Analysts’ Earnings Forecast, Recommendation, and Target Price Revisions

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Securities analysts play an important role in the capital market. As information intermediaries, securities analysts provide three main quantitative outputs for investors: earnings forecasts, stock recommendations, and target prices. An extensive body of literature documents significant immediate or delayed market responses to analysts’ revisions in earnings forecasts (Gleason and Lee [2003]) or stock recommendations (Womack [1996]). However, relatively little research has examined market responses to revisions in target prices, mostly due to the lack of target price data in machine readable form.

Despite the large literature on securities analysts, prior research tends to focus separately on the three analyst signals, so little is known about how the informativeness of these signals compare with each other. For example, which type(s) of revisions do investors consider as more informative? Should investors focus on one particular type of revision when making investment decisions or can they gain incremental returns by incorporating multiple types of revisions? Our study seeks to address these questions by focusing on the immediate and delayed market responses to revisions in all three types of outputs provided by analysts.

Based on a sample of analyst revisions of earnings forecasts, stock recommendations, and target prices from mid-1999 to 2010, we show significant market responses in the short window around all three types of revisions. More importantly, we show that the associations between short-window market returns and target price revisions and recommendation revisions, respectively, are stronger than those between short-window market returns and earnings forecast revisions in both economic and statistical terms. These stronger market responses are observed along with less frequent revisions in target prices and stock recommendations than revisions in earnings forecasts. These results are consistent with analysts revising target prices or stock recommendations only when they receive significant information, whereas they revise earnings forecasts more frequently.

A number of studies have documented delayed market responses to revisions in analyst earnings forecasts (Gleason and Lee [2003]). Consistent with this evidence, we show significantly positive association between revisions in earnings forecasts and excess returns in the subsequent month. We also document similar delayed market responses to revisions in stock recommendations and target prices. To understand how investors may utilize the revisions in these analyst signals in constructing investment portfolios, we further examine excess hedge returns based on decile rankings of revisions in individual signals as well as decile rankings using all three signals. We find that the hedge returns are the highest when inves-
tors simultaneously use information in all signals. This is also true if we focus on returns on long portfolios only (as opposed to hedge returns).

Our study contributes to the literature along two main lines. First, it provides additional evidence on target price revisions by securities analysts, an area of limited prior research. Our results show that analysts revise their target prices less frequently than earnings forecasts, but more frequently than stock recommendations. There are both immediate and delayed market responses to the revisions in target prices. Second, our study addresses the question of how the various information contained in revisions of earnings forecasts, target prices, and stock recommendations compare with each other.

Our results show that revisions in target prices and stock recommendations are on average more informative than revisions in earnings forecast revisions. Also, the fact that an investor earns higher hedge returns based on information from all three signals than based on information from each of the individual signals suggests that each of these three signals provides information incremental to the other two signals. This result has important implications to investors who can better position their portfolios to take advantage of recent analyst revisions.

LITERATURE REVIEW

A long and extensive literature examines the role of securities analysts in the capital market. For excellent reviews, see Schipper [1991], Brown [1993], and Ramnath, Rock, and Shane [2008], who focus on analysts’ earnings forecasts and/or stock recommendations only. In this section, we briefly summarize prior research that examines market responses to quantitative outputs by analysts.

A number of studies show immediate and delayed responses to analyst earnings forecast revisions (Stickel [1991], Elgers, Lo, and Pfeiffer [2001], and Gleason and Lee [2003]). Several studies have also examined market responses to revisions in stock recommendations. Barber, Lehavy, and Trueman [2010] documented that abnormal returns to analysts’ recommendations stem from both the rating levels assigned and the changes in those ratings. Other studies document return drifts subsequent to analyst recommendations (Ivkovic and Jegadeesh [2004] and Barber et al. [2001]. Researchers have also examined how market responses to analyst forecast revisions or stock recommendation revisions vary in the cross-section or across event time with various firm or analyst characteristics (Gleason and Lee [2003], Ivkovic and Jegadeesh [2004], and Jegadeesh and Kim [2010]). Overall, this line of research suggests that analysts’ earnings forecast revisions and recommendation revisions convey significant information to the capital market, yet the capital market does not fully and immediately incorporate such information.

Much less attention, however, has been paid to market responses to target price revisions. Most studies in this area focus on the accuracy of the target prices (Bradshaw and Brown [2006], Lyssimachou, Lee, and Walker [2009], Bonini et al. [2010], and Demirakos, Strong, and Walker [2010]). A few other studies have examined whether target prices or target price revisions have implications for investment strategies. Da and Schaumburg [2011] documented that industry relative valuations, which are implicit in analyst target prices, provide investors with valuable information, although the implied absolute valuations themselves are much less informative. More closely related to our study, Brav and Lehavy [2003] found a significant market reaction to the information contained in analyst target prices, both unconditionally and conditional on contemporaneously issued stock recommendation revisions and earnings forecast revisions. Although Brav and Lehavy generally found on average no significant excess returns in the periods subsequent to target price revisions, they did show that the market underreacts to target price revisions conditional on certain recommendation revisions.

While Brav and Lehavy [2003] provided some initial evidence on how investors respond to revisions in target prices, as they cautioned in their article, their sample period (1997–1999) coincides with the highs of the bull market in the United States, which might be viewed as an historically unusual period. Therefore, their results may not be generalizable to other periods. Our sample period starts in 1999 and extends through 2010, covering both boom and bust periods. More importantly, we seek to examine if any incremental information exists within each of the three main signal revisions provided by analysts during this much longer period, which mainly includes the post Reg FD period in which firms were prevented from selective disclosure to analysts.

Prior research on securities analysts tends to focus on individual outputs provided by analysts. A few studies examine the relation between different types of revisions. For example, focusing on the overall informative-
ness of equity analyst reports, Asquith, Mikhail, and Au [2005] showed that various contents of an equity analyst report, such as revisions in earnings forecasts or target prices and the justifications supporting an analyst’s opinion, provide incremental information depending on the nature of the report (i.e., a downgrade, upgrade, or reiteration). However Asquith, Mikhail, and Au used specific stock reports as their basis for sample selection, also 1997–1999, a period in which analyst forecasts and reports were very powerful given the market sentiment at the time. Bradshaw [2002] examined how analysts disclose target prices as justifications for their stock recommendations. These studies, however, do not examine the relation among market reactions to different types of analyst revisions.

Thus, given the very sparse literature on the market effects of analyst target price revisions (especially in the post-1999 period) and on their interactions with recommendation revisions and earnings forecast revisions, our study provides evidence on both of these issues.

SAMPLE AND RESULTS

We identify all revisions of EPS for Fiscal Year 1 (FY1), the next full year for which earnings have not been announced from the I/B/E/S detail split-adjusted database. For an earnings forecast (target price and stock recommendation) to be included in our revision sample, we require that the same analyst has published at least one prior forecast (recommendation and target price) within the previous 365 days. For earnings forecast revisions, we require that the prior and current forecasts use the same currency and are on the same primary/diluted basis. For target price revisions, we require that both the prior and current target prices use the same currency and have a 12-month horizon. Because target price revisions are only sparsely available from I/B/E/S prior to July 1999, our sample period for all revisions is July 1999–December 2010.

Because we are interested in examining market reactions to announcements of revisions, we calculate the short-term buy-and-hold excess return for the trading window [−1, +1] day centered on the revision announcement day, Day 0. The excess return is calculated by subtracting the average buy-and-hold return on a portfolio of stocks that have the same size (market value of equity as of the prior quarter-end, using two groups), book-to-market ratio of equity (as of the prior quarter-end, using three groups), and 12-month momentum (12-month buy-and-hold returns ending 1 month prior to the current month, using three groups) from the buy-and-hold return of the firm for trading [−1, +1] day. All sample observations are required to have data available to calculate the excess returns in the three-day window around the revision announcement date. All return data are from the CRSP database and are adjusted for delisting returns by substituting −1 when a forced delisting code appears in CRSP. Only firms with common shares (codes 10 and 11) are included in the analysis.

Many of the earnings forecast revisions occur immediately after quarterly preliminary earnings announcements (Ivkovic and Jegadeesh [2004] and Zhang [2008]). We identify from the Compustat Quarterly file the most recent preliminary earnings announcement date within 90 days prior to the revision announcement. Since market reactions to the earnings announcements may be correlated with market reactions to analyst revisions that occur immediately after the earnings announcements, we control for this effect using an indicator variable that takes the value of one if a revision occurred within three calendar days after a preliminary earnings announcement (Close = 1), and zero otherwise (Close = 0).

Revisions of Earnings Forecasts

Panel A of Exhibit 1 presents summary statistics of the subsample of earnings forecast revisions. We identify over 1.1 million different revisions in our sample period, with 32.6% of them occurring in the three days after preliminary earnings announcements. We calculate the percentage revision, PREV, as the current EPS forecast minus the prior EPS forecast by the same analyst, scaled by the absolute value of the prior forecast. We winsorize PREV to fall within the range [−1, +1]. As Panel A shows, the mean and median earnings forecast revisions are negative, probably reflecting analysts’ beginning-of-the-year optimism, which erodes throughout the year as more information becomes available or as analysts cater to managers’ incentives to meet or beat analyst forecasts. Similarly, the mean and median short-window excess returns around the revision announcements are also negative, reflecting market responses to the mean and median negative earnings forecast revisions. The mean and median returns are, however, very close to zero.
Panel B of Exhibit 1 shows the mean excess return in the short window around the revision announcement for deciles of the percentage revision in earnings forecasts, PREV. We expect and find that low levels of PREV (i.e., the most downward revisions of earnings forecasts) are associated with negative excess returns and that high levels of PREV (i.e., the most upward revisions of earnings forecasts) are associated with positive excess returns. In fact, we find that the mean returns increase monotonically from the lowest PREV decile to the highest PREV decile. The last row of Panel B provides the excess return of the highest decile minus the bottom decile, denoted as H–L, which is equal to 6.4% for all revisions. Thus, if an investor had a crystal ball and was able to form portfolios using only the extreme deciles of the upcoming earnings forecast revisions the payoff would be 6.4% in the three-day window around the revision announcement.

Because earnings surprises are known to be correlated with returns around earnings announcements and with analyst forecast revisions, we examine separately those revisions that occur immediately after earnings announcements (Close) and those that occur at other times (Other). Indeed, we find that the excess returns
on the hedge portfolio based on revisions that are close to earnings announcements (H–L) are higher at 9.2%. We also find that the excess returns on the hedge portfolio based on other revisions (i.e., revisions that do not immediately follow earnings announcements), although somewhat smaller, are still economically and statistically significant at 5.1%. This suggests that the strong market responses to earnings forecast revisions are not simply driven by market responses to the earnings announcements per se.

Panel C of Exhibit 1 presents mean coefficients of monthly cross-sectional regressions of the excess return around the revision, XRETREV, on a scaled measure of the percentage revision, PREV. To construct the scaled measure, each month we assign each revision its decile rank (from 0 to 9). We then divide that rank by 9 and subtract 0.5. Thus, observations are assigned values in the range of $[-0.5, +0.5]$. This transformed variable is labeled RPREV in the exhibit. When regressing XRETREV on RPREV, the intercept is equal to the mean excess return of all observations that month. The slope coefficient measures the return on the highest decile minus the return on the lowest decile (i.e., the return on the hedge portfolio).

The first row of Panel C of Exhibit 1 shows that the mean short-window return around the revision for the hedge portfolio is 6.26%, very close to the average of 6.4% based on portfolio tests in Panel B. Panel C also shows that the average hedge return is 5.03% for Other revisions, with an additional 4.25% (i.e., the coefficient on RPREV * Close) if the revision is immediately after an earnings announcement. These values are very close to the 5.1% and 9.2% for the H–L portfolios in Panel B. Thus, consistent with prior studies, earnings forecast revisions by analysts are associated with significant market reactions around the revision announcements.

Revisions of Target Prices

Exhibit 2 provides similar analyses for target price revisions. Similar to PREV for earnings forecast revisions, we calculate PREV for target price revisions as the change in the target prices divided by the prior target price. First, we observe that the number of target price revisions is about 468,000, roughly 40% of the number of earnings forecast revisions in the same period (1.15 million). We cannot tell whether analysts indeed issue fewer target price revisions than earnings forecast revisions, or whether I/B/E/S has failed to collect the target price revisions from some analysts due to technical issues. Second, similar to earnings forecast revisions, a nontrivial percentage of the target price revisions occur immediately after earnings announcements (34.8%). Note further that unlike earnings forecast revisions, target price revisions have positive means and medians, indicating that analysts are more likely to revise target prices upward than downward.

Panel B of Exhibit 2 shows the mean excess returns around target price revisions for deciles of PREV. The bottom row H–L also shows the hedge portfolio returns. Consistent with what we observe for earnings forecast revisions, the excess returns around the target price revisions increase monotonically from the lowest decile, which has the most downward target price revisions, to the highest decile, which has the most upward target price revisions. Furthermore, the excess return on the hedge portfolio is 11.3% for target price revisions, much higher than the comparable figure in Exhibit 1 of 6.4%. Again, the target price revisions immediately after earnings announcements have greater excess return (13.9% on the hedge portfolio) than other announcements (10.1%), with both being substantially higher than their counterpart numbers based on earnings forecast revisions.

Panel C of Exhibit 2 reports regression analyses of the excess returns around target price revisions. The scaled measure, RPREV, is calculated analogously as in Panel C of Exhibit 1. The results confirm economically and statistically significant excess returns for hedge portfolios based on target price revisions in our sample period: 9.2% using all revisions, 8.1% using Other revisions, and an additional 3.5% if the revision is a Close revision (i.e., within three days of an earnings announcement date). Thus, we find that the market effects of target price reactions are significant and actually seem stronger than those of the earnings forecast revisions.

Revisions of Stock Recommendations

Panel A of Exhibit 3 provides similar data for recommendation revisions. PREV is calculated as the change in the ratings of the stock recommendation deflated by $-4.3$. There are very few recommendation revisions, only about 134,000, during our sample period. The number of recommendation revisions is less than 12% of the number of earnings forecast revisions and
about 28% of the number of target price revisions in the same time period. We further find that unlike earnings forecast and target price revisions, which tend to bunch after earnings announcements by firms, recommendation revisions immediately after earnings announcements occur in only 18.5% of the cases, about half as many as for earnings and target price revisions. The mean recommendation revision is negative although its median is zero.

Panel B of Exhibit 3 shows the excess returns around recommendation revisions are largely monotonically increasing with the decile rank of the revision. The hedge portfolio returns around all recommendation revisions is 8.3%, higher than the 6.4% for earnings forecast revisions, but lower than the 11.3% for target price revisions. The hedge portfolio return for recommendation revisions immediately after earnings announcements is very high at 13.6% on average, compared with only 7% for other recommendations. As seen from the regression results in Panel C of Exhibit 3, the hedge portfolio obtains average monthly returns of 10.1% for all recommendation revisions, with 8.4% for Other revisions and
an additional 9.4% for Close revisions. Thus, although less frequent than either earnings forecast revisions or target price revisions, the recommendation revisions are associated with significant and also greater market reactions around their announcements.

Multiple Revisions on the Same Day

The regression analysis in Exhibits 1 to 3 uses all revisions assuming that they comprise independent observations. On some days, however, our sample may contain more than one revision, particularly when the revision occurs immediately after preliminary earnings announcements or other major announcements by firms. Because the dependent variable in the regression, XRETREV, is the same for all revisions made on the same day, the simultaneous revisions cannot be considered independent. To examine the sensitivity of our results to this potential bias, we redo the regression analysis in Exhibits 1 to 3 (Panel C) using the average RPREV, the transformed ranked percentage revision,
Each day which effectively aggregates all revisions on the same day into one observation. These results are reported in Exhibit 4.

As shown in the first row in each of the three panels of Exhibit 4, earnings forecast revisions have the lowest market impact of 4.43%, followed by 7.27% for target price revisions, and 9.14% for recommendation revisions. The comparable exhibits from Exhibits 1 to 3 are 6.26%, 9.19%, and 10.14%. Although the magnitudes are smaller in Exhibit 4, they are in the same order as before, and remain economically and statistically significant. Also consistent with earlier results, a nontrivial part of the responses is driven by revisions that occur immediately after preliminary earnings announcements, as shown in the regressions that control for Close. Overall, Exhibit 4 continues to show that recommendation revisions have the strongest impact on returns, followed by target price revisions, and then earnings forecast revisions.

**Exhibit 4**

### Market Effects Using One Observation on Each Day

<table>
<thead>
<tr>
<th></th>
<th>Intercept</th>
<th>RPREV</th>
<th>Close</th>
<th>RPREV*CLOSE</th>
<th>N</th>
<th>R²</th>
</tr>
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<tr>
<td><strong>Panel A: Earnings Forecast Revisions</strong></td>
<td></td>
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<tr>
<td>Mean</td>
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<td></td>
<td>5027</td>
<td>0.042</td>
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</tr>
<tr>
<td>Mean</td>
<td>-0.0006</td>
<td>0.0345</td>
<td>0.0004</td>
<td>0.0583</td>
<td>5027</td>
<td>0.053</td>
</tr>
<tr>
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<td>0.1053</td>
<td>0.0001</td>
<td>0.6006</td>
<td>0.0001</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Panel B: Target Price Revisions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
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<td>0.0727</td>
<td></td>
<td></td>
<td>2492</td>
<td>0.084</td>
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<tr>
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<td>0.0001</td>
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<tr>
<td>Mean</td>
<td>0.0006</td>
<td>0.0622</td>
<td>0.0022</td>
<td>0.049</td>
<td>2492</td>
<td>0.095</td>
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<td>Significance</td>
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<td>0.0311</td>
<td>0.0001</td>
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<td></td>
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<tr>
<td><strong>Panel C: Recommendation Revisions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
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<td>0.0914</td>
<td></td>
<td></td>
<td>911</td>
<td>0.085</td>
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<td>Significance</td>
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<td>0.0001</td>
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<tr>
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<td>-0.0065</td>
<td>0.0863</td>
<td>911</td>
<td>0.099</td>
</tr>
<tr>
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<td>0.0001</td>
<td>0.0002</td>
<td>0.0001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: The exhibit entries replicate Panel C in Exhibits 1 to 3, with one exception. On each calendar day, we select the median RPREV and RPREV as the independent variables for each of the three signals, effectively limiting the analysis to one observation each day. Each panel presents summary statistics of 138 monthly cross-sectional regressions of XRETREV on RPREV and on RPREV, RPREV*CLOSE, and CLOSE. RPREV is the decile rank of PREV scaled by nine, minus 0.5. XRETREV is the three-day buy-and-hold excess return centered on the revision date. PREV is the change in the recommendation code from the prior recommendation, scaled by –4. CLOSE is a dummy variable that obtains one if the revision occurs within three calendar days of a preliminary earnings announcement, zero otherwise. N is the average number of monthly revisions (observations) used to estimate the regressions. R² is the average R² of the monthly regressions.

**Comparisons Across Revision Types**

The previous analyses show that market reactions to target price revisions and recommendation revisions are stronger than to earnings forecast revisions. However the comparison is based on evidence from three different samples and does not test whether the differences are statistically significant. To perform such an analysis, we combine all revisions into one sample, and designate target price revisions by a dummy variable TP, which obtains the value of one if the revision is for target price, and zero otherwise. Similarly, we define a dummy variable REC, which obtains a value of one for a recommendation revision, and zero otherwise. We then regress the short-window excess return around the revision announcement date on RPREV, the decile rank of the percentage revision (divided by 9 minus 0.5) based on all three signals, and on RPREV * TP and RPREV * REC. The coefficients of the last two variables indicate whether target price revisions and recommendation revisions have stronger or weaker market effects than earnings forecast revisions.

Exhibit 5 provides means of coefficient estimates based on monthly cross-sectional Fama–MacBeth regressions during the sample period July 1999–December 2010. Specifically, each month we rank all percentage revisions (PREV) into deciles and construct RPREV as explained before. We then regress XRETREV on the independent variables by month and tabulate the means and their significance levels based on the time-series distribution of the 138 monthly coefficients. As shown in the first model of Exhibit 5, RPREV has a mean coefficient of 6.25%, which represents the average market reactions to earnings forecast revisions. RPREV * TP has a significantly (p < 0.01) positive coefficient of 2.93%, suggesting that target price revisions have market reactions that are, on average, stronger by 2.93% than earnings forecast revisions. A similar implication is obtained for recommendation revisions. The interaction term between RPREV and REC has an average coefficient of 3.88%, also significantly different from zero at the 0.01 level.
Model 2 in Exhibit 5 is a similar test, except that it allows for different coefficients (and market reactions) for revisions made immediately after earnings announcements (indicated by the Close variable) and other revisions. Consistent with evidence in Exhibit 1, the results show that earnings forecast revisions that are not close to earnings announcements have an average market reaction of 5.03%, whereas those immediately after earnings announcements have an additional average reaction of 4.22%. The coefficient on RPREV * TP remains positive and significant at 3.02%, indicating significantly stronger market reactions to target price revisions. On the one hand, the coefficient on RPREV * TP * Close is negative and significant at −0.74%, indicating that the additional market reaction when a revision is announced immediately after an earnings announcement is weaker for target price revisions than for earnings forecast revisions. On the other hand, market reactions to recommendation revisions are 3.36% higher than market reactions to the earnings forecast revisions and an additional 5.42% higher if the recommendation revision is made immediately after an earnings announcement. Both of the coefficients are significantly different from zero. Thus, overall, Exhibit 5 shows that target price and recommendation revisions are associated with significantly stronger market reactions than earnings forecast revisions. Although revisions issued immediately after earnings announcements receive, on average, stronger market responses than other revisions, the effect is particularly strong for recommendation revisions.

Subsequent Returns

In the preceding analysis, we examine the associations of analyst revisions with short-window returns around the revision announcement days. Although such an analysis is useful in understanding and comparing the informativeness of revisions of the three signals, it may be of limited applied value because an investor cannot trade on the revision until it becomes publicly available. Thus, it is important to examine whether the information in analyst revisions is associated with subsequent returns. To make such an analysis meaningful for practical applications, we consider a calendar-time monthly portfolio strategy.

Specifically, at the end of each month we identify all revisions that occur during the month through one calendar day prior to month-end. This ensures that on the last day of the month we can actually form our portfolios using available information about revisions as of that day. We form portfolios based on the average percentage revision during the month and then hold the portfolios for one month. At the end of the next month, the portfolios are reconstituted based on revisions during that month. Because we have return data from CRSP only through December 2010, the analysis covers the 137-month period of July 1999–November 2010.

Exhibit 6 reports summary statistics for the calendar-time analysis. The total number of firm-month observations is 293,967. The observations have a positive mean and median subsequent monthly return (MRET) of 1.1% and 0.74%, respectively. The average and median excess monthly return (XMRET) is much closer to zero,
as should be expected. The mean percentage revision PREV is negative, likely because of the dominance of earnings forecast revisions in our sample, which tend to be downward revisions. Indeed, the exhibit shows 257,174 firm-months for earnings forecast revisions; 179,605 firm-month target price revisions; and only 91,103 firm-month recommendation revisions.4

Exhibit 7 provides information on the average monthly return to a trading strategy that simulates a hedge portfolio with long positions in the top decile of percentage revisions and short positions in the bottom decile. For each panel, we classify percentage of revisions (PREV) into 10 groups based on all revisions considered in that panel, assign the decile rank (0–9) to each member of a group, divide the number by 9, and subtract 0.5. Thus, the coefficient on RPREV is the average monthly return on the hedge portfolio during the 137 months of our sample period.

Panel A of Exhibit 7 shows that the mean monthly excess return when only earnings forecast revisions are used is 0.81%, with an average of 1,875 revisions per month. The target price revisions in Panel B show an average monthly excess return of 0.99%, with an average of 1,309 revisions each month. Note, however, that the hedge return based on target price revisions is not statistically different from zero at conventional significance levels. Panel C shows that the monthly average return of the hedge portfolio when only recommendation revisions are used is 0.6%, significantly different from zero (p = 0.02). The average number of observations per month is only 663.

Panel D of Exhibit 7 shows the monthly return to the hedge portfolio if we use all revisions during a month to form the portfolios, regardless of whether they are for earnings forecasts, target prices, or recommendations. On average, there are 2,114 revisions each month. The average monthly excess return on the hedge portfolio is 1.08%, which is statistically different from zero at the 0.01 level. It is evident from Exhibit 7 that the highest subsequent returns are obtained for a strategy that uses information in all three revision signals. This result suggests that each of the three signals provides information that is incremental to the other signals.

In addition to the preceding analyses, we also estimate a Fama–French five-factor model in each of the four panels to provide an alternative measure of excess returns. Specifically, we regress the raw return MRET from each monthly hedge portfolio in excess of the risk-free rate on the five Fama–French factors, including market returns in excess of the risk-free rate, small-minus-big size factor, high-minus-low B/M factor, momentum factor, and short-term reversal factor. Data for all of these factors are obtained from the Kenneth French data library.

We then report the intercept (alpha) in each of the four panels in Exhibit 7. The trading strategies based on earnings forecast revisions and target price revisions earn a monthly alpha of 1.07% and 1.13%, respectively. But the alpha based on recommendation revisions is very small and also insignificant. Finally, the alpha based on all revision signals is significantly positive at 1.19%, slightly higher than the alphas based on earnings forecast revisions alone or target price revisions alone.

Overall, contrary to the immediate market reactions to revisions in the three signals, Exhibit 7 shows that earnings forecast revisions do not have the lowest mean and that recommendation revisions do not have the highest mean return in the subsequent month. In fact, the excess returns subsequent to recommendation

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**EXHIBIT 6**

Summary Statistics for Calendar-Time Analysis

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<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>10th Pctl</th>
<th>50th Pctl</th>
<th>90th Pctl</th>
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<td>MRET</td>
<td>293967</td>
<td>0.0110</td>
<td>0.1655</td>
<td>(0.1500)</td>
<td>0.0074</td>
<td>0.1636</td>
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<td>XMRET</td>
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<td>0.0020</td>
<td>0.1496</td>
<td>(0.1390)</td>
<td>0.0025</td>
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<tr>
<td>PREV</td>
<td>293967</td>
<td>0.0017</td>
<td>0.2344</td>
<td>(0.2500)</td>
<td>0.0000</td>
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<td>ESPEV</td>
<td>257154</td>
<td>0.0301</td>
<td>0.2642</td>
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<td>TPPREV</td>
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</tbody>
</table>

Notes: This exhibit is based on identifying all monthly observations for each firm, when there is at least one revision (either earnings forecast, target price, or recommendation) during that month. It uses data for July 1999–November 2010. MRET is the next month’s buy-and-hold return. XMRET is the next month’s buy-and-hold excess return of the firm above peers with similar size, B/M ratio, and 12-month price momentum. PREV is the average revision of all three signals (earnings, target prices, and recommendations) during that month for that firm. ESPREV is the average earnings forecast revisions for that month for that firm. The earnings revision is the change in earnings forecast from the prior forecast, scaled by the absolute value of the prior forecast. TPPREV is the average target price revisions for that month for that firm. The target price revision is the change in target price from the prior target price, scaled by the prior target price. RECPREV is the average recommendation revisions for that month for that firm. The recommendation revision is the change in the recommendation code from the prior recommendation, scaled by –4.
revisions are substantially smaller and less significant than the returns subsequent to earnings forecast revisions. Earnings forecast revisions consistently have significant subsequent excess returns, however, supporting prior research that investors seem to underreact to analyst earnings forecast revisions (Stickel [1991], Elgers, Lo, and Pfeiffer [2001], and Gleason and Lee [2003]). More importantly, the results in Exhibit 7 suggest that using information in all three types of revisions can help investors earn incremental excess returns.

The analysis in Exhibit 7 assumes both long and short stock positions are held. Because shorting certain stocks may be expensive and many institutional investors do not engage in short sales of securities, it is of interest to examine the calendar-time monthly returns of long-only portfolios. Exhibit 8 provides the average returns of a strategy that uses 100 firms with the highest percentage revisions. Thus, the strategy assumes that the portfolio holds 100 names each month, regardless of the particular signal that we use. Exhibit 8 shows both the mean raw return and the mean excess return on each portfolio over the 137 months in our sample period. The relevant numbers are the excess returns, XMRET, because we need to adjust for risk. In addition, we also examine the intercept from the five-factor Fama–French model.

As Exhibit 8 shows, using earnings forecast revisions (Panel A) only yields an average monthly excess return of 0.46%. Portfolios based on target price revisions (Panel B) yield an excess return of 0.11%, but it is statistically insignificant. Portfolios based on recommendation revisions (Panel C) yield an excess return of 0.20%, which is significant at the 0.06 level. The largest average excess return, XMRET, is obtained for the top 100 firms when we use all revisions. Specifically, in Panel D, the average excess return is 1.16% and is significant at the 0.01 level. Similar patterns are also observed based on the intercepts from the Fama–French five-factor model.

Overall, Exhibit 8 provides further support to our results reported in Exhibit 7: using information from all three types of revision signals yields the highest excess returns, even when the positions are long only. In addition, the excess returns subsequent to target price revisions or recommendation revisions are not consistently significant, whereas those subsequent to earnings forecast revisions are. These results are consistent with the view that investors are more likely to underreact to analyst earnings forecast revisions, whereas their responses to target price revisions or recommendation revisions are relatively more immediate and more complete.
SUMMARY AND CONCLUSIONS

In our study, we examine the immediate and delayed market effects of analysts’ revisions of earnings forecasts, target prices, and recommendations. We find that all three types of revisions are positively and significantly associated with immediate market reactions. Immediate market reactions to target price and recommendation revisions are, however, significantly stronger than market reactions to earnings forecast revisions. Counterbalancing the stronger, immediate market effects of target price and recommendation revisions is their scarcity; there are substantially fewer target price revisions and even fewer recommendation revisions than earnings forecast revisions.

Examining whether investors can use previously announced revisions to create portfolios and gain future excess returns, we find that by far the best strategy is to combine all three signals (i.e., using revisions of earnings forecasts in conjunction with revisions in target prices or recommendations). Further, contrary to the evidence about the immediate market reactions to the revisions, portfolios based on earnings forecast revisions in the previous month earn consistently higher excess returns than portfolios based on the other two types of revision signals, whether we focus on hedge portfolios or long-only portfolios.

Our study can be useful to portfolio managers who use analysts’ quantitative outputs in constructing portfolios. Our analyses show that all three revisions should be combined in order to form a more profitable strategy. Our results also shed further light on market reactions to target price revisions, which have not yet been studied extensively in academic research. We show their importance in affecting returns, especially in the short window immediately around the target price revisions.

ENDNOTES

1Brav and Lehavy [2003] focused on two alternative measures of target prices: 1) target price relative to stock price and 2) changes in target price relative to stock price.

2Note, as we show later, there are many more earnings forecast and target price revisions than recommendation revisions. Thus, the work of Asquith, Mikhail, Au [2005], which began with stock reports, cannot be generalized to the population of all revisions.

E X H I B I T  8
Subsequent Month’s Returns: Top 100 Firms

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Median</th>
<th>t-Statistic</th>
<th>Pr &gt;</th>
<th>t</th>
<th></th>
<th>FF-Intercept</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Earnings Forecasts Revisions</strong></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>MRET</td>
<td>137</td>
<td>0.0146</td>
<td>0.0680</td>
<td>0.0157</td>
<td>2.51</td>
<td>0.0131</td>
<td></td>
<td></td>
<td>0.0088</td>
<td>0.0481</td>
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<tr>
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<tr>
<td><strong>Panel B: Target Price Revisions</strong></td>
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<tr>
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<td><strong>Panel D: All Revisions</strong></td>
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</table>

Notes: The exhibit presents statistics of calendar-time returns on long portfolios formed based on the top 100 firms according to their average revisions during the month. Each month-end, all firms are ranked according to their average PREV for the month. The top 100 firms (the most positive revisions) are selected for a long portfolio. Returns are for the following month. The strategy assumes monthly rebalancing. MRET is the next month’s buy-and-hold return. XMRET is the next month’s buy-and-hold excess return of the firm above peers with similar size, B/M ratios, and 12-month price momentum. N is the number of months (July 1999–November 2010). The exhibit statistics are based on all 137 months. FF-Intercept (Significance) is based on regressions of the monthly portfolio raw return, MRET, minus the risk-free rate on the market return minus the risk-free rate, the high-minus-low factor, the small-minus-big factor, the momentum factor, and the short-term reversal factor. All factors and risk-free rates are from the Kenneth French data library. In Panels A, B, and C, the portfolios are based only on the top 100 firms ranked by revisions in earnings, target prices, and recommendations, respectively. In Panel D, portfolios are created using the top 100 firms on all revisions (earnings, target prices, and recommendations).
3 Analyst recommendations in I/B/E/S are scaled between 1 and 5, with 1 being the strongest recommendation. Therefore, we deflate the change in recommendations by –4 (as opposed to 4) so that the revision is increasing in the analyst’s view of the firm’s outlook.

4 A firm-month is included in the analyses only if there is at least one analyst revision in that month.

5 We also examine firms in the top decile instead of the top 100 firms. Note that this trading strategy employs different numbers of firms based on the different types of revision signals because of the varying frequency of revisions for each type. The results are largely similar.

REFERENCES


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