causes of differences in the information contents. The different channels through which corporate insiders and financial analysts obtain information and the scope of their respective information do not seem to explain the observed differences. Conflicts of interest in financial analyst activities, along with restrictions in insider trading activity may contribute to the significant differences in their respective information signals.

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Table 1**Descriptive Statistics on Firms with Analyst Following, 1994-2003**

The table presents, for each year, the number of firms with analyst coverage, the mean consensus rating (the average of all outstanding recommendations for the firm), and the percentage of firms with strong buy and buy recommendations. It also reports the distribution of the number of analysts following a firm and the percentage of analysts issuing buy recommendations. A rating of '1' reflects a strong buy recommendation, '2' a buy, '3' a hold, '4' a sell, and '5' a strong sell.

Year	Firms with Analyst Coverage			Analyst Coverage				
	Number of Firms	Mean Rating	% of Buys	Mean	Median	Min.	Max	% of Buys
1994	3863	2.06	55.86	5.59	3	1	37	61.97
1995	4120	2.08	53.57	5.70	3	1	38	61.02
1996	4659	1.98	60.06	5.29	3	1	37	65.31
1997	4759	1.98	61.29	5.23	3	1	41	67.37
1998	4759	2.03	57.70	5.72	4	1	41	66.07
1999	4584	2.02	61.50	6.48	4	1	45	69.05
2000	4336	2.02	61.16	6.34	4	1	41	68.86
2001	3702	2.08	54.89	5.98	4	1	35	65.11
2002	3497	2.42	34.00	6.48	4	1	41	48.14
2003	3624	2.46	30.74	6.54	4	1	48	43.72

Table 2

**Consensus Analyst Recommendations and Stock Characteristics of Firms,
1994-2003**

This table reports consensus analyst recommendations, size rankings, and book-to-market rankings of two-way sorted firms, by coverage and consensus analyst recommendation. At the end of each quarter, we sort stocks into quintiles based on the number of analysts covering the stocks. The Least-Coverage quintile contains stocks with only one analyst following, quintile 2 stocks with two analysts following, quintile 3 stocks with at least three but fewer than six analysts following, quintile 4 stocks with six to 10 analysts following, and finally, the Most-Coverage quintile stocks with more than 10 analysts following. Within each quintile of stocks, we re-group them into three portfolios based on the consensus analyst recommendation ratings, with the 'Favorable' portfolio consisting of firms with the lowest consensus ratings and the 'Unfavorable' portfolio with the highest consensus ratings. A rating of '1' reflects a strong buy recommendation, '2' a buy, '3' a hold, '4' a sell, and '5' a strong sell. For each coverage/consensus-recommendation portfolio, we report the number of annual observations, mean consensus recommendation rating, mean size ranking, and mean book-to-market equity ranking. A size ranking is assigned to a firm as follows. At the end of each year, we sort NYSE, AMEX, and NASDAQ stocks into ten size-formed deciles according to the breakpoints of the market capitalization of NYSE stocks. We then assign a ranking of '1' to stocks in the smallest size decile and '10' to stocks in the largest size decile. We employ the same procedure to assign the ranking of the book-to-market equity ratio (BM) to firms, but the breakpoints are based on the BM of all NYSE, AMEX, and NASDAQ stocks. A ranking of '1' is assigned to stocks in the lowest book-to-market decile and '10' to stocks in the highest book-to-market decile.

Coverage/Consensus Recommendation	Number of Observations	Mean Consensus Recommendation	Mean Size Ranking	Mean BM ranking
Least Coverage	8713	2.13	1.61	5.99
Favorable	2649	1.00	1.64	5.45
Medium	2671	2.00	1.56	5.87
Unfavorable	3393	3.11	1.63	6.49
Quintile 2	6368	2.06	2.06	5.67
Favorable	2181	1.26	2.12	4.78
Medium	1861	1.99	2.11	5.52
Unfavorable	2326	2.85	1.97	6.62
Quintile 3	11940	2.04	3.12	5.15
Favorable	4122	1.41	3.17	4.22
Medium	3798	2.00	3.32	5.02
Unfavorable	4020	2.72	2.87	6.23
Quintile 4	8046	2.11	5.08	4.80
Favorable	2701	1.57	5.13	3.90
Medium	2646	2.09	5.30	4.65
Unfavorable	2699	2.68	4.83	5.87
Most Coverage	7275	2.19	7.91	4.48
Favorable	2430	1.75	8.05	3.74
Medium	2423	2.17	8.13	4.24
Unfavorable	2422	2.65	7.56	5.48

Table 3**Insider Transactions by Year, 1994-2003**

The table shows the total values of insider buys and sells in billions of U.S. dollars, the numbers of insider buy and sell transactions, the ratio of the value of insider purchase transactions to the total value of insider transactions (PVA), and the ratio of the number of insider purchase transactions to the number of all insider transactions (PNA). Both PVA and PNA are expressed in percent.

Year (1)	Value of Transactions (\$b)		Number of Transactions		% of Buys	
	Buys (2)	Sells (3)	Buys (4)	Sells (5)	PVA= (2)/[(2)+(3)]	PNA= (4)/[(4)+(5)]
1994	1.97	12.98	10323	18669	13.19	35.61
1995	3.59	21.43	10144	29244	14.35	25.75
1996	4.10	22.25	11881	27991	15.56	29.80
1997	3.48	22.15	11394	23352	13.58	32.79
1998	4.56	28.48	18527	21664	13.80	46.10
1999	6.48	29.57	19252	22574	17.97	46.03
2000	4.42	45.97	17611	33114	8.77	34.72
2001	2.81	26.49	13366	38437	9.59	25.80
2002	1.52	16.31	25008	41911	8.54	37.37
2003	2.16	24.23	14589	63040	8.19	18.79

Table 4

Consensus Analyst Recommendations and Insider Trading Activity in the Current and Subsequent Quarters, 1994-2003

The table presents ratios of insider buy transactions in the current (subsequent) quarter across two-way sorted firms, by analyst coverage and consensus analyst recommendation (the level of consensus analyst recommendation in Panel A (Panel C), and the change in consensus analyst recommendations in Panel B (Panel D)). PVA is the ratio of the value of insider purchases to the total value of insider transactions, and PNA is the ratio of the number of insider purchases to the number of all insider transactions. The construction of the two sets of portfolios is as follows. At the end of each quarter, we sort stocks into quintiles based on the number of analysts covering the stocks. The Least-Coverage quintile contains stocks with only one analyst following, quintile 2 stocks with two analysts following, quintile 3 stocks with at least three but fewer than six analysts following, quintile 4 stocks with six to 10 analysts following, and finally, the Most-Coverage quintile stocks with more than 10 analysts following. For Panels A and C, within each coverage-quintile, we re-group stocks into three portfolios based on the consensus analyst recommendation rating, with the ‘Favorable’ portfolio consisting of firms with the lowest ratings and the ‘Unfavorable’ portfolio with the highest ratings. For Panels B and D, within each coverage-quintile, we re-group stocks into three portfolios based on the change in consensus analyst recommendations, with the ‘Upgrade’ (‘Downgrade’) portfolio consists of stocks that have been upgraded (downgraded) from the previous to the current quarter. Finally, the ‘No-Change’ portfolio consists of stocks whose consensus recommendation remains unchanged. The table also reports the difference in buy ratios between the top and bottom portfolios with t -statistics reported in parentheses.

	Least Coverage		Quintile 2		Quintile 3		Quintile 4		Most Coverage	
	PVA	PNA	PVA	PNA	PVA	PNA	PVA	PNA	PVA	PNA
Panel A: Current Quarter’s Ratios by Recommendation Level										
Favorable (F)	0.257	0.444	0.152	0.344	0.105	0.235	0.078	0.163	0.072	0.159
Medium	0.314	0.537	0.283	0.423	0.157	0.306	0.160	0.256	0.103	0.184
Unfavorable (U)	0.365	0.558	0.418	0.524	0.346	0.473	0.325	0.475	0.167	0.306
(U–F)	0.108	0.115	0.265	0.180	0.240	0.238	0.247	0.312	0.096	0.147
	(2.80)	(5.59)	(6.64)	(11.7)	(7.86)	(11.4)	(6.63)	(13.0)	(3.14)	(7.05)
Panel B: Current Quarter’s Ratios by Recommendation Change										
Upgrade (Up)	0.294	0.455	0.218	0.370	0.143	0.278	0.113	0.229	0.077	0.177
No Change	0.304	0.527	0.240	0.438	0.161	0.334	0.137	0.291	0.089	0.196
Downgrade (Dn)	0.343	0.503	0.269	0.439	0.215	0.359	0.170	0.322	0.121	0.249
(Dn–Up)	0.049	0.049	0.051	0.069	0.072	0.081	0.056	0.093	0.044	0.071
	(1.12)	(1.64)	(2.09)	(2.74)	(2.18)	(5.41)	(2.07)	(3.70)	(2.18)	(2.98)

Table 4 - Continued

Consensus Analyst Recommendations and Insider Trading Activity in the
Current and Subsequent Quarters, 1994-2003

	Least Coverage		Quintile 2		Quintile 3		Quintile 4		Most Coverage	
	PVA	PNA	PVA	PNA	PVA	PNA	PVA	PNA	PVA	PNA
Panel C: Subsequent Quarter's Ratios by Recommendation Level										
Favorable (F)	0.215	0.451	0.148	0.344	0.103	0.243	0.097	0.192	0.098	0.185
Medium	0.356	0.522	0.275	0.410	0.148	0.287	0.127	0.280	0.088	0.186
Unfavorable (U)	0.363	0.546	0.329	0.513	0.301	0.456	0.288	0.438	0.138	0.280
(U-F)	0.148 (3.93)	0.094 (4.52)	0.181 (5.77)	0.169 (8.62)	0.198 (6.56)	0.213 (10.8)	0.192 (4.80)	0.246 (10.5)	0.040 (1.24)	0.094 (6.40)
Panel D: Subsequent Quarter's Ratios by Recommendation Change										
Upgrade (Up)	0.250	0.449	0.226	0.374	0.145	0.275	0.148	0.248	0.091	0.201
No Change	0.338	0.523	0.210	0.432	0.140	0.325	0.124	0.297	0.071	0.191
Downgrade (Dn)	0.347	0.535	0.304	0.449	0.204	0.361	0.166	0.335	0.128	0.255
(Dn-Up)	0.097 (2.35)	0.086 (2.63)	0.078 (2.42)	0.075 (3.33)	0.059 (2.46)	0.086 (5.56)	0.018 (0.57)	0.087 (3.02)	0.037 (1.91)	0.055 (2.36)

Table 5

Consensus Analyst Recommendations and Insider Trading Activity in the Current Quarter, Controlling for the Book-Market and Momentum Effects, 1994-2003

Panels A and B of the table present ratios of insider buy transactions in the current quarter across two-way independently sorted firms, by book-market equity ratio (BM) and the level of consensus analyst recommendation or the change in consensus recommendations, with each portfolio having an equal distribution of analyst coverage. Panels C and D contain the same, but controlling for momentum effects. PVA is the ratio of the value of insider purchase transactions to the total value of insider transactions, and PNA is the ratio of the number of insider purchase transactions to the number of all insider transactions. The construction of the portfolios is as follows. Within each coverage-quintile, we independently determine three breakpoints for the BM ranking of stocks and three breakpoints for the level of (change in) the consensus analyst recommendation. The BM ranking of stocks is obtained by sorting NYSE, AMEX, and NASDAQ stocks at the end of each year into ten BM-formed deciles according to the breakpoints of the BM of NYSE stocks. We then assign a ranking of '1' to stocks in the lowest BM decile and '10' to stocks in the highest BM decile. The first BM breakpoint consists of BM rankings of '1', '2' and '3', the next of BM rankings of '4' to '7', and the third of BM rankings of '8', '9' and '10'. Stocks are then assigned to each of the 30 cells based on the analyst coverage, BM ranking, and level of (change in) the consensus analyst recommendation. We then stratify these cells into nine groups of stocks – Low, Medium, and High BM portfolios, and Favorable, Medium, and Unfavorable (or Upgrade, No-Change, and Downgrade) portfolios, such that all nine groups of stocks have almost equal distribution of analyst coverage. The same procedure is employed for momentum-sorted portfolios. The table also reports the difference in buy ratios between the top and bottom portfolios with t -statistics reported in parentheses.

	Low BM		Medium BM		High BM	
	PVA	PNA	PVA	PNA	PVA	PNA
Panel A: BM and Recommendation Level						
Favorable (F)	0.083	0.191	0.193	0.327	0.306	0.478
Medium	0.147	0.248	0.211	0.372	0.401	0.525
Unfavorable (U)	0.232	0.372	0.352	0.471	0.425	0.569
(U–F)	0.149	0.180	0.159	0.144	0.122	0.094
	(8.34)	(12.7)	(7.98)	(11.9)	(4.54)	(5.20)
Panel B: BM and Recommendation Change						
Upgrade (Up)	0.097	0.205	0.214	0.353	0.335	0.489
No Change	0.125	0.257	0.222	0.381	0.398	0.551
Downgrade (Dn)	0.166	0.271	0.261	0.435	0.379	0.551
(Dn–Up)	0.068	0.065	0.048	0.083	0.043	0.059
	(4.45)	(5.07)	(2.55)	(7.06)	(2.49)	(3.51)

Table 5 - Continued

Consensus Analyst Recommendations and Insider Trading Activity in the Current Quarter, Controlling for the Book-Market and Momentum Effects, 1994-2003

	Low Momentum		Medium Momentum		High Momentum	
	PVA	PNA	PVA	PNA	PVA	PNA
Panel C: Momentum and Recommendation Level						
Favorable (F)	0.252	0.358	0.168	0.303	0.111	0.221
Medium	0.304	0.437	0.232	0.371	0.169	0.261
Unfavorable (U)	0.409	0.543	0.311	0.468	0.241	0.365
(U-F)	0.157	0.186	0.143	0.165	0.130	0.144
	(6.50)	(12.1)	(7.49)	(12.6)	(7.41)	(11.6)
Panel D: Momentum and Recommendation Change						
Upgrade (Up)	0.260	0.411	0.220	0.354	0.137	0.230
No Change	0.327	0.465	0.222	0.384	0.147	0.270
Downgrade (Dn)	0.350	0.479	0.256	0.402	0.167	0.294
(Dn-Up)	0.087	0.064	0.034	0.046	0.029	0.062
	(3.71)	(3.52)	(1.67)	(3.11)	(1.69)	(4.88)

Table 6

Event-Time Analysis of Insider Trading Activities Conditioned on the Change in Analyst Recommendations, 1994-2003

The table reports average ratios for insiders' value and number of buy/sell transactions (VAL and NUM, respectively) during the period surrounding a change in analyst recommendation announcements of their firm's stock, across firms sorted by analyst coverage and the change in the analyst recommendation. For each firm, VAL (NUM) is defined as the ratio of the value (number) of all insider purchases or sales in the 30 days immediately after the change in recommendations to the sum of the total value (number) of all insider purchases or sales for the 30 days prior and subsequent to the recommendation announcement. Within each quintile, we take the average of the ratios for all firms that have experienced an upgrade (Upgrade) in analyst recommendations, and separately for those that have experienced a downgrade (Downgrade). The construction of the five quintiles is as follows. At the end of each quarter, we sort stocks into quintiles based on the number of analysts covering the stocks. The Least-Coverage quintile contains stocks with only one analyst following, quintile 2 stocks with two analysts following, quintile 3 stocks with at least three but fewer than six analysts following, quintile 4 stocks with six to 10 analysts following, and finally, the Most-Coverage quintile stocks with more than 10 analysts following. Panels A and B present the average insider-buy and sell ratios, respectively, for the 30 days subsequent to the change in recommendation announcements and also report the difference in the ratios between Upgrade and Downgrade portfolios of firms. All t -statistics are reported in parentheses. Except for those on the differential ratios, all t -tests are a test of the null that the buy or sell ratio is 0.5.

	Least Coverage		Quintile 2		Quintile 3		Quintile 4		Most Coverage	
	VAL	NUM	VAL	NUM	VAL	NUM	VAL	NUM	VAL	NUM
Panel A: Insider-Buy Ratios										
Upgrade (Up)	0.534 (1.22)	0.531 (1.13)	0.475 (-1.13)	0.479 (-0.97)	0.546 (3.85)	0.546 (3.96)	0.526 (2.55)	0.527 (2.74)	0.546 (6.41)	0.547 (6.70)
Downgrade (Dn)	0.596 (4.20)	0.596 (4.28)	0.611 (5.99)	0.612 (6.15)	0.612 (11.9)	0.609 (11.7)	0.613 (13.9)	0.615 (14.5)	0.591 (14.5)	0.593 (14.9)
(Dn-Up)	0.06 (1.73)	0.07 (1.86)	0.14 (4.68)	0.13 (4.66)	0.07 (4.35)	0.06 (4.21)	0.09 (6.65)	0.09 (6.92)	0.05 (4.78)	0.05 (4.88)
Panel B: Insider-Sell Ratios										
Upgrade (Up)	0.584 (3.10)	0.590 (3.40)	0.587 (4.40)	0.586 (4.39)	0.601 (10.8)	0.604 (11.3)	0.605 (14.2)	0.605 (14.5)	0.590 (18.3)	0.590 (18.7)
Downgrade (Dn)	0.566 (2.69)	0.568 (2.83)	0.524 (1.33)	0.525 (1.44)	0.503 (0.38)	0.506 (0.66)	0.533 (4.72)	0.535 (5.04)	0.537 (7.78)	0.537 (8.01)
(Dn-Up)	-0.02 (-0.50)	-0.02 (-0.61)	-0.06 (-2.37)	-0.06 (-2.29)	-0.10 (-7.66)	-0.10 (-7.77)	-0.07 (-7.08)	-0.07 (-7.03)	-0.05 (-7.71)	-0.05 (-7.85)

Table 7

Insider Buy Activity Around A Change in Analyst Recommendations, 1994-2003

The table reports average ratios for insiders' buy value to the total insider trading value and the number of buy transactions to the total number of insider transactions (BVA and BNO, respectively) during the period surrounding a change in analyst recommendation announcements of their firm's stock, across firms sorted by analyst coverage and the change in the analyst recommendation. For each firm, we compute the ratio of the value of all insider purchases to the total value of all insider purchases and sales (BVA) occurring during the 30 days prior to and 30 days after the change in recommendations. Within each quintile, we take the average of the ratios for all firms that have experienced an upgrade (Upgrade) in analyst recommendations, and separately for those that have experienced a downgrade (Downgrade). The construction of the five quintiles is as follows. At the end of each quarter, we sort stocks into quintiles based on the number of analysts covering the stocks. The Least-Coverage quintile contains stocks with only one analyst following, quintile 2 stocks with two analysts following, quintile 3 stocks with at least three but fewer than six analysts following, quintile 4 stocks with six to 10 analysts following, and finally, the Most-Coverage quintile stocks with more than 10 analysts following. The table also reports the difference in the ratios between Upgrade and Downgrade portfolios of firms within each quintile with their corresponding t -statistics reported in parentheses.

	Least Coverage		Quintile 2		Quintile 3		Quintile 4		Most Coverage	
	BVA	BNO	BVA	BNO	BVA	BNO	BVA	BNO	BVA	BNO
Panel A: 30-Day Buy Ratios Prior to Recommendation Change										
Upgrade (Up)	0.507 (0.25)	0.514 (0.50)	0.473 (-1.24)	0.484 (-0.75)	0.395 (-9.48)	0.403 (-8.83)	0.361 (-15.8)	0.370 (-14.9)	0.309 (-33.4)	0.320 (-31.7)
Downgrade (Dn)	0.505 (0.20)	0.507 (0.26)	0.408 (-4.79)	0.412 (-4.59)	0.380 (-12.9)	0.389 (-12.1)	0.362 (-18.0)	0.369 (-17.2)	0.299 (-38.7)	0.310 (-36.9)
(Dn-Up)	-0.00 (-0.05)	-0.01 (-0.20)	-0.07 (-2.26)	-0.07 (-2.48)	-0.02 (-1.05)	-0.01 (-1.02)	0.00 (-0.10)	0.00 (-0.05)	-0.01 (-1.27)	-0.01 (-1.40)
Panel B: 30-Day Buy Ratios Following Recommendation Change										
Upgrade (Up)	0.455 (-1.69)	0.464 (-1.39)	0.383 (-5.84)	0.395 (-5.30)	0.340 (-17.0)	0.351 (-15.9)	0.298 (-27.2)	0.308 (-26.1)	0.280 (-44.8)	0.292 (-42.7)
Downgrade (Dn)	0.535 (1.54)	0.547 (2.09)	0.493 (-0.37)	0.504 (0.26)	0.476 (-2.70)	0.483 (-1.96)	0.429 (-9.95)	0.438 (-8.86)	0.347 (-31.1)	0.358 (-29.1)
(Dn-Up)	0.08 (2.29)	0.08 (2.42)	0.11 (4.13)	0.11 (4.15)	0.14 (10.6)	0.13 (10.3)	0.13 (12.7)	0.13 (12.7)	0.07 (9.69)	0.07 (9.61)

Table 8

Average Monthly Market-Adjusted Stock Returns (in Percent), 1994-2003

The table shows average monthly market-adjusted stock returns (in percent) over various holding periods associated with the full sample, Net Insider Buys, No Insider Trade, and Net Insider Sells for firms sorted on the change in the recommendation. It also presents the average quarterly number of firm observations. For a given portfolio formed on the basis of the change in the recommendation, we sort stocks into three groups based on their value of insider transactions for a given quarter: stocks where insiders are net buyers (Net Insider Buys), stocks where insiders are net sellers (Net Insider Sells), and stocks with no insider trade. The average monthly market-adjusted stock returns are measured over one ($-1Q$), two ($-2Q$) and four ($-4Q$) quarters prior to and one ($+1Q$), two ($+2Q$) and four ($+4Q$) quarters following a change in the analyst recommendation. The 'Upgrade' portfolio consists of firms with upgrade recommendations, the 'Downgrade' portfolio are those with downgrades, and finally 'No Change' portfolio contains firms with no change in analyst recommendations. 'No of Obs' refers to average number of observations for each quarter. All t -statistics reported in parentheses are based on standard errors adjusted for heteroskedasticity and autocorrelation.

	No. of Obs.	$-4Q$	$-2Q$	$-1Q$	$+1Q$	$+2Q$	$+4Q$
		Full Sample					
Upgrade	1224	0.577 (8.22)	0.827 (9.54)	0.970 (8.30)	0.101 (1.02)	0.065 (1.13)	-0.078 (-1.47)
No Change	1621	-0.198 (-2.27)	-0.143 (-2.02)	-0.040 (-0.36)	0.178 (1.62)	0.150 (2.10)	0.163 (3.07)
Downgrade	1312	-0.221 (-3.15)	-0.490 (-6.68)	-0.734 (-6.57)	-0.290 (-2.80)	-0.226 (-3.32)	-0.117 (-2.06)

Table 8 - Continued

Average Monthly Market-Adjusted Stock Returns (in Percent), 1994-2003

	No. of Obs.	-4Q	-2Q	-1Q	+1Q	+2Q	+4Q
Net Insider Buys							
Upgrade	201	-0.215 (-1.96)	-0.128 (-1.20)	-0.412 (-2.41)	0.750 (4.14)	0.634 (4.58)	0.448 (3.69)
No Change	305	-0.814 (-5.68)	-0.986 (-8.32)	-1.073 (-5.26)	1.058 (6.23)	0.803 (5.97)	0.741 (5.93)
Downgrade	239	-1.166 (-9.53)	-1.697 (-11.4)	-2.482 (-12.7)	0.134 (0.71)	0.145 (1.00)	0.305 (2.37)
No Insider Trade							
Upgrade	655	0.068 (1.00)	0.318 (3.78)	0.469 (4.22)	-0.073 (-0.64)	-0.140 (-1.65)	-0.261 (-3.23)
No Change	957	-0.541 (-5.57)	-0.457 (-5.78)	-0.321 (-2.34)	-0.053 (-0.38)	-0.034 (-0.36)	0.002 (0.03)
Downgrade	691	-0.681 (-8.98)	-0.941 (-10.4)	-1.193 (-9.49)	-0.465 (-3.79)	-0.381 (-4.86)	-0.271 (-4.63)
Net Insider Sells							
Upgrade	370	1.813 (11.4)	2.185 (11.4)	2.549 (9.24)	0.128 (0.62)	0.165 (1.13)	-0.002 (-0.02)
No Change	347	1.331 (11.0)	1.563 (10.0)	1.786 (9.38)	0.043 (0.31)	0.080 (0.84)	0.091 (1.12)
Downgrade	379	1.302 (8.60)	1.227 (7.85)	1.416 (5.63)	-0.216 (-1.22)	-0.144 (-0.92)	-0.105 (-0.83)

Table 9

Average Monthly Characteristic-Adjusted Stock Returns (in Percent), 1994-2003

The table shows average monthly characteristic-adjusted stock returns (in percent) over various holding periods associated with the full sample, 'Net Insider Buys', 'No Insider Trade', and 'Net Insider Sells' for firms sorted on the change in the recommendation. It also presents the average quarterly number of firm observations. For a given portfolio formed on the basis of the change in the recommendation, we sort stocks into three groups based on their value of insider transactions for a given quarter: stocks where insiders are net buyers (Net Insider Buys), stocks where insiders are net sellers (Net Insider Sells), and stocks with no insider trade. The average monthly characteristic-based adjusted stock returns are measured over one ($-1Q$), two ($-2Q$) and four ($-4Q$) quarters prior to and one ($+1Q$), two ($+2Q$) and four ($+4Q$) quarters following a change in the analyst recommendation. The 'Upgrade' portfolio consists of firms with upgrade recommendations, the 'Downgrade' portfolio are those with downgrades, and finally 'No Change' portfolio contains firms with no change in analyst recommendations. 'No of Obs' refers to average number of observations for each quarter. All t -statistics reported in parentheses are based on standard errors adjusted for heteroskedasticity and autocorrelation.

	No. of Obs.	$-4Q$	$-2Q$	$-1Q$	$+1Q$	$+2Q$	$+4Q$
		Full Sample					
Upgrade	1126	0.118 (6.64)	0.497 (8.28)	0.695 (8.47)	0.146 (2.20)	0.132 (3.32)	0.018 (0.57)
No Change	1526	0.022 (1.14)	0.007 (0.15)	0.022 (0.32)	0.090 (1.35)	0.072 (1.68)	0.073 (3.02)
Downgrade	1262	-0.123 (-5.26)	-0.427 (-8.26)	-0.616 (-8.57)	-0.247 (-3.51)	-0.210 (-4.86)	-0.124 (-3.62)

Table 9

Average Monthly Characteristic-Adjusted Stock Returns (in Percent), 1994-2003

	No. of Obs.	-4Q	-2Q	-1Q	+1Q	+2Q	+4Q
Net Insider Buys							
Upgrade	184	0.011 (0.24)	-0.040 (-0.48)	-0.253 (-2.04)	0.564 (4.02)	0.465 (4.39)	0.253 (3.45)
No Change	287	-0.077 (-1.97)	-0.531 (-5.15)	-0.727 (-5.18)	0.863 (7.56)	0.597 (6.87)	0.520 (7.52)
Downgrade	229	-0.289 (-7.08)	-1.137 (-12.8)	-1.860 (-15.0)	0.094 (0.66)	0.024 (0.21)	0.119 (1.63)
No Insider Trade							
Upgrade	589	0.019 (0.83)	0.246 (3.56)	0.413 (4.62)	0.039 (0.53)	-0.006 (-0.11)	-0.096 (-2.20)
No Change	899	-0.041 (-1.64)	-0.174 (-3.93)	-0.144 (-1.92)	-0.129 (-1.48)	-0.105 (-1.85)	-0.090 (-2.43)
Downgrade	664	-0.234 (-7.10)	-0.692 (-10.2)	-0.902 (-9.47)	-0.434 (-4.29)	-0.357 (-5.35)	-0.278 (-5.54)
Net Insider Sells							
Upgrade	356	0.346 (7.61)	1.235 (12.4)	1.692 (12.2)	0.142 (1.04)	0.213 (2.14)	0.102 (1.42)
No Change	331	0.247 (6.62)	0.933 (9.19)	1.119 (8.22)	0.029 (0.26)	0.103 (1.36)	0.132 (2.19)
Downgrade	367	0.206 (5.03)	0.584 (7.55)	0.812 (6.95)	-0.127 (-1.42)	-0.053 (-0.62)	0.019 (0.29)

Table 10

Consensus Analyst Recommendations, Insider Trades, and Future Stock Returns, 1994-2003

The table summarizes results of quarterly cross-sectional regressions of six-month returns on consensus analyst recommendations, insider trades, and three firm-specific characteristics. It reports average coefficients, with t -statistics in parentheses. The six-month returns are measured subsequent to the calendar quarter in which change in consensus analyst recommendations is measured. Size is the market capitalization at the end of previous year and is in natural logarithm. Book-to-market is the year-end book-to-market equity ratio. Momentum is the firm's past six-month return prior to the quarter in which the change in the consensus recommendation is determined. The Recommendation Change is '1' if a stock is in the Upgrade portfolio, '0' if a stock is in the No-Change portfolio, and '-1' if a stock is in the Downgrade portfolio. Upgrade is a dummy variable which is '1' if a stock is in the Upgrade portfolio, '0' otherwise. Downgrade is a dummy variable which is '1' if a stock is in the Downgrade portfolio, '0' otherwise. NetTrade Value (Number) is '1' if a stock experiences net insider buying as measured in transaction value (number), '0' if zero net transaction and '-1' if a stock experiences net insider selling. NetBuy Value (Number) is a dummy variable with value of '1' if a stock experiences net insider buying as measured in transaction value (number), '0' otherwise. NetSell Value (Number) is a dummy variable with value of '1' if a stock experiences net insider selling as measured in transaction value (number), '0' otherwise. All measures of insider trading are expressed in natural logarithm. t -statistics are based on standard errors adjusted for heteroskedasticity and autocorrelation.

Table 10
Consensus Analyst Recommendations, Insider Trades, and Future Stock Returns, 1994-2003

Parameter	Model						
	1	2	3	4	5	6	7
Intercept	-2.25 (-3.45)	-2.35 (-3.47)	-2.35 (-3.47)	-2.23 (-3.43)	-2.23 (-3.44)	-2.33 (-3.56)	-2.33 (-3.55)
Size	0.220 (1.24)	0.239 (1.36)	0.242 (1.38)	0.237 (1.35)	0.239 (1.37)	0.247 (1.46)	0.252 (1.49)
BM	0.742 (3.23)	0.721 (3.20)	0.717 (3.19)	0.717 (3.18)	0.713 (3.18)	0.724 (3.21)	0.720 (3.21)
Momentum	0.516 (2.90)	0.548 (3.08)	0.552 (3.10)	0.538 (3.04)	0.542 (3.06)	0.524 (2.99)	0.529 (3.01)
Recommendation Change	0.146 (4.79)			0.148 (4.88)	0.149 (4.90)		
NetTrade Value		0.168 (2.34)		0.172 (2.40)			
NetTrade Number			0.209 (2.74)		0.213 (2.80)		
Upgrade						0.006 (0.06)	0.010 (0.10)
Downgrade						-0.278 (-3.24)	-0.276 (-3.23)
NetBuy Value						0.584 (6.64)	
NetSell Value						0.180 (1.79)	
NetBuy Number							0.584 (6.57)
NetSell Number							0.122 (1.14)