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THE INFORMATION CONTENT OF ANALYSTS' RECOMMENDATIONS REVISITED

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Bradley et al. (BCLO, 2014) find evidence that the time stamps reported in I/B/E/S for analysts' recommendations are systematically delayed giving the appearance that recommendations are uninformative. We review the findings of BCLO and extend their analyses along three dimensions. First, we show that time stamp delays are less likely to be associated with all-star analysts, affiliated analysts, and analysts from high reputation banks, but are more likely from independent analysts. Second, we show that recommendations from all-star analysts, analysts working for high reputation banks, and analysts who issued a previous influential recommendation are more likely to be influential. Finally, we examine post-recommendation drift following influential revisions and find post-revision returns of 18(−44) basis points for upgrades (downgrades) over the 2.5 hours following the revision.

1 Introduction

A growing stream of evidence challenges the long-standing belief that analysts' earnings forecasts and recommendations have investment value. For example, Altinkilic and Hansen (2009) and Altinkilic *et al.* (2013) show that analysts' recommendations and earnings forecasts are associated with insignificant intraday stock price reactions, on average. The results from these studies suggest that analysts' recommendations and forecasts appear to be informative because they 'piggyback' on other material firm-specific news. Similarly, Loh and Stulz (2011) find that only 10% of analysts' recommendations generate a statistically significant stock price reaction.

In light of these new findings, Bradley *et al.* (2014) (hereafter, referred to as BCLO) re-examine the information content of analysts' recommendations and find evidence that the time

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stamps reported in *I/B/E/S* for recommendations released during trading hours are systematically delayed when compared with newswire time stamps. The delay in reported time stamps gives the false appearance that recommendations systematically follow news. This finding is critical for academics, who rely on the accuracy of data to make scientific discoveries, and practitioners, who depend on the integrity of data to back test trading strategies. After adjusting for time stamp delays, recommendation upgrades (downgrades) generate a statistically significant announcement 30-minute return of 1.83% (−2.10%). Furthermore, the delayed time stamps reported in *I/B/E/S* are not only confined to analysts' recommendations. They show that earnings announcements as well as management guidance releases reported in *I/B/E/S* and *First Call* are also systematically delayed when compared with newswires.

In addition to documenting time stamp delays, BCLO (2014) also examine the relative importance of analysts' recommendations compared with earnings announcements and management guidance. The authors find that analysts' recommendations are more likely to be associated with 'jumps' or major move in stock prices than either earnings announcements or guidance.

In this paper, we first review the main findings and implications of BCLO (2014). We then extend their analysis in three ways. First, we examine which recommendations are most impacted by the time stamp delay. Second, we examine the characteristics associated with influential analysts' recommendations. Finally, we explore the post-recommendation stock price drift following influential recommendations.

With respect to the time stamp delay, we examine the likelihood of a delayed recommendation in the *I/B/E/S* database. As a proxy for the likelihood of delay, we use an indicator that takes the value of one if the recommendation was released during trading hours and zero otherwise. Our findings suggest that delayed recommendations are less likely if they are issued by all-star analysts, affiliated analysts, and analysts from high reputation banks. Delayed recommendations are more likely to come from independent analysts.

We next examine the likelihood of an analyst recommendation being influential using a logistic regression framework. We find evidence that recommendations released by all-star analysts, analysts from high reputation banks, and analysts who previously issued an influential recommendation are more likely to release influential recommendations. Recommendations released by independent analysts and recommendations released after earnings announcements or management guidance are less likely to be associated with jumps in stock prices.

Finally, we examine the return drift following influential recommendations. We find an immediate reaction of 3.32% (−3.64%) in the 15-minute interval surrounding the release of the recommendation. For recommendation upgrades, this price reaction is nearly complete. Over the next 10, 15-minute intervals, the stock price drifts up 18 basis points. For recommendations downgrades, the drift is larger and amounts to 44 basis points over the 10, 15-minute windows following the recommendation release. While these returns are statistically significant, they are unlikely exploitable once trading costs are introduced.

The remainder of this paper proceeds as follows. In Section 2, we discuss the main implications of BCLO (2014). In Section 3, we present our primary empirical results. Concluding comments are presented in Section 4.

2 Existing evidence

BCLO examine the information content of analysts' recommendation for firms listed on the NYSE between 2002 and 2007 with complete and consecutive trading records. Firms in the sample are required to have at least one recommendation, one management guidance forecast, a CRSP share code of 10 or 11, and not have been delisted or experienced a trading halt during the sample period. Data on analysts' recommendations and earnings announcements are obtained from *I/B/E/S*, while data on management guidance forecasts are obtained from *First Call*. BCLO's final dataset consists of 12,506 recommendation upgrades and downgrades on 537 firms.

In order to verify the accuracy of reported time stamps, BCLO searched the newswires (*Dow Jones News Retrieval*, *Reuters*, and *LexisNexis*) for all daytime announcements reported by *I/B/E/S* and *First Call*. The earliest reported time stamp for each announcement was retained and referred to as the newswire time stamps. Any reported time stamps that are delayed relative to corresponding newswire time stamp are replaced. The final sample contains announcement time stamps that have been verified against the newswires.[1] For continuity, we use the same sample of firms and announcements as in BCLO for all analyses in this study.

Table 1 shows the primary findings on time stamp delay in the *I/B/E/S* database. The table is reproduced from BCLO (2014). It compares announcement period returns using the *I/B/E/S*-reported time stamp versus the time stamp obtained from newswires. The announcement period return for

Table 1 The impact of time stamp corrections.

	N	Mean	Std. dev.	10th	Median	90th
Panel A: Time stamp difference in hours between *I/B/E/S* and the newswires						
All recommendations	305	2.38	3.51	0.48	1.30	5.01
Upgrades	140	2.87	4.69	0.50	1.43	5.64
Downgrades	165	1.96	1.94	0.47	1.25	4.45

	N	Mean	Std. dev.	10th	Median	90th	% Positive
Panel B: 30-Minute returns surrounding *I/B/E/S* and newswire time stamps							
Upgrades:							
I/B/E/S-reported time	136	−0.07%	1.08%	−1.29%	0.04%	0.87%	52.2%
Newswire-reported time	112	1.83%***	2.95%	−0.60%	1.50%***	5.13%	81.3%
p-Value for difference		0.01			0.01		
Downgrades:							
I/B/E/S-reported time	150	−0.09%	1.28%	−1.20%	0.00%	0.94%	46.7%
Newswire-reported time	124	−2.10%***	2.83%	−6.61%	−1.22%***	0.38%	18.6%
p-Value for difference		0.01			0.01		

This table compares *I/B/E/S*-reported time stamps with those obtained from the newswires. Panel A reports descriptive statistics on the difference between these two time stamps in hours. Panel B reports 30-minute returns centered on the time stamp. *p*-Value for difference is the *p*-value for the difference between the returns generated using the *I/B/E/S*-reported time stamp and the newswire time stamp. Table 1 is based on Table 4 from Bradley *et al.* (2014).

both recommendation upgrades and downgrades using the $I/B/E/S$-reported time stamp is not statistically different from zero. When the announcement time is adjusted to the newswire time stamp, however, the announcement period returns are statistically and economically meaningful. Recommendation upgrades generate an average return of 1.83%, while downgrades generate an average return of −2.10%.

These results show that focusing on the $I/B/E/S$-reported time stamps gives the false appearance that analysts' recommendations piggyback on significant market movements. However, once the corrected time stamps are used, BCLO find that analysts' recommendations are indeed informative. These results underline the importance of data integrity for academic researchers as well as practitioners. For academics, it is important that researchers verify the integrity and accuracy of the database used prior to their analyses, otherwise it could lead one to arrive at erroneous conclusions. For practitioners this is especially important because trading strategies rely on backtesting methods using historical data.

The above result suggests that analyst recommendations are, on average, informative, but their relative importance compared to other firm disclosures is not clear. The second contribution of BCLO is to address the relative importance of analyst revisions compared to earnings announcements and management guidance, which are arguably the most important firm disclosures.

This analysis employs a nonparametric jump detection method of Lee and Mykland (2008). A "jump" in stock price is defined by a visibly

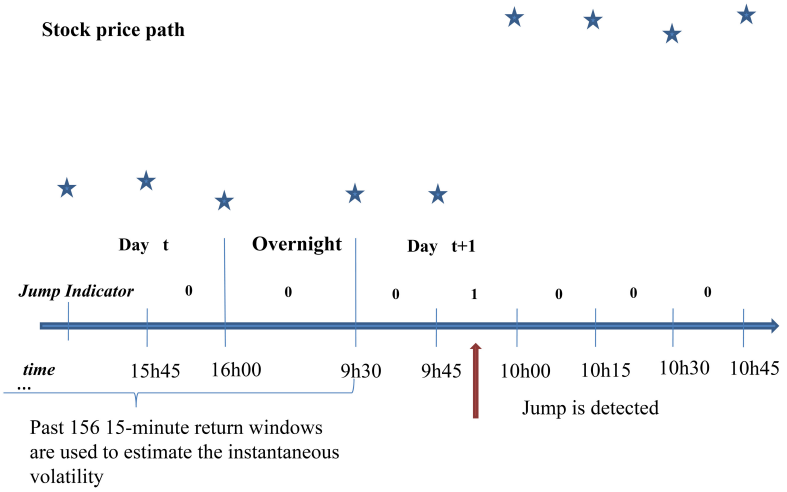

Figure 1 Time line and jump detection method. This figure illustrates the intuition behind the jump detection test used in this paper. Each "star" represents the discrete observed stock price path. According to this figure, a jump occurs between 9h45 and 10h00. We partition the time horizon during the trading day into 15-minute intervals. We retrieve the stock price from the NYSE TAQ database that is closest to each interval mark. We then apply the Lee and Mykland (2008) test to detect whether the return over each 15-minute interval can be characterized as a jump. The intuition behind this test is to compare the logarithmic return over each interval with its instantaneous volatility that is computed using the past $K = 156$ return observations. See Appendix A of BCLO for details of the statistical jump detection threshold. If a jump is detected, we set the jump indicator variable for that return interval equal to one (zero otherwise). Overnight refers to the closing period from day $t - 1$ to the opening period on day t. Figure 1 is based on Figure 2 from Bradley *et al.* (2014).

large movement in a firm's stock price. The Lee and Mykland (2009) method identifies a jump in stock price by comparing each return interval with the instantaneous volatility estimated using past observations. The technical details of the jump detection method can be found in Appendix A of BCLO, but we reproduce their Figure 1 to explain the intuitive approach behind the method. The graph shows 15-minute time intervals from 15h30 on day t to 10h45 on day $t+1$. The period between 16h00 (day t) and 9h30 (day $t+1$) represents the overnight period when US stock markets are closed. The stars in Figure 1 represent the stock price path in each 15-minute interval. In this example, a jump is indicated between the 9h45 and 10h00 interval.

In Table 2, we report the univariate probability of observing a jump during the same 15-minute window as either a recommendation, earnings announcement, or management guidance forecast.

Table 2 provides jump detection statistics with two different time intervals: 30-minute returns and 15-minute returns. Using 30-minute returns, there are over 10 million time intervals, where only 0.4% of observations are classified as jumps (43,879/10,042,726). The same detection rate is found using 15-minute intervals. The middle rows show the relative importance of analyst revisions compared to earnings announcements and management guidance. Given that a disclosure occurs, the percentages shown indicate the probability that such a disclosure is associated with a jump in the stock price. Using 30-minute returns, 23.8% of analyst recommendations, 31.7% of earnings announcements, and 35.9% of management guidance causes a jump. When we move to a finer return interval, i.e., 15-minute return, the

Table 2 Univariate estimates of jump probability.

	Nonparametric jump	
	30-minute return	15-minute return
Number of observations	10,042,726	19,663,802
Number of jumps	43,879	86,576
Detection rate	0.40%	0.40%
Recommendations associated with jumps	23.80%	28.30%
Earnings associated with jumps	31.70%	36.30%
Guidance associated with jumps	35.90%	39.10%
Recommendations associated with jumps	20.80%	25.00%
Earnings associated with jumps	13.30%	16.30%
Guidance associated with jumps	9.50%	10.50%

This table presents descriptive statistics for jump probabilities computed using the nonparametric method described in Lee and Mykland (2008). We detect intraday jumps following the Lee and Mykland (2008) approach using both 15- and 30-minute returns. The univariate jump probability is defined as the percentage of jumps occurring when a particular type of announcement is released. The first rows report the detection rate for each approach, which is defined as the number of jumps divided by the number of observations followed by the likelihood of a jump conditional on the announcement of earnings, recommendations, or guidance. The last rows, we exclude jumps for which two or more events occur in the same window. Table 2 is based on Table 7 from Bradley *et al.* (2014).

detection rate stays constant at 0.4%, but the probability of these events causing a jump increases slightly. Based on the results shown, it appears that of the three disclosures, analysts' recommendation changes are the least likely channel to cause a jump. However, because these disclosures oftentimes overlap, it is impossible to accurately determine which one precisely causes the jump. Thus, events that arrive simultaneously during a time interval are excluded from the analysis to isolate the impact of a single event.

When confounding events are excluded from the analysis (i.e., an earnings announcement and a management guidance that are issued in the same time interval), the results suggest that analyst revisions are the most informative disclosure. Looking at the 15-minute return interval, recommendation revisions cause a jump 25% of the time compared to 16.3% and 10.5% for earnings and management guidance, respectively.

Besides examining the univariate jump probability centered on each information disclosure, as in Table 2, BCLO also studies the determinants of observing jumps in a multivariate framework using panel logistic regressions. In this setup, the dependent variable in the logistic regression is a dummy variable equal to one when there is a jump detected at each 15-minute return interval, and zero otherwise. The independent variables consist of various information event dummies.

Table 3 Logistic regression of intraday jump likelihood.

	All jumps	Positive jumps	Negative jumps
	(1)	(2)	(3)
Intercept	−5.94 (0.01)	−6.70 (0.01)	−6.58 (0.01)
Upgrade	2.99 (0.01)	3.47 (0.01)	−0.55 (0.01)
Downgrade	2.56 (0.01)	−0.83 (0.01)	3.16 (0.01)
Initiation	1.86 (0.01)	1.75 (0.01)	1.55 (0.01)
Earnings announcement	2.10 (0.01)	2.1 (0.01)	1.65 (0.01)
Guidance	1.54 (0.01)	1.2 (0.01)	1.28 (0.01)
Market-wide event	1.04 (0.01)	1.14 (0.01)	0.84 (0.01)
Overnight indicator	2.59 (0.01)	2.71 (0.01)	2.45 (0.01)

This table shows the results from a logistic regression for the likelihood of observing a jump during each 15-minute interval. Regression specification (1) reports results for all (positive and negative) jumps. Regression specifications (2) and (3) report results for positive and negative jumps, respectively. A positive (negative) jump is one in which the 15-minute during the period is positive (negative) and sufficiently large to cause a jump. For positive jumps, the dependent variable takes the value of one if there was a positive jump in a given 15-minute interval (zero otherwise). Similarly, for negative jumps, the dependent variable takes the value of one if there was a negative jump in a given 15-minute interval (zero otherwise). The independent variables are all indicator variables designed to capture various events including upgrades, downgrades, initiations, earnings announcements, management guidance, market-wide events, and the timing of the announcement relative to trading or non-trading hours (Overnight indicator). We use the S&P500 E-mini futures contract to proxy for market-wide events. Firm fixed effects are included in each regression. *p*-Values are reported in parentheses. Intraday jumps are detected over each 15-minute interval using the Lee and Mykland (2009) method. The sample consists of 19,663,802 fifteen-minute return observations obtained from the sample consisting of 537 firms from 2002 through 2007.

For illustration, a matrix of information event dummies for firm j may take the following form:

$$X_j = \begin{pmatrix} 0 & 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \end{pmatrix}$$

Upgrade indicator
Downgrade
Earnings indicator
.....

In the above example, all independent variables are indicator functions indicating whether a particular information event occurs, i.e., equal to one, in each 15-minute interval, and zero otherwise. BCLO estimates a panel of logistic regression over 19,663,802 fifteen-minute return intervals. Table 3 reports an extended version of the logistic regression results of jump likelihood in BCLO.

In the logistic regression (1) in Table 3, we estimate the panel logistic model on the probability of observing either positive or negative jumps in each 15-minute interval. All the independent variables are highly significant with p-Values of less than 1 percent. Positive (negative) coefficients on each variable suggest that its occurrence is likely to cause (not cause) a jump in the same 15-minute window. Overall, the coefficients on *Upgrade* and *Downgrade* are positive and have the largest and second largest magnitude. These dummy variables correspond to analysts' recommendation upgrades and downgrades, respectively. Importantly, the importance of analyst recommendations in influencing jumps is higher than earnings announcements and management guidance. Overall, Table 3 further confirms the univariate results in Table 2 that analyst recommendations are more likely to cause jumps than other disclosure channels.

The logistic regression specifications (2) and (3) in Table 3 extend the results in BCLO by looking at the determinants of positive and negative jumps separately. For positive jumps, the dependent variable takes the value of one if there was a positive jump in a given 15-minute interval (zero otherwise). Similarly, for negative jumps, the dependent variable takes the value of one if there was a negative jump in a given 15-minute interval (zero otherwise). Logistic regression (2) shows that a recommendation upgrade is positively associated with a positive jump, but negatively associated with a negative jump. Therefore, a recommendation upgrade influences the stock price to jump upward and not downward, confirming that the market reacts following the recommendation change in the right direction. Similarly, logistic regression (3) shows that a recommendation downgrade is likely to cause a negative jump but not a positive jump. Overall, in both logistic regressions (2) and (3), analysts' recommendations are the most likely source of jumps in intraday returns.

3 Updated results

In this section, we extend the analysis presented in BCLO along three dimensions. First, we examine the characteristics of delayed recommendations in $I/B/E/S$. Second, we examine the characteristics associated with influential analysts' recommendations. Finally, we examine the post-announcement period drift in stock prices associated with influential analysts' recommendations.

In Table 4, we examine the likelihood of a recommendation having a delayed time stamp in the $I/B/E/S$ database. BCLO hand checks all analyst

Table 4 Likelihood of a delayed recommendation.

	Prob. of a delayed recommendation
Intercept	−0.87 (0.01)
Revision magnitude	0.22 (0.01)
General experience	0.18 (0.01)
Stock experience	−0.01 (0.01)
All-star	−0.14 (0.01)
Independent	0.63 (0.01)
Affiliated	−0.26 (0.01)
Bank reputation	−0.4 (0.01)
Past influential recommendation	−0.71 (0.01)
No. of observations	12,497

This table reports results from a logistic regression for the likelihood of observing a delayed recommendation. BCLO shows that most of recommendations reported in *I*/*B*/*E*/*S* during the trading hours are delayed. Therefore, as a proxy for the likelihood of delay, we use an indicator variable that takes the value of one if the recommendation was released ruing the trading hours and zero otherwise. We estimate the likelihood of a delayed recommendation on various recommendation-level and analyst-level characteristics. *Magnitude of revision* is the change in the recommendation level. *General experience* is a dummy variable equal to one if the analyst making the recommendation has four or more years of total experience, zero otherwise. *Stock experience* is a dummy variable equal to one if the analyst covered the same firm for four or more years consecutively, zero otherwise. *All-star analysts* is a dummy variable if the analyst is defined as an all-star analyst by *Institutional Investor*, zero otherwise. *Independent analysts* is a dummy variable equal to one if the analyst works for an investment firm that does not participate in investment banking activities, zero otherwise. *Affiliated analysts* is a dummy variable equal to one if the analyst's firm provided investment banking services for the firm during the past three years, zero otherwise. *Bank reputation* is defined as banks with a Carter–Manaster ranking of 9, zero otherwise. *Past influential recommendation* takes a value of one if the analyst issued a recommendation associated with a jump during the last calendar year, zero otherwise.

recommendations reported during the daytime in the $I/B/E/S$ database. Among those reported recommendations found in the newswires they find that they are almost always delayed. Thus, as a proxy for the likelihood of a delay recommendation revision, we use an indicator variable that takes the value one if the recommendation was released during trading hours and zero otherwise. We examine the likelihood that a recommendation reported in *I*/*B*/*E*/*S* is delayed to various recommendation-level and analyst-level characteristics. The independent variables include *Magnitude of revision*, which is the change in the recommendation level. *General Experience* is a dummy variable equal to one if the analyst making the recommendation has four or more years of total experience, zero otherwise. *Stock-specific experience* is a dummy variable equal to one if the analyst covered the same firm for four or more years consecutively, zero otherwise. *All-star analysts* is a dummy variable if the analyst is defined as an all-star analyst by *Institutional Investor*, zero otherwise. *Independent analysts* is a dummy variable equal to one if the analyst works for an investment firm that does not participate in investment banking activities, zero otherwise. *Affiliated analysts* is a dummy variable equal to one if the analyst's firm provided

Table 5 Determinants of influential recommendations.

	Prob. of influential recommendation
Intercept	−4.44 (0.01)
Revision magnitude	0.09 (0.03)
General experience	0.01 (0.89)
Stock experience	−0.13 (0.01)
All-star	0.1 (0.01)
Independent	−0.67 (0.01)
Affiliated	−0.17 (0.01)
Bank reputation	0.53 (0.01)
Past influential recommendation	0.25 (0.01)
Prior 1-hour return	0.02 (0.29)
Overnight indicator	3.06 (0.01)
Post-Global Settlement Indicator	0.93 (0.01)
Before Earnings or Guidance	−0.01
After Earnings or Guidance	−0.92
No. of observations	11,975
Likelihood ratio	0.01

This table shows the results from a logistic regression for the likelihood of observing a jump during the 15-minute interval when a recommendation is released. The dependent variable takes a value of one if there was a jump in the 15-minute interval (zero otherwise) coinciding with an analyst recommendation. *Revision Magnitude* is the absolute value of change in the recommendation level. *General experience* is a dummy variable equal to one if the analyst making the recommendation has four or more years of total experience, zero otherwise. *Stock experience* is a dummy variable equal to one if the analyst covered the same firm for four or more years consecutively, zero otherwise. *All-star* is a dummy variable if the analyst is defined as an all-star analyst by *Institutional Investor*, zero otherwise. *Independent* is a dummy variable equal to one if the analyst works for an investment firm that does not participate in investment banking activities, zero otherwise. *Affiliated* is a dummy variable equal to one if the analyst's firm provided investment banking services for the firm during the past three years, zero otherwise. *Bank reputation* is defined as banks with a Carter–Manaster ranking of 9, zero otherwise. *Past Influential Recommendation* takes a value of one if the analyst issued a recommendation associated with a jump during the last calendar year, zero otherwise. *Prior 1-hour return* is the stock return one hour prior to the recommendation. *Overnight Indicator* is a dummy variable equal to one if the recommendation occurred during non-trading hours, zero otherwise. *Post-Global Settlement Indicator* is a dummy variable equal to one if the recommendation release date is after the Global Research Settlement, zero otherwise. *Before Earnings or Guidance* and *After Earnings or Guidance* are dummy variables equal to one if earnings or guidance are released in event days [−2, −1] and [0, 2] relative to an analyst recommendation, respectively. Firm fixed effects are included in each regression. *p*-Values are reported in parentheses.

investment banking services for the firm during the past three years, zero otherwise. *Bank reputation* is defined as banks with a Carter–Manaster ranking of 9, zero otherwise. *Past influential recommendation* takes a value of one if the analyst issued a recommendation associated with a jump during the last calendar year, zero otherwise.

The results suggest that delayed recommendations are less likely if they are issued by all-star

analysts, affiliated analysts, and analysts from high reputation banks. Delayed recommendations are more likely to come from independent analysts, when the change in the level of the recommendation is large or when the analyst has more general experience.

In Table 5, we examine the relation between analysts' characteristics and the likelihood of observing a jump. We use the panel logistic regression model to explore characteristics associated with recommendations that cause a jump in the 15-minute interval. The dependent variable is a dummy variable that takes the value of one if a recommendation causes a jump in the same interval, and zero otherwise. Control variables are as described in Table 4. All-star analysts and analysts from reputable brokerage houses are more likely to issue a recommendation causing a jump in the stock price. Similarly, analysts who have issued an influential recommendation in the past are more likely to issue another influential recommendation. Independent analysts, affiliated analysts, and recommendations released following earnings or guidance announcements are less likely to be associated with a jump.

The findings above are inconsistent with Altinkilic *et al.* (2013). They find that analysts' forecast revisions are information free regardless of whether the forecasts are bold, more accurate, more timely, and are from analysts working for reputable banks. In contrast, we find that there are significant and predictable differences in the ability of analysts to generate an influential recommendation.

As a final test, we examine the return drift following influential recommendation upgrades and downgrades. We examine announcement period returns over a $[-5, +15]$-window surrounding the release of the recommendation. Each period corresponds to a 15-minute window. The results are presented in Table 6.

Recommendation upgrades (downgrades) associated with a jump generate a 15-minute, announcement period return of 3.32% (−3.64%), on average. For recommendation upgrades, the announcement period return is nearly complete. Over the [+1, +5] window, the stock return is only 7 basis points. Over the [+6, +10] window, the stock return is 11 basis points. While

Table 6 Return drift following influential recommendations.

Return window	Recommendations with jumps		Overnight recommendations with jumps		All-star recommendations with jumps	
	Upgrade	Downgrade	Upgrade	Downgrade	Upgrade	Downgrade
[−5,−1]	0.08%**	−0.03%	0.08%***	0.009%	0.10%***	−0.05%
[0]	3.32%***	−3.64%***	3.33%***	−3.55%***	3.22%***	−3.48%***
[1, 5]	0.07%*	−0.34%***	0.05%	−0.33%***	0.03%	−0.22%***
[6, 10]	0.11%***	−0.10%***	0.11%***	−0.09%***	0.15%***	−0.07%***
[11, 15]	−0.03%	0.04%*	−0.02%	0.05%**	−0.02%	0.09%**

This table reports average returns following influential recommendations over different event windows. Influential recommendations were detected by applying the Lee and Mykland (2008) method to our data from 2002 to 2007 using 15-minute returns that are computed from discretely sampled stock prices at each discrete time point (9h30, 9h45, 10h00, etc.). Period 0 refers to the 15-minute window containing influential recommendation. Window +1 is the 15-minute window immediately following the recommendation release. All other windows are labeled similarly. ***, **, * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

the returns over both of these windows are statistically significant, the returns are likely not large enough to offset trading costs. Over the [+11, +15] window, the return is a statistically insignificant 3 basis points.

With respect to recommendation downgrades, the return over the [+1, +5] window is a statistically significant −0.34% and the return over the [+6, +10] window is −0.10%. The cumulative return over the [+1, +10] window of −0.44% is unlikely to be economically meaningful after considering transaction costs.

In Table 6, we also report separate results on the post-recommendation drift for overnight recommendations and all-star analysts. Based on the results in Table 5, both of these variables are significant determinants of influential recommendations. Thus, we explore whether post-recommendation drift is more likely for these types of recommendations. The results are similar across these two subsamples. In sum, the results in Table 6 point to a quick and efficient market reaction to the information contained in analysts' recommendations.

4 Conclusion

Decades of academic research suggests that analysts' opinions are informative to financial markets and aid in the price discovery process. However, a series of recent academic papers challenges this view and suggest that analysts' recommendations systematically 'piggyback' news events, giving the false impression that analysts' recommendations generate investment value. Bradley *et al.* (2014) re-examine the information content of analysts' recommendations and show that time stamp delays drive the new findings. Once these time stamps are corrected using timelier newswire time stamps, analyst recommendations are indeed informative. They also show that analyst recommendations are more likely to cause a major market movement than important firm disclosures such as earnings announcements and management guidance.

In this paper, we review the important findings of Bradley *et al.* (2014) and provide several extensions that should be of interest to practitioners and the academic community. First, we consider which types of recommendations are most likely to be delayed. We find that delays are less likely to come from all-star analysts and analysts that work for high reputation banks, but are more likely from independent analysts.

Next, we explore characteristics related to the likelihood of releasing an influential recommendation. We find informative recommendations are more likely to be issued by all-star analysts, by analysts from high reputation banks, and by analysts who previously issued an influential recommendation. They are less likely to come from independent analysts and following earnings announcements and management guidance.

Finally, we examine post-recommendation drift after the release of an informative analyst recommendation. For both upgrades and downgrades, we find statistically significant returns in the direction of the recommendation revision up to 2.5 hours following the announcement, but the returns are unlikely large enough to exploit once market frictions are introduced.

Note

[1] BCLO did not verify time stamps reported after the trading hours, i.e., overnight, as they do not significantly impact intraday return calculation. Furthermore, not all *I*/*B*/*E*/*S*-reported recommendations are found in the newswires and hence cannot be verified.

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