Stock Timing by Analysts[1]

Naveen Daniel
Drexel University
LeBow College of Business
3141 Chestnut Street, Philadelphia, PA 19104
Phone: 215-895-5858
Email: nav@drexel.edu

Sang Mook Lee
Penn State University
Great Valley School of Graduate Professional Studies
30 E. Swedesford Road, Malvern, PA 19355
Phone: 215-817-2714
Email: sxl65@psu.edu

Lalitha Naveen
Fox School of Business Temple University
1801 Liacouras Walk, Philadelphia, PA 19122
Phone: 215-204-6435
Email: lnaveen@temple.edu

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Preliminary: Please do not quote without authors' permission

Abstract

Prior literature has documented that analysts engage in valuable information discovery and information interpretation. Our contribution is to introduce a third role that analysts play that is also valuable to investors, which we term "stock timing." Specifically, we define a timing report as one where the analyst revises his recommendation but does not revise the Price Target or any of the 23 fundamental drivers of stock price tracked by I/B/E/S. Because the analyst maintains the same price target as in his prior report but still revises his recommendation, such timing calls are contrarian valuation calls. Analysts issue timing downgrades (upgrades) in response to price increases (declines) since the release of their prior report on the firm. We find the 3-day announcement return is over 2% in magnitude, 62% of the reports are winners, 10% of the reports are large enough to be considered influential. The ability to time is similar is magnitude to information interpretation but smaller compared to information discovery. We find considerable cross-sectional and time-series variation in timing ability. We find that the probability of issuing a timing report is positively related to the opportunities to time the stock provided by potential mispricing.

Stock Timing by Analysts

Revisions in recommendations by sell-side analysts are associated with positive abnormal returns for upgrades and negative abnormal returns for downgrades. Several studies (Ivkovic and Jegadeesh, 2004; Asquith, Mikhail, and Au, 2005; Chen, Cheng, and Lo, 2010) have attempted to answer the specific question: what do analysts do to create this value? These studies document two sources for this value addition. First, the analyst may revise his recommendation after generating new signals regarding firm fundamentals by talking to management, competitors, suppliers, customers, or industry contacts. This is termed as information discovery. Second, the analyst may revise his recommendation following information release (such as earnings, industry data). This is termed as information interpretation. The innovation in our paper is to propose a third source of value addition: we hypothesize that analyst possess what we term as "stock timing" ability. This is the ability to discern that the recent stock price movement is not due to a change in firm fundamentals, and then issue an upgrade if the price has fallen or issue a downgrade if the price has risen.

We define a timing report as one where, in relation to his prior report, the analyst revises his recommendation but does not revise his estimate of fundamental value of the firm (i.e., Price Target) or any of the 23 fundamental drivers of firm value (such as Revenue, EPS etc.) for any of the 28 future time periods tracked by I/B/E/S.[2] Though an analyst could revise a maximum of 672 (=24×28) I/B/E/S measures, the maximum number of changes made by an analyst in a single report is 414. Because the analyst maintains the same price target as in his prior report, but still revises his recommendation, it must be because the stock price, subsequent to the release of his prior report, has either moved up warranting a downgrade or moved down warranting an

[2] I/B/E/S keeps track of 10 annual forecasts, 12 quarterly forecasts, and 6 semi-annual forecasts. See Appendix for the full list of 24 measures (including price target) tracked by I/B/E/S.

upgrade. Thus, we are able to capture the essence of stock timing with our definition. Moreover, one may regard a timing report as a short-term contrarian call rather than a long-term valuation call because, by definition, the analyst is not changing his view on firm fundamentals. Using a methodology described in detail in the next section, we classify all reports as timing, discovery, and interpretation. Any reports that are not obviously identifiable as one of these three groups is classified as "others."

If analysts possess stock timing ability as we hypothesize, then (i) markets should react to the release of the timing reports and (ii) economic determinants should explain the cross-sectional and time-series variation in timing ability. To test these predictions, we combine I/B/E/S data from Detail History file and Recommendation file to create the full time series of recommendations made by each analyst over the period 1999–2012. We first identify all revisions and, within this group, we then identify the reports that are timing reports by comparing the Price Target and the 23 I/B/E/S measures in the revision with that in the prior report. Having identified the timing revisions, we then exclude initiations and reiterations. We then exclude revisions issued in the 2 days before and 2 days after earnings announcement date as given in I/B/E/S. We also exclude pseudo revisions issued in 2002 when many brokers, made revisions as they switched to a 3-tier rating scale, but these were not true revisions to comply with a series of regulations (e.g., NASD 277 & NYSE 472). Our final sample consists of 130,729 revisions.

Before we examine our research questions, we provide some validity for our identification strategy. For non-timing reports, we find the stock return between the release of the revision report and the release of the prior report on the same stock by the same analyst is positive for both downgrades and upgrades. By contrast, for timing reports, the return is positive

for downgrades and negative for upgrades. Thus, timing reports seem to be in response to short-term price movement and represent contrarian calls. This provides some confidence to our identification of timing reports.

To get a sense for the importance of timing reports, we first estimate the frequency with which analysts issue timing reports. We find that almost a third of the reports are timing revisions. Moreover, we find that 34% of the downgrades and 26% of the upgrades are timing calls. The higher frequency for downgrades is consistent with the idea that analysts, who are typically reluctant to downgrade stocks, could more easily justify a downgrade to the management if it is a timing downgrade. Analysts could point out to management that their expectations of the fundamentals of the firm have not changed. This way they could continue to be on favorable terms with the management of the firms they track.

Having established the importance of timing reports in terms of their frequency, we turn to our first test of timing ability. We examine the market reaction to timing reports by estimating the cumulative abnormal return (CAR) over the interval [–1, +1] where day 0 refers to the report date. Abnormal return is the stock return less return from a market model estimated over the interval [–300, –46]. The benchmark return is the equal-weighted CRSP returns. We find that timing revisions are associated with mean market reaction of over 2% (CARs = –2.4% for downgrades and +2.2% for upgrades). This is statistically and economically significant, and compares well with the CARs for interpretation reports (–2.6% for downgrades and +2.1% for upgrades). Consistent with Daniel, Lee, and Naveen (2014), however, the CARs for timing are smaller than the CARs for discovery (–4.1% for downgrades and +3.7% for upgrades).

If timing revisions are short-term calls, we expect most of the investor reaction to occur on announcement. It is still possible that the announcement return is incomplete in the sense that

it captures only part of the market reaction to the release of timing reports. Therefore, we examine the post-revision abnormal returns (sometimes referred to as "drift" in the literature) to timing reports. We consider CARs over 1-month [+2, +22], 2-month [+2, +43], and 3-month [+2, +64] intervals following the report date. We find a 1-month post-revision drift in the same direction as the initial reaction (–1.3%) for downgrades but a reversal (–0.5%) for upgrades. The magnitude becomes larger as the drift period extends to 3 months (–2.9% for downgrades and –2.7% for upgrades). Thus, it seems that timing upgrades are short-term contrarian calls because the price corrects itself completely: total abnormal return (announcement return + drift) equals –0.5% over the [–1, +64] period. To the contrary, timing downgrades appear to be true downgrades disguised as timing downgrades, perhaps to keep the management happy (total abnormal return equals –5.3% over the [–1,+64] period).

While the average market reaction indicates timing ability, on average, it does not indicate whether the analyst exhibits ability in any given timing report. We construct three proxies of timing ability at the report level: *Winner*, *Influential Winner*, and *Persistent Winner*. *Winner* is an indicator variable that equals 1 if the announcement CAR has the correct sign (positive for upgrades and negative for downgrades), and equals 0 otherwise. We find the mean of *Winner* to be 60% (significantly greater than 50%), implying that timing ability is widespread and mean announcement CARs are not driven by a few observations.

We then define an indicator variable, *Influential Winner* (as in Lo and Stulz (2011)), which equals 1 if the announcement return has the expected sign (i.e., *Winner* = 1) and is statistically significant at the 5% level. We find that 9–10% of the announcement abnormal returns associated with timing reports are large enough to be influential. In comparison, Loh and

Stulz (2011) find that 13% of the reports in their study are influential as per their definition. Thus, some analyst possess significant timing ability.

We next examine whether analysts exhibit persistence in timing ability using a simple 2×2 classification. We put all timing revisions into four bins based on whether the current timing report is a *Winner* and whether the prior timing report on the same firm by the same analyst is also a *Winner*. We then define *Persistent Winner*, which equals 1 if the current timing report and the prior timing report are both *Winners*, and equals 0 otherwise. We find the mean of *Persistent Winner* to be 37%. Statistically, we are able to reject the null hypothesis of no persistence in ability. The collective evidence on market reaction suggests that analysts have timing ability.

As a second test of our hypothesis that analysts have stock timing ability, we examine the economic forces that can explain the variation in timing ability. Our proxies for timing ability are *Winner, Influential Winner*, and *Persistent Winner*. Because we observe whether the analyst has timing ability only if he or she issues a timing report, we estimate bivariate probit regressions of *Timing* and our proxies for timing ability. *Timing* is an indicator variable that equals 1 if the revision is a timing report, and equals 0 otherwise.

At the univariate level, we find that 28.8% of the 7,487 analysts in our sample issue no timing reports (i.e., *Timing* = 0) through their entire career. At the other extreme, about 7.3% of the analysts issue timing reports over 90% of the time. Even analysts who issue timing reports do not issue timing reports on all the firms they cover. About 11.2% of analysts issue at least one timing report on all the firms they cover. Only a third of analysts issue timing reports on half the firms they cover. These results provide some preliminary evidence that there is cross-sectional variation in timing, which is both analyst and stock-specific. At the aggregate level, we

find that timing revisions are more frequent in the months when mispricing is more likely, as proxied by high levels of market volatility (*VIX*). This result indicates that there is also time series variation in timing.

Timing depends on opportunities available to the analyst to issue a timing report. The opportunities are likely to be higher when VIX and stock volatility are higher, and when the potential for stock to be mispriced is higher. Firms with lower institutional ownership, smaller analyst following, and those that are hard-to-value (as per Baker and Wurgler (2006)) are more likely to be mispriced. Consistent with our hypothesis, we find that *Timing* is indeed related to the five proxies.

We have two broad categories of hypotheses regarding the firm and analyst characteristics that predict timing ability: (i) analyst experience and (ii) costs to the analyst to issuing a timing report. We expect analyst experience, in terms of years being an analyst, years following the industry to which the stock belongs and the number of stocks in the same industry, and years following the stock to be positively related to timing ability. Such experience enables the analyst to disentangle stock price movements due to fundamentals and stock price movements due to mispricing. The first timing report comes after 4.3 years after being an analyst, 3.4 years after following the industry, and 2.9 years after following the stock, implying that experience matters.

In terms of costs, we expect that analysts who cover more firms and industries will find it harder (because of the significant time costs involved) to capitalize on any temporary mispricing that affects the stocks in their portfolio. On the other hand, given the heavy workload associated with covering multiple stock across many industries, it might be harder for such analysts to engage in costly information discovery and hence they may resort to timing as a way to

distinguish themselves. Thus, it is not clear how coverage universe affect the analyst ability to exhibit timing ability. Consistent with our hypotheses, we find that timing ability is positively related to experience. We find mixed evidence when it comes to the costs of timing.

To sum up, prior papers have proposed and examined two important roles of analysts, namely information discovery and information interpretation. We propose a third role: stock timing, which is the ability to time short-term price moves. Our contribution is to document that stock timing is both pervasive and valuable. Our paper provides a first step to understanding this significant role of analysts.

I. Data

Our sample period is from 1999 to 2012. We start with 1999 because I/B/E/S has availability of price targets only from 1999. We combine data from Detail History file containing the measures tracked by I/B/E/S (Price Target, EPS, etc.) and Recommendation file to create the full time series of recommendations (initiations, reiterations, and revisions) made by each analyst for each firm. This is required in order to identify which of the revisions are timing reports. Because our idea of timing rests on the analyst making a comparison of price target with current price, we throw out the reports on firms for which the analyst has never issued a price target.

A. Definitions of Timing

Our idea of timing is one where the analyst revises his recommendation but does not revise his estimate of the fundamental value of the stock (Price Target) or his estimate of 23 firm fundamentals (Sales, EPS, etc.) tracked by I/B/E/S.[3] Of course, there can be different definitions

[3] We handle missing I/B/E/S data in the following way. If a fundamental measure is not available in the both the revision and the previous report, then it implies that the analyst does not think that measure is relevant to estimate his price target and hence only the non-missing measures are compared to identify the timing revisions. If a fundamental measure is available in only one of the two reports (either the revision or the prior report), then we exclude that revision from the final sample. If a fundamental measure has a non-missing value in both the revision

of what it means to say that the analyst has not changed his fundamental view of the firm. We consider an alternative definition of timing, which is less strict than our base case.

Our alternative definition of timing is one where the analyst revises his recommendation but does not revise his estimate of fundamental value of the stock, namely the price target.[4] That is, we do not examine whether the analyst has changed his forecast of the fundamentals of the firm (such as Sales or EPS). One could think of the other 23 measures such as EPS as providing signals of price target. For example, one could think of the analyst arriving at the price target by forecasting, say, future EPS and an appropriate future P/E multiple. Because price target could not have changed as per our definition, if the EPS was increased, the analyst must be implicitly reducing the P/E multiple in order to keep the price target the same.[5] Thus, the analyst estimates of various aspects of the fundamentals offset each other. For example if NFLX entered the content business, the analyst could raise his forecasted EPS while at the same time using a lower P/E multiple to reflect the competitiveness of the content business, leaving the price target the same.

B. Classification of Reports as Discovery, Interpretation, and Timing

Prior research (Ivkovic and Jegadeesh (2004), Asquith, Mikhail, and Au (2005), Chen, Cheng, and Lo (2010), Livnat and Zhang (2012)) generally follows the same broad pattern for identifying discovery and interpretation reports. These papers first identify a set of events (such

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report and the prior report, only then are we able to make a comparison to determine whether the revision is a timing report or not.

[4] This alternative definition of timing has a close parallel to the definition of market timing in the investments literature. The market timer compares his forecast of, say, the S&P500 index (his timing benchmark) to the current index level to decide whether to invest and, if so, how much to invest in the S&P 500 index. In the case of the analyst, he compares his forecast of the stock price—the price target—to the current stock price to decide on his recommendation.

[5] It is also possible that the increase in his earnings forecast is so small that it has a negligible impact on price target, and hence the analyst decides to leave the price target unchanged.

as earnings) and then assume that reports issued within a window surrounding the event date contain analyst interpretation, while all other reports contain discovery. The papers differ in the set of events and the event windows they consider. For example, Jegadeesh and Ivkovic (2004) consider earnings releases as the only event that analysts respond to and assume that all reports issued in weeks (+1, +6) relative to the earnings release date (excluding days 0 and 1) contain interpretation. Thus all reports issued in weeks (-6, -1) are assumed to contain discovery. Similarly, Chen, Cheng, and Lo (2010) assume in their main results that reports in days (+2, +6) contain interpretation, while those in days (-6, -2) contain discovery.

Based on these papers, we adopt the following classification. We define all reports that are issued in days (+3, +7) following an earnings release as interpretation reports.[6] To be conservative, we include in this group reports that we would normally have classified as timing as per our definition above. We define as discovery all reports that are issued in days (-3, -7) and that are not timing reports as per our definition. The logic here is discovery refers to new information production by the analyst—a report that does not have any change in any of the fundamental estimates (as in timing revisions) cannot, therefore, constitute discovery. Any remaining reports are classified as "Others." These reports are a mix of interpretation and discovery, which cannot be separately identified unless we read through the contents of each report as in Daniel, Lee, and Naveen (2014).

C. Timing Frequency Around Earnings

[6] We ignore day –2 and day +2 relative to the earnings date. We do this because when we estimate the cumulative abnormal returns (CARs) to the report, we use a window (–1, +1) relative to the report date. Thus, when we calculate CARs for a report issued on day +2 relative to earnings, day –1 relative to this report would actually refer to day +1 relative to earnings. This would therefore contaminate our CAR results because the CAR window overlaps with the market reaction to earnings. For the same reason, we also ignore day –2 relative to the earnings announcement.

We compute the timing frequency in the 6 weeks surrounding earnings week. We obtain the earnings announcement date from I/B/E/S. Week 0 is the 5-day interval surrounding the earnings announcement date, week –1 is days (–7, –3), and week +1 is days (+3, +7) relative to the earnings announcement date. Figure 1 plots the frequency. We find that the frequency is between 30 to 35% (overall mean = 30%) in all *weeks* except week 0 and 1. For these 10 *days* alone, we plot the frequency on a daily basis. We find the frequency to be above 30% for *day* -2 and *day* -1 relative to earnings. It falls to 20% on day 0 and to its lowest level of 9% on day 1. It climbs back over the next 6 days and hits the normal level of just above 30% on the first day of week 2, and maintains the same frequency over *weeks* 2 to 6. The evidence suggests that timing is not related to data interpretation, at least with respect to earnings.

D. Are These Truly Timing Reports?

Before we examine our research questions, we first document that timing reports are indeed in response to stock price. We report the mean stock returns between the release of the timing report and the release of the "prior report" by the same analyst on the same firm when his fundamental view is exactly same as that in the timing report. The "prior report," thus, depends on our definition of timing. For our base case definition, the prior report for the timing report is the one where all the I/B/E/S measures are exactly same as in the timing report. Because our announcement CARs are estimated over the [–1,+1] window, the prior price change is estimated from day 0 of the release of the prior report to day –2 of the release of the timing report. For timing reports, we expect to find positive returns before downgrades and negative returns before upgrades.

Panel A of Table I reports the results for our base case timing definition. For timing revisions, as expected, we find a positive return (+3.9%) before downgrades and a negative

return (–1.4%) before upgrades. In contrast, for non-timing revisions, we find positive returns for both upgrades and downgrades.[7] These numbers are not large because the number of days that elapses between the timing report and the prior report is only 57 days.

We follow a similar procedure for examining the validity of our alternative definition of timing described in Section I.A. As per our first alternative definition, the analyst has not changed his fundamental view if he maintains the same price target. Therefore, we start with the timing report, go back in time, and identify the first report where the price target is different from that in the timing report. The report following this identified report contains the same price target as that in the timing report, and this is the "prior report." On average, there are 139 days between the timing report and the prior report. We compute the return between these two reports. Panel B of Table I reports the results. We find that prior to release of timing reports, the price has run up 6.1% before downgrades and the price has stayed the same before upgrades. For non-timing reports, once again it is positive for both downgrades and upgrades. As final proof, we use the sample of analyst reports downloaded from Investext in 1999 and 2003 (see, Daniel, Lee, and Naveen (2014)). Of the 213 revisions, 67 are timing reports as per our definition. We read these reports and code whether the analyst mentions that the reason for his revision is due to either price run up (in the case of downgrades) or price fall (in the case of upgrades). We find that in 43% of the timing reports, the analysts mention price change as the reason for the revision. Thus, we are confident we have identified timing reports correctly.

E. Prevalence of Timing Reports

[7] We report the values for non-timing reports only to draw the comparison with timing reports. We have no hypothesis regarding the difference in returns between timing and non-timing reports. We report the difference for those who might be curious.

We examine the frequency of timing reports to get a sense for the importance of this issue. Table II reports the results. Panel A reports the frequency for our base case definition of timing. Overall, 30% of revisions are timing reports. Thus, a substantial fraction of the reports is timing reports. We find the frequency to be higher in the case of downgrades compared to upgrades (34% vs. 26%). The higher number for downgrades is to be expected because analysts are typically reluctant to downgrade stocks in order to keep their management contacts happy (Chen and Matsumoto, 2006; Mayew, 2006; Brown et al., 2013). An analyst could more easily justify a downgrade to the management if it is a timing downgrade because they could point out that their expectations of the fundamentals of the firm have not changed and that they downgraded only because of movement in stock price.

Panel B reports the frequency for our alternative definition of timing report, which is one where the analyst revises his recommendation but does not revise the price target (but could revise any of the other fundamental measures such as EPS). We find 54% of the revisions to be timing reports, which, as expected, is higher than the number in Panel A because the only condition we impose is that the price target has to be the same. Here again, the frequency of timing downgrades is higher than the frequency of timing upgrades (60% vs. 47%). Overall, timing revisions are a big subset of overall revisions, and hence deserve a closer look.

II. Main Results

First, we examine the market reaction to the release of timing reports ability. Second, we examine the factors that can explain the variation in timing ability.

A. Do Analysts have Timing Ability?

A. 1. Announcement Returns

We examine if timing reports are a reflection of analyst skill by estimating market reaction to the release of timing reports. As with all event studies that examine whether announcement returns are significantly different from zero, this is a test of the joint hypotheses that analysts have ability and that the markets react accordingly. For brevity, we will simply interpret market reaction as a reflection of analyst timing ability. That is, if market reaction is negative to a timing downgrade or positive to a timing upgrade, we will interpret the result to mean that analysts have timing ability.

We estimate the cumulative abnormal returns over the [–1, +1] period, where day 0 is the report date. We choose day –1 to account for potential tipping of the recommendation by the analyst to his clients and day +1 to account for the fact that the report could have been released after market close on day 0.[8] We estimate the market model using CRSP equal-weighted returns as the market proxy over the interval [–300,–46]. Table III presents the results. We provide data for non-timing reports for the purpose of comparison only, because we have no prediction that timing reports will be significantly different from non-timing reports.

We first report the mean CARs in Panel A of Table III. We find significant negative return (–2.4%) for timing downgrades and significant positive returns (+2.2%) for timing upgrades. This implies that analysts have timing ability.[9] This is of the same magnitude as the CARs for *Interpretation* (-2.6% and 2.1% respectively for downgrades and upgrades), but lower than those for *Discovery* (-4.1% and 3.7% respectively). The CARs being highest for discovery is consistent with Daniel, Lee, and Naveen (2014) who argue that investors react more strongly

[8] Kecskes et al. also consider day 1 return but use the open price instead of the closing price. Given low volumes during pre-open trading and after-close trading on days other than big-news days such as earnings release, institutional investors who follow analysts may not have had a chance to trade on the report before open on day 1. That is why we use day 1 closing price.

[9] The median CARs are is lower: –1.4% for timing downgrades +1.2% for timing upgrades.

to reports that contain discovery because the report is backed by private information generated by the analyst. Note that we have no hypothesis for whether the announcement CARs for timing reports should be bigger or smaller than that for all other reports. We report the CARs for the other categories purely for comparison purpose.

To examine whether this ability is widespread, we define *Winner* = 1 if the announcement return to the timing report has the predicted sign (negative for downgrades and positive for upgrades), and 0 otherwise. Panel B of Table III reports the mean of *Winner*. We find 63% of timing downgrades have negative CARs and 60% of the timing upgrades have positive CARs. These numbers are significantly greater than 50% implying that a substantial number of analysts have timing ability. Again, these numbers are comparable to those for *Interpretation* (64% and 64% respectively for downgrades and upgrades) but slightly lower than those for *Discovery* (70% and 70% respectively).

Next, we examine whether some of the announcement returns are economically large. Specifically, as in Lo and Stulz (2011), we define an indicator variable *Influential Winner*, which equals 1 if the CAR[–1, +1] has the correct expected sign (i.e., *Winner* = 1) and is statistically significant at the 5% level, and equals 0 otherwise. CAR[–1, +1] is significant if the absolute value of CAR[–1,+1] > $1.96\times\sqrt{3}\times\sigma_e$, where σ_e is the standard deviation of residuals in the estimation interval. Panel C reports the mean of *Influential Winner*. We find that between 9-10% of the timing revisions are influential. This is comparable with Loh and Stulz (2011) who find that 12% of their sample reports have influential CARs, and indicates that some analysts seem to have the ability to predict big short-term moves in stock price. In untabulated results, for these influential timing reports, the mean announcement CARs are –15.3% for downgrades

and +13.9% for upgrades. These numbers are comparable to the mean CARs for influential non-timing reports.

A. 2. Post-Revision Returns

If timing revisions are short-term valuation calls, we expect most of the investor reaction to occur on announcement. It is still possible that the announcement return is incomplete in the sense that it captures only part of the market reaction to the release of timing reports. The magnitude of the post-revision drift depends on how quickly the announcement returns impound the information in the report is impounded. Therefore, we examine the post-revision abnormal returns computed as the CARs over the 1-month [+2,+22], 2-month [+2,+43], and 3-month [+2,+64] periods. As in Keskes et al. (2014), we use a 21-day trading interval to represent a 1-month calendar interval.

Table IV reports the results. From Panel A, we find that for timing downgrades, the mean 1-month drift is –1.3%. This implies that there is continuation of the announcement reaction in the same direction. Such a continuation is consistent with analysts masking their true long-term downgrades as timing downgrades. In contrast, for timing upgrades, however, there seems to be a mild reversal of the initial reaction (–0.5%).[10] Thus, upgrades seem to be much more of a short-term valuation call. Examination of the longer-term drift (Panels B and C) provides further validation. The continuation for downgrades and reversal for upgrades strengthens further to –2.9% for downgrades and an identical –2.7% for upgrades. Thus, for upgrades, the initial market reaction of +2.2% completely reverses over the next 3 months. In comparison, for *Interpretations*, there is continuation of the announcement reaction for

[10] As with announcement CARs, we have no hypothesis whether the post-revision CARs for timing reports should be bigger or smaller than that for non-timing reports. We therefore report the post-revision CAR for non-timing reports purely for comparison purpose.

downgrades, but less reversal for upgrades. For *Discovery*, there is little drift in either direction for both upgrades and downgrades.

Panel D reports the mean of total abnormal return over the interval [–1,+64], which is the sum of announcement abnormal return[–1,+1] and post-revision abnormal return[+2,+64]. We find the total CAR is -5.3%% for downgrades and -0.5% for upgrades. The total CARs for downgrades are comparable across *Timing*, *Interpretation*, and *Discovery*, but for upgrades, the CARs are higher for *Interpretation* and *Discovery* compared to *Timing*.

A. 3. Persistence

Next, we examine whether analysts exhibit persistence in timing ability using a simple 2×2 classification used in the literature on portfolio performance evaluation (for example: Brown and Goetzmann, 1995). We put all timing revisions into four bins based on whether the current timing report is a *Winner* and whether the prior timing report on the same firm by the same analyst is also a *Winner*. We refer to our four groups as WW ($Winner_t$, $Winner_{t-1}$), WL ($Winner_t$, $Loser_{t-1}$), LW ($Loser_t$, $Winner_{t-1}$), and LL ($Loser_t$, $Winner_{t-1}$). Here *Loser* is simply 1-*Winner*. Because timing ability could be stock-specific (we provide evidence for this in Section II.F.1), we do not attempt to characterize an analyst as persistent timer by aggregating data across all stocks covered by the analyst (as in Mikhail, Walther, and Willis 2004).

Table V reports the result. We report the number of observations that belong to each of the four groups. For each cell, we also report the mean announcement abnormal return (in parentheses), the mean post-revision abnormal return over the interval [+2,64] {in braces}, and the mean total abnormal return [in square brackets]. Because the observations within a group include both upgrades and downgrades, we present the returns to an investor who takes a long position in upgrades and a short position in downgrades.

We find that, of the total of 11,981 reports, 7,219 (or 60%) are *Winners* at time *t-1* and a similar fraction (7,172/11,981 = 60%) are *Winners* at time *t* (see "Overall" row). This is also the aggregate of the numbers reported in Panel B of Table III.[11]

To test the null of no persistence, we define the Cross-Product Ratio (CPR) as in Brown and Goetzmann (1995). This is the odds ratio of the number of repeat performers to the number of those that do not repeat, and is given by (#WW×#LL)/ (#WL×#LW), where # indicates the number of reports in each group. As per the numbers shown in Table IV, CPR = 1.26. The standard error of the natural log of the CPR is given by $\sqrt{\frac{1}{\#WW}+\frac{1}{\#WL}+\frac{1}{\#LW}+\frac{1}{\#LL}}$. The test statistic is logarithm of CPR divided by the standard error and this is 6.0. Therefore, we reject the null of no persistence.

We also find the returns (announcement, post-revision, and total) to be higher for timing reports that are persistent winners. Announcement CARs for WW are +6.2% and those for WL are 5.8%. CARs for persistent losers are -5.0%. We observe similar pattern in both post-revision CARs and Total CARs, suggesting that persistent timing ability is recognized by the market place.

B. What Factors Explain the Variation in Timing Ability?

Having established that analysts have timing ability, we then explore the factors that explain the cross-sectional and time-series variation in timing ability. First, we develop our hypotheses regarding factors that explain the variation in timing and timing ability. Second, we present univariate evidence on this variation. Finally, we present regression results that explain the variation in both timing frequency and timing ability.

[11] The numbers are slightly different from those in Table II because to define persistent *Winner*, we need to have the same analyst issue two timing reports on the same firm during our time-period. This causes attrition in the sample size in Table IV.

B. 1. Hypotheses Development and Variable Construction

In this section, we develop hypotheses regarding firm, analyst, and broker characteristics predict variation in timing as well as in timing ability.

Timing depends on opportunities available to the analyst to issue a timing report. Stock price moves must provide sufficient opportunities for the analyst to issue timing revisions. First, we expect analysts to issue timing reports when market volatility, proxied by monthly average of the daily closing values of volatility of the S&P500 index (*VIX*), is high. Second, we expect a volatile stock to provide more opportunities for the analyst to issue timing reports. For example, when volatility is high, stocks are more likely to reach the price target issued by the analyst, giving a chance for the analyst to issue a timing downgrade opportunistically. High volatility could also result in stock price moving much below the price target, giving the analyst a chance to issue a timing upgrade. We estimate *Stock Volatility* as the standard deviation of daily stock returns in the 21 trading days (roughly corresponds to a calendar month) prior to the issue of the timing report. Third, opportunities are more likely where stock mispricing is more likely. Firms with high institutional ownership (*Institutional Ownership*) are less likely to be mispriced. Similarly, if there are many analysts following the stock, then uncertainty associated with the prospect of the firm will be lower, providing less mispricing opportunity for analysts to time their calls. To test this hypothesis, we use *Analyst Following*, which is the number of analysts' annual earnings forecasts used by I/B/E/S to calculate the consensus estimate for the firm for the month that is prior to the month in which the analyst issues his timing report on that firm.

Finally, we follow Baker and Wurgler (2006) to identify a set of firms who are likely to exhibit wider swings in price away from fundamentals. They argue that stocks of smaller, younger, unprofitable, high-volatility, non–dividend paying, growth firms, and firms in financial

distress are likely to be harder to value and also harder to arbitrage, and hence likely to be subject to mispricing. Thus, we use the factor score derived from firm size (proxied by natural logarithm of market capitalization), firm age (years trading on CRSP), profitability (EBITDA/Sales), Dividend Payer dummy, Market-to-Book of Equity, and Altman Z-Score. We do not include volatility because we consider it separately. Only one factor has an eigen value greater than 1. The factor loadings have the correct sign except for market-to-book ratio: we find younger, unprofitable, non–dividend paying, and firms in financial distress have a lower factor score. Hence, we term the factor score *Low-Likelihood-of-Mispricing Factor Score*.

We have two broad categories of hypotheses regarding firm and analyst characteristics that predict timing ability: (i) analyst experience and (ii) costs to the analyst to issuing a timing report.

While opportunities are a necessary condition to issuing a timing report, it is not sufficient to issue a winning timing report. The analyst must have the experience to decipher if the price move is due to change in fundamentals or due to mispricing. We define three different types of relevant experience. (i) *Market Experience*, which is the number of months the analyst has spent covering at least one stock. (ii) *Industry Experience*. We have two proxies: the number of months the analyst has been covering the industry to which the stock belongs and the number of stocks covered by the analyst in the same industry in that year. (iii) *Stock Experience*, which is the number of months the analyst has been covering the stock. We compute the experience values in the year before the analyst issues his timing report. The first timing revision issued by an analyst on a given firm follows 3.4 revisions issued by the same analyst on the same firm and the first timing report comes after 2.9 years of following the stock. This implies that analyst experience matters. We also estimate a factor score for each analyst-firm-

year observation using our three experience measures because the correlations among the experience measures are high: 86% between market and industry experience, 52% between market and stock experience, and 58% between industry and stock experience. We term the factor score *Analyst Experience Factor Score*.

Even if opportunities arise and the analyst has the experience to disentangle stock price movements that arise from changes in fundamental versus mispricing, the analyst has to make a tradeoff between the benefits and costs of issuing a timing report. The benefits of issuing a prescient timing call to the analyst's clients are just the same as the benefits from issuing a revision in recommendation following information discovery or interpretation. Thus, the costs associated with timing might play a bigger role.

In terms of costs to issuing a timing report, we identify only type of costs: time costs. To issue a timing report, the analyst has to be opportunistic to take advantage of, sometimes, fleeting mispricing opportunities. Thus, the analyst has to keep up with what is going on with all the stocks that he covers. This job becomes harder as his coverage universe expands. Thus, we expect that greater the number of industries (*Number of Industries*) and greater the number of stocks (*Number of Stocks*) the analyst covers, the less the likelihood of issuing a timing report. We compute the values of the variables in the year when the analyst issues his timing report. Once again, we compute a factor score, for each analyst-year observation using our two proxies because the correlation is high at 56%. We term the factor score *Analyst Costs Factor Score*.

Table VI reports the descriptive statistics of these variables.

B. 2. Univariate Results

If timing ability is uncommon, we should find that not all analysts issue timing reports. To explore this hypothesis we first estimate the frequency with which analysts issue timing

reports over their entire career. That is, we estimate the analyst-level mean of *Timing*, which we term *Analyst Frequency*. Because this variable is a continuous number, we place the 7,487 analysts in the sample in 12 bins depending on the frequency with which they issue timing reports: exactly 0%, between 0 and 10%,…,, between 90 and 100%, and exactly 100%. Panel A of Figure 2 presents the bar chart of the distribution of *Analyst Frequency*, where each bar represents the proportion of the 7,487 analysts in the sample who belong to each of the 12 bins. We find that 28.8% of the analysts never issue a timing report. We exclude analysts who work for less than a year from our sample before we perform this analysis. Thus, short-tenured analysts who have not yet faced market conditions conducive to issuing a timing report do not drive our results. Moreover, the average tenure of the analysts who never issue a timing report is 3.9 years. Thus, it is not that these analysts are in the database for a short period. At the other extreme, some analysts issue timing reports at a very high frequency: 7.1% of the analysts issue timing reports 100% of the time.

The results above do not tell us whether analysts issue timing reports on all the stocks they cover. It is likely that analysts are not equally skilled at detecting short-term tops and bottoms in all the stocks they cover. To explore this, we first identify whether the analyst has issued at least one timing report on a given firm (on average, an analyst covers 14 firms). We first sum up *Timing* for each analyst for each stock the analyst covers over the entire time during which he has covered the stock. If the sum of *Timing* ≥ 1, it implies that the analyst has issued at least one timing revision on that firm. We then define *Stock Frequency*, which is the fraction of stocks in the analyst's coverage whose sum of *Timing* ≥ 1. As before, we place analysts in 12 bins depending on the frequency: exactly 0%, between 0 and 10%,…, between 90 and 100%, and exactly 100%. Panel B of Figure 2 presents the bar chart of the distribution of *Stock Frequency*,

where each bar represents the proportion of the 7,487 analysts in the sample who belong to each of the 12 bins. In addition to excluding from our sample analysts who work for less than a year, we also exclude analysts who did not make any revision during our sample period from 1999 to 2012. This ensures that we are only including analysts who can time the stocks they cover, but choose not to.

As before, we find that 28.8% of analysts do not have a timing report in any of the stocks they cover. It is not because these analysts cover just a few stocks; the average number of stocks these analysts cover is 8.3. In untabulated results, we find that the median analyst issues timing reports in 17% of the firms. We find (by counting the frequencies for bins > 50%) that about a third of the analyst issue timing reports on more than half their coverage universe. About 11% of the analysts issue timing reports in all of the stocks they cover. Overall, the results imply that issuing timing reports is not pervasive and timing ability might not only be analyst specific but also specific to the stock they cover.

Next, we explore the time series variation in timing reports. When markets are volatile, prices are likely to deviate from fundamental values, giving opportunities for the analyst to step in and issue timing reports. To explore this, we compute the monthly average of the daily closing of *VIX*. We compare this with the monthly mean of *Timing*. Figure 3 plots the time series of average *VIX* and average *Timing*. As shown in Figure 3, both seem to move in tandem during our sample period, except for 4th quarter of 2008 when Lehman Brothers filed for bankruptcy. Consistent with our hypothesis, we find a statistically significant correlation of 0.22 (p-value < 0.01), implying there is time series variation in timing.[12]

B. 3. Multivariate Analysis

[12] When excluding the 4th quarter of 2008 when the VIX shot to an all-time high, the correlation increases to 0.30 with p-value of 0.0001.

We first present logistic regression results for *Timing*. Table VII reports the results. We winsorize all the variables at the 1st and 99th percentile values. We estimate the p-values using standard errors clustered at the analyst-firm level. Given that *VIX* is the same for all observations within a month, we do not include time fixed effects. In Column 1, we use the *Opportunities Factor Score* as the independent variable. As expected, we find the coefficient to be positive, consistent with the idea that analysts try to time the stocks when the opportunities are high for the stock to deviate temporarily from its fundamentals.

In Column 2, we replace the factor score with its individual components. We find that, as hypothesized, *Timing* is more likely when market volatility and stock volatility are high. Also, as expected, *Timing* is negatively related to institutional ownership and analyst following. Contrary to our expectation of a negative coefficient on *Low-Likelihood-of-Mispricing Factor Score*, we find the factor has no explanatory power.

In Column 3, we replace the *Low-Likelihood-of-Mispricing Factor Score* by its underlying components. Firm size, profitability, and dividend status do not affect the likelihood of *Timing*. Consistent with our hypothesis, we find timing is more likely in younger firms, growth firms, and firms in financial distress. This is consistent with the conjecture of Baker and Wurgler that younger firms, high-growth firms, and firms in financial distress are hard to value and hard to arbitrage, which gives rise to higher probability of being mispriced, which in turn provides greater opportunities for the analyst to engage in stock timing.

We finally report the results for regressions of timing ability. Our three proxies for timing ability are *Winner*, *Influential Winner*, and *Persistent Winner*. Since we observe timing ability only when there is a timing report in the first place, we estimate Heckman probit regressions of *Timing* and timing ability. In the interest of brevity, and because the results on

Timing are very similar to those in Table VII, we only report the results for the timing ability measures. Table VIII reports the 2nd stage results.

Column 1–3 reports the regression results using the *Analyst Experience Factor Score* and *Analyst Costs Factor Score*. In all three cases, as expected, *Analyst Experience Factor Score* is significantly positive. This implies that more experienced analysts are more likely to exhibit timing ability. We find that, as expected, *Analyst Costs Factor Score*, is significantly negative but in only two out of three specifications.

Column 4–6 reports the regression results using the underlying components of the two factor scores. Not all components have a statistically significant impact. *Market Experience* and *Industry Experience* in terms of years covering the industry to which the stock belongs does not predict timing ability. *Industry Experience* in terms of number of same-industry stocks covered by the analyst has an uncertain impact on timing ability. While the coefficient is positive (as expected) when it comes to predicting *Influential Winner*, the coefficient is negative when it comes to predicting *Persistent Winner*. *Stock Experience*, as expected, is positively related to timing ability.

In terms of time costs as captured by the busyness of the analyst, we find that the number of stocks covered by the analyst has no bearing on his timing ability. As expected, the number of industries covered has a negative impact on timing ability, but in only two of the three specifications.

Overall, economic determinants appear to explain the variation in timing ability, though there are certain results that go contrary to our expectations. The finding that economic determinants predict timing ability provides further validation that analysts indeed possess timing ability.

III. Robustness

Table IX reports the results of the various robustness tests we conduct. Our first set of tests examines alternative definitions of *Timing*. Our second set of tests examines alternative windows for announcement returns and post-revision returns.

A. Alternative Definitions of Timing

Our base case definition of timing is one where the analyst revises his recommendation but does not revise any of the other I/B/E/S measures such as EPS, price target etc. Our alternative definition of timing, also mentioned in Section I.A, is a recommendation revision where the analyst does not revise his price target even though he could revise any of the 23 fundamental drivers of stock price. Row 1a and Row 1b of Table IX reports the mean announcement CARs and post-revision CARs. Once again, the numbers are similar to that for our base case definition of timing.

Our second alternative definition of timing report is one in which the analyst issues a recommendation revision in the 48 hours prior to earnings release. Clearly, the analyst is making a bold call.[13] In untabulated results, we find that only 2% of recommendation revisions are issued 2 days prior to earnings release. Row 2a and Row 2b of Table IX reports the mean announcement CARs and post-revision CARs respectively. We find that the mean announcement CARs are -3.4% for downgrades and +3.9% for upgrades. These numbers are higher in magnitude to the base case (-2.0% and +2.5%). Thus, the markets seem to respond to these bold analysts more strongly.

B. Alternative Estimation Windows

[13] It is also possible that the earnings information leaked out and the analyst capitalizes on the information to issue a revision in advance of the earnings release. This seems unlikely because a timing report is one where the analyst does not revise any of the fundamental measures but only the recommendation. Thus if the information leaked out was above (below) expectations, then the analyst should have revised his outlook for the fundamental upwards (downwards), which would make it a regular revision and not a timing revision.

Our base case announcement CARs are over the window [-1,+1]. Panel B of Table X reports the announcement CARs over the windows [-2,2] and [-3,+3]. Results are similar to our base case results.

IV. Conclusions

What do analysts do and how do they add value? The literature has documented that analysts engage in information discovery and data interpretation, and both these activities add value. The contribution of our paper is to document a third dimension, what we term as stock timing. This is the ability of the analyst to discern that the recent stock price movements are not due to fundamentals and revise their recommendation to reflect potential mispricing. Specifically timing is defined as the change in recommendation regarding a stock by an analyst without a corresponding change in any of the fundamental estimates of the firm. We show that timing reports are a significant fraction of total reports (30%). Timing is valuable to investors as evidenced by stock returns around the date of a timing report. We find that firm-specific, analyst-specific, and market-specific factors predict both the probability of timing as well as the timing ability. Specifically, timing is more likely at time periods when markets are more volatile, for more volatile stocks, as well as for stocks that are more likely to be mispriced. Timing ability is higher for more experienced analysts and for analysts covering fewer industries.

Appendix
Fundamental Measures Tracked by I/B/E/S

Variable	Description	Forecast Period
(EPS)	Earnings Per Share	▪ 10 Annuals ▪ 12 Quarters ▪ 6 Semi-Annuals
(BPS)	Book Value Per Share	
(CPS)	Cash Flow Per Share	
(Non per share, CPX)	Capital Expenditure	
(CSH)	Cash Earnings Per Share	
(DPS)	Dividend Per Share	
(EBG)	Earnings Per Share - Before Goodwill	
(Non Per Share, EBI)	EBIT	
(EBS)	EBITDA Per Share	
(Non Per Share, EBT)	EBITDA	
(Non Per Share, ENT)	Enterprise Value	
(EPX)	Earnings Per Share - Alternate	
(FFO)	Funds From Operations Per Share	
(GPS)	GAAP/Earnings Per Share - Fully Reported	
(Percent, GRM)	Gross Margin	
(Non Per Share, NAV)	Net Asset Value	
(NDT)	Net Debt	
(Non Per Share, NET)	Net Income	
(Non Per Share, OPR)	Operating Profit	
(Non Per Share, PRE)	Pre-tax Profit	
(Percent, ROA)	Return on Assets	
(Percent, ROE)	Return on Equity	
(Non Per Share, SAL)	Revenue	
(PTG)	Price Target	Mostly 6, 12 and 18 Month Horizons

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Figure 1
Timing Surrounding Earnings

The figure plots the mean of *Timing* over weeks -6 to -1 and weeks +2 to +6 surrounding earnings. In the middle 2 weeks (10 trading days), it plots the daily frequency of *Timing*. Earning announcement day is in the middle of week 0. *Timing* equals 1 if the recommendation revision is a timing report, and equals 0 otherwise. A timing report is one where the analyst revises his recommendation but does not revise the price target or any of the 23 fundamental measures of firm value.

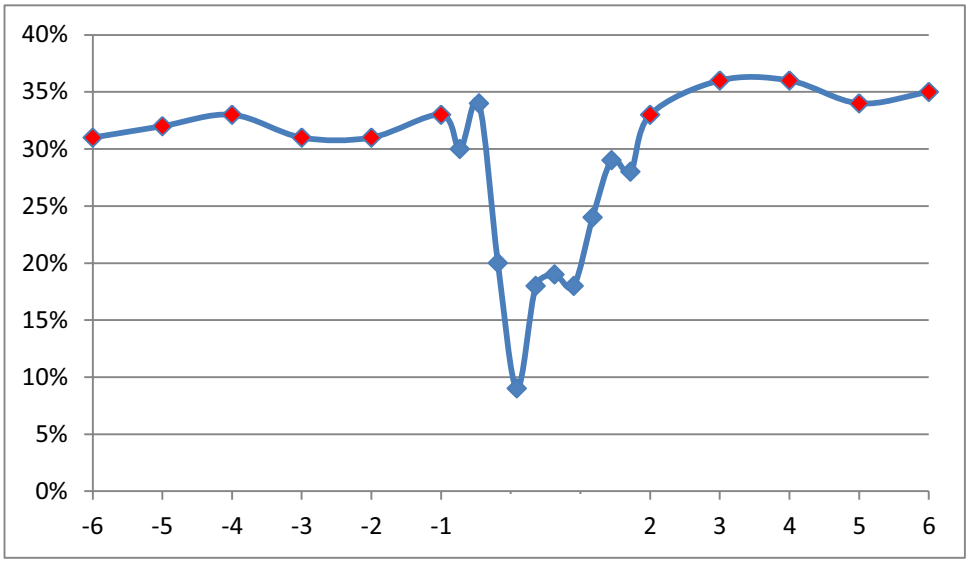
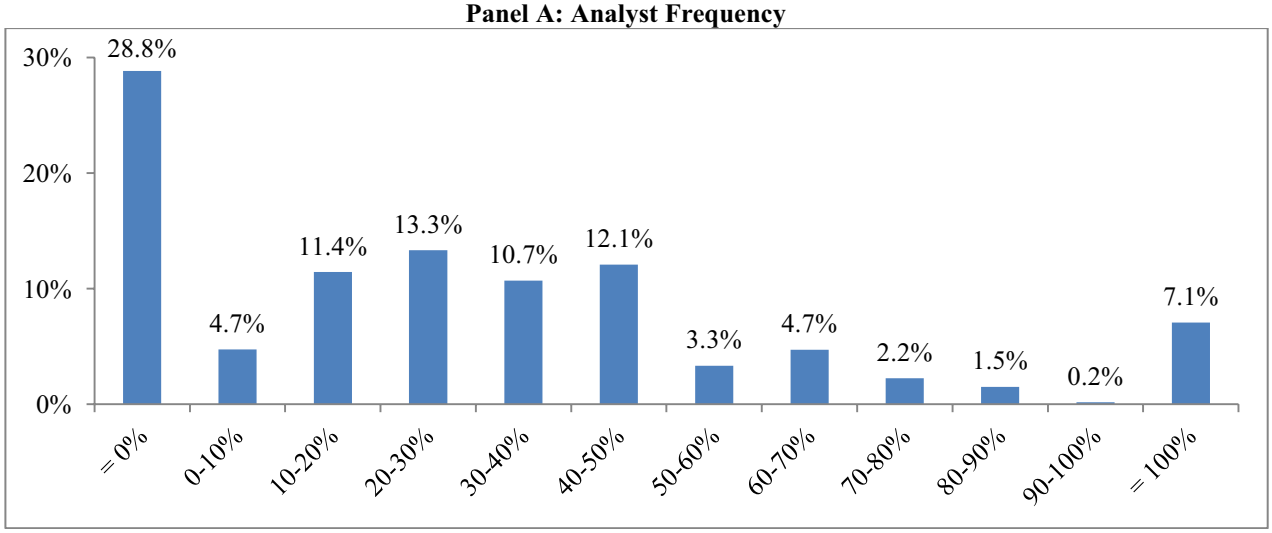


Figure 2
Cross-Sectional Variation in Timing Frequency

The figure documents the cross-sectional variation in timing. We estimate the frequency with which analysts issue timing reports over our sample periods from 1999 to 2012 (*Analyst Frequency*). This is the analyst-level mean of *Timing*, which equals 1 if the recommendation revision is a timing report, and equals 0 otherwise. We place the 7,487 analysts in the sample in 12 bins depending on *Analyst Frequency*: exactly 0%, between 0 and 10%,…, between 90 and 100%, and exactly 100%. We exclude analysts who work for less than twelve months at the time of recommendation revisions or who did not make any recommendation revision during their careers as analysts from our sample before we perform this analysis. Panel A presents the bar chart of the distribution of *Analyst Frequency*, where each bar represents the proportion of the 7,487 analysts in the sample who belong to each of the 12 bins. Panel B presents the bar chart of the distribution of *Stock Frequency*, which is the fraction of stocks in the analyst's coverage on which the analyst has issued at least one timing report during the time he has covered the stock. To estimate this frequency, we first sum up *Timing* for each analyst for each stock the analyst covers over the entire time period during which he has covered the stock. If the sum of *Timing* ≥ 1, it implies that the analyst has issued at least one timing revision on that firm. *Stock Frequency* is the fraction of stocks in the analyst's coverage whose sum of *Timing* ≥ 1. We put each analyst into 12 bins depending on: exactly 0%, between 0 and 10%,…, between 90 and 100%, and exactly 100%. The bar chart plots the proportion of the total of 7,487 analysts who belong to each of the 12 bins.

Panel A: Analyst Frequency



Panel B: Stock Frequency

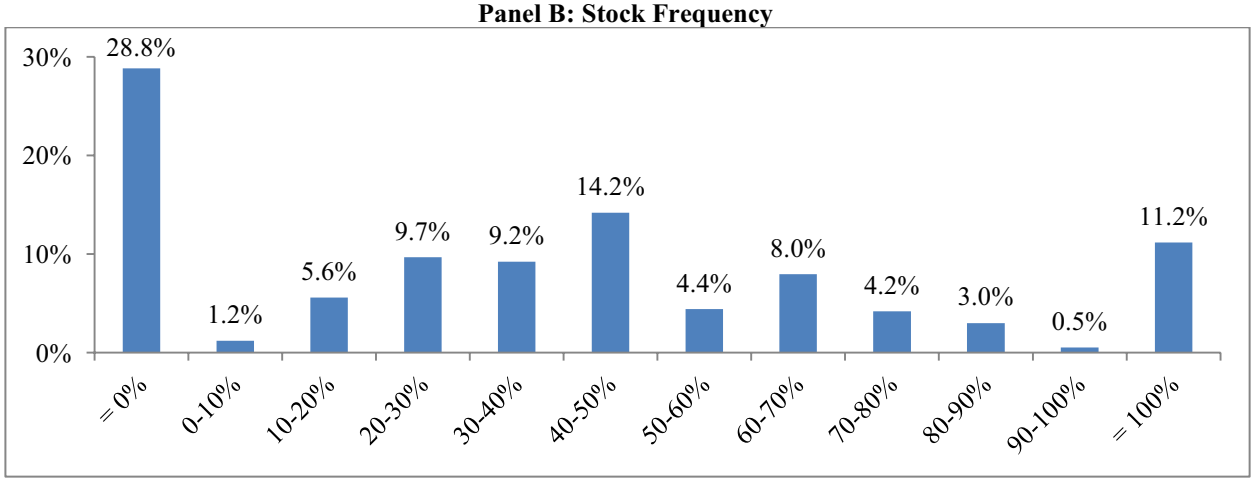


Figure 3
Time-Series Variation in Timing Frequency

The figure plots the month-by-month mean of daily closing values of *VIX* and mean of *Timing*. The overall mean of *VIX* and *Timing* are also plotted in the graph. *VIX* is the implied volatility of S&P500 index options. *Timing* equals 1 if the recommendation revision is a timing report, and equals 0 otherwise.

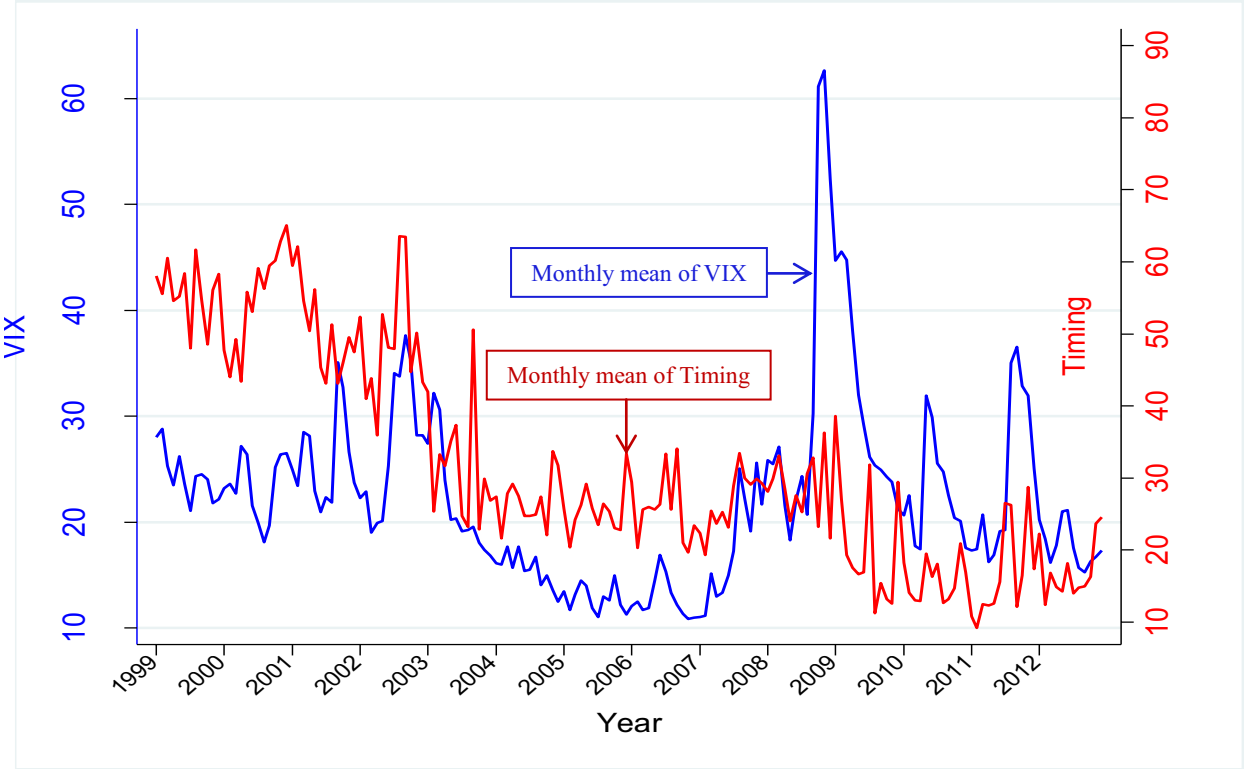


Table I
Are Timing Reports in Response to Price Movement?

The table examines whether timing reports are indeed in response to stock price movement. We report the mean stock returns between the release of the timing report and the release of the "prior report" on the same firm by the same analyst in which his fundamental view is exactly same as that in the timing report. The "prior report," thus, depends on our definition of timing. In Panel A, a timing report is one where the analyst revises his recommendation but does not revise any of the 24 measures tracked by IBES for any of the future time periods. Thus the prior report is the one where all the 24 IBES measures are exactly the same as in the timing report. In Panel B, a timing report is one where the analyst revises his recommendation but does not revise his price target. Therefore, we start with the timing report, go back in time, and identify the first report where the price target is different from that in the timing report. The report following this identified report contains the same price target as that in the timing report, and this is the "prior report." We exclude reports (contaminated reports) issued five days around quarterly earnings announcement dates. We also exclude reports issued during 2002 to take care of mere rating system changes to comply with regulatory rules.

Panel A: Return Since Prior Report for Base Case Definition of Timing

	Timing (A)	Interpretation (B)	Discovery	Others
Downgrade	3.9%***	2.3%***	1.9%***	2.1%***
Upgrade	-1.4%***	1.2%***	0.9%*	1.0%***

Panel B: Return Since Prior Report for Alternative Definition of Timing

	Timing (A)	Interpretation (B)	Discovery	Others
Downgrade	6.1%***	4.0%***	0.5%	1.9%***
Upgrade	0.1%	4.1%***	5.9%***	5.2%***

Table II
How Frequent Are Timing Reports?

The table reports the fraction of recommendation revisions that are defined as timing reports. Thus, the sample consists of only revisions in recommendations. The different panels correspond to different definitions of timing. In Panel A, a revision is defined as a timing report if the analyst revises his recommendation but does not revise any of the 24 measures tracked by IBES. In Panel B, a revision is defined as a timing report if the analyst revises his recommendation but does not revise the price target. We exclude reports (contaminated reports) issued five days around quarterly earnings announcement dates. We also exclude reports issued during 2002 to take care of mere rating system changes to comply with regulatory rules.

Panel A: Base Case Definition of Timing

	Timing	Interpretation	Discovery	Others	Total	Timing/Total
Downgrade	22,927	6,025	2,301	36,181	67,434	34%
Upgrade	16,726	6,478	2,287	37,804	63,295	26%
Total	39,653	12,503	4,588	73,985	130,729	30%

Panel B: Alternative Definition of Timing

	Timing	Interpretation	Discovery	Others	Total	Timing/Total
Downgrade	40,095	6,025	1,313	20,001	67,434	60%
Upgrade	30,017	6,478	1,524	25,276	63,295	47%
Total	70,112	12,503	2,837	45,277	130,729	54%

Table III
Announcement CARs

The table reports results of tests examining the initial market reaction to the release of timing reports. A timing report is one where the analyst revises his recommendation but does not revise any of the 24 measures tracked by IBES. The sample consists of only revisions in recommendations. We obtain the cumulative abnormal returns (CARs) to the announcements from Eventus. This is the stock return minus the return predicted from the market model cumulated over the interval [–1,+1], where day 0 is the day of the report. We estimate market model parameters using CRSP equal-weighted returns as the market proxy over the interval [–300,–46]. Panel A reports the mean of announcement CARs. Panel B reports the mean of *Winner*, which equals 1 if the announcement CAR has the expected sign (positive for upgrades, negative for downgrades), and equals 0 otherwise. Panel C reports the mean of *Influential Winner*, which equals 1 if the announcement CAR has the expected sign (i.e., *Winner* = 1) and is statistically significant at the 5% level, and equals 0 otherwise. Announcement CAR is statistically significant if the absolute value of the announcement CAR > $1.96\times\sqrt{3}\times\sigma_e$, where σ_e is the standard deviation of residuals in the estimation interval. For Panel C, as in Lo and Stulz (2011), we also exclude revisions of firms followed by less than 4 analysts or revisions having multiple recommendations on the same date. We exclude reports (contaminated reports) issued five days around quarterly earnings announcement dates. We also exclude reports issued during 2002 to take care of mere rating system changes to comply with regulatory rules.

Panel A: Announcement CARs

	Timing (A)	Interpretation (B)	Discovery	Others
Downgrade	-2.4%***	-2.6%***	-4.1%***	-4.6%***
Upgrade	2.2%***	2.1%***	3.7%***	3.2%***

Panel B: Winner

	Timing (A)	Interpretation (B)	Discovery	Others
Downgrade	63%***	64%***	70%***	70%***
Upgrade	60%***	64%***	71%*	70%***

Panel C: Influential Winner

	Timing (A)	Interpretation (B)	Discovery	Others
Downgrade	9%***	13%***	16%***	15%***
Upgrade	10%***	13%***	14%*	14%***

Table IV
Post-Revision CARs and Total CARs

The table reports results of tests examining the return that investors could earn by buying after the release of the timing report. The post-revision CAR is the stock return minus the return predicted from the market model cumulated over various intervals. Given approximately 21 trading days per month, we estimate 1-month, 2-month, and 3-month post-revision CARs over the intervals [+2,+22], [+2,+43] and [+2,+64] respectively, where day 0 is the day of the report. We estimate market model parameters using CRSP equal-weighted returns as the market proxy over the interval [–300,–46]. Panels A, B, and C reports the mean post-revision CARs. Panel D reports the mean of total CAR over the interval [–1,+64], which is the sum of announcement CAR[–1,+1] and post-revision CAR[+2,+64]. We exclude reports (contaminated reports) issued five days around quarterly earnings announcement dates. We also exclude reports issued during 2002 to take care of mere rating system changes to comply with regulatory rules.

Panel A: Post-Revision CAR[+2,+22]

	Timing (A)	Interpretation (B)	Discovery	Others
Downgrade	-1.3%***	-0.8%***	0.1%	-0.9%***
Upgrade	-0.5%***	0.4%***	0.6%**	0.0%

Panel B: Post-Revision CAR[+2,+43]

	Timing (A)	Interpretation (B)	Discovery	Others
Downgrade	-2.1%***	-1.6%***	-0.3%	-1.2%***
Upgrade	-1.5%***	-0.2%	0.4%	0.0%

Panel C: Post-Revision CAR[+2,+64]

	Timing (A)	Interpretation (B)	Discovery	Others
Downgrade	-2.9%***	-2.2%***	-1.0%	-1.6%***
Upgrade	-2.7%***	-0.5%	-0.8%	-0.3%**

Panel D: Mean Total CAR[–1,+64]

	Timing (A)	Interpretation (B)	Discovery	Others
Downgrade	-5.3%***	-4.8%***	-5.2%***	-6.2%***
Upgrade	-0.5%**	1.7%***	2.8%***	3.0%***

Table V
Do Analysts Exhibit Persistence in Timing Ability?

The table reports results from tests that examine whether analysts exhibit persistence in timing ability. Using a 2×2 classification, we put all timing revisions into four bins based on whether the current timing report is a *Winner* and whether the prior timing report on the same firm by the same analyst is a *Winner*. We exclude the first timing revision made by the analyst on a given firm because there cannot be a prior timing report issued on the same firm by the same analyst employed by the same broker. *Winner* equals 1 if the announcement CAR has the expected sign (positive for upgrades, negative for downgrades), and equals 0 otherwise. We report the number of timing reports that belong to each group, the mean announcement abnormal return (in parentheses), the mean post-revision abnormal return {in braces}, and the mean total abnormal return [in square brackets]. Announcement CAR is the stock return minus the return predicted from the market model cumulated over the interval [–1,+1], where day 0 is the day of the report. We estimate market model parameters using CRSP equal-weighted returns as the market proxy over the interval [–300,–46]. Post-revision CAR is the stock return minus the return predicted from the market model cumulated over the interval [+2,+22]. Total CAR is the sum of announcement CAR and post-revision CAR. We exclude reports (contaminated reports) issued five days around quarterly earnings announcement dates. We also exclude reports issued during 2002 to take care of mere rating system changes to comply with regulatory rules.

		$Winner_t$		Overall
		Yes	No	
$Winner_{t-1}$	Yes	4,479 (6.20%) {0.80%} [6.80%]	2,740 (-4.70%) {0.31%} [-4.38%]	7,219 (1.95%) {0.62%} [2.56%]
	No	2,693 (5.80%) {1.07%} [6.87%]	2,069 (-5.01%) {0.21%} [-4.32%]	4,762 (1.70%) {0.74%} [2.63%]
	Overall	7,172 (5.92%) {0.90%} [6.83%]	4,809 (-4.81%) {0.27%} [-4.36%]	11,981 (1.85%) {0.66%} [2.59%]

Table VI
Descriptive Statistics of Key Variables that Explain Variation in Timing Ability

Panel A reports the descriptive statistics of key variables that explain the variation in timing ability while Panel B reports the correlations among these variables. The sample includes all recommendation revisions issued between 1999 and 2012. A recommendation revision is defined as a timing report if the analyst revises his recommendation but does not revise any of the 24 measures tracked by IBES for any of the future time periods. Market Volatility is monthly average of VIX. Stock Volatility is the annualized standard deviation of daily stock returns in the 21 days (roughly corresponds to a month) prior to the issue of the revision. Institutional Ownership is a percentage of shares owned by institutional investors at the quarter of revision. Analyst Following is the number of annual earnings forecasts used by IBES to calculate the consensus estimate for the firm for the month prior to which the analyst issues revisions on that firm. Market Experience is the number of years working as an analyst at the time of revision. Stock Experience represents the number of years since an analyst began covering a firm at the time of revision. Number of Industries represents the number of industries the analyst covers in the year of revision. Number of Firms represents the number of firms the analyst covers in the year of revision. We exclude reports (contaminated reports) issued five days around quarterly earnings announcement dates. We also exclude reports issued during 2002 to take care of mere rating system changes to comply with regulatory rules. Panel B reports the correlation of those variables with *** representing for $p<0.01$, ** for $p<0.05$ and * for $p<0.1$.

Panel A: Summary Statistics

Variable	Mean	SD	Median	p25	p75
Market Volatility	22.4	9.4	20.7	16.2	25.6
Stock Volatility	54.7	40.0	42.6	28.4	67.1
Institutional Ownership	0.6	0.3	0.7	0.5	0.9
Analyst Following	12.1	8.2	10.0	5.0	17.0
Low-likelihood-of-Mispricing Factor	0.0	0.8	-0.1	-0.6	0.6
Opportunities Factor Score	0.0	0.8	0.1	-0.5	0.6
Market Experience	7.7	5.5	6.8	3.5	10.6
Industry Experience: Years covering industry	6.4	5.2	5.3	2.3	9.2
Industry Experience: Number of stocks covered in the same industry	10.2	8.5	8.0	3.0	14.0
Stock Experience	3.1	3.2	2.0	0.8	4.2
Analyst Experience Factor Score	0.0	1.0	-0.2	-0.7	0.5
Number of Industries	4.1	2.9	3.0	2.0	5.0
Number of Stocks	18.0	10.9	16.0	12.0	22.0
Analyst Costs Factor Score	0.0	0.7	-0.1	-0.5	0.3

Panel B: Correlations

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	Market Volatility	1								
(2)	Stock Volatility	0.42***	1							
(3)	Institutional Ownership	-0.00	-0.14***	1						
(4)	Analyst Following	-0.01***	-0.13***	0.24***	1					
(5)	Market Experience	0.03***	-0.06***	0.13***	0.06***	1				
(6)	Industry Experience: Years covering industry	0.03***	-0.07***	0.12***	0.08***	0.86***	1			
(7)	Industry Experience: Number of stocks covered in the same industry	0.02***	-0.05***	0.01***	0.02***	0.10***	0.25***	1		
(8)	Number of Industries	0.02***	-0.12***	0.14***	0.14***	0.52***	0.58***	0.07***	1	
(9)	Number of Stocks	0.04***	-0.01**	0.10***	-0.09***	0.16***	0.05***	-0.14***	0.07***	1

Table VII
What Explains the Variation in Timing?

The table presents logistic regressions results with *Timing* as the dependent variable. *Timing* equals 1 if the revision is a timing report, and equals 0 otherwise. *Market Volatility* is based on S&P's volatility index (VIX). *Stock Volatility* is the standard deviation of daily stock returns in the 21 trading days (roughly corresponds to a calendar month) prior to the issue of the timing report. *Analyst Following* is the number of analysts covering the stock. *Low-Likelihood-of-Mispricing Factor Score* is based on Firm Size (natural log of firm market capitalization), Profitability (EBITDA/Assets), Dividend Payer (indicator variable that equals 1 if firms pays dividend), market-to-book ratio of equity, and Z-score. Standard errors are clustered at both firm-analyst pair level. p-values are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Variable	**Dependent Variable = Timing**		
Opportunities Factor Score	0.141***		
	(0.007)		
VIX		0.006***	0.006***
		(0.001)	(0.001)
Stock Volatility		0.001***	0.001***
		(0.000)	(0.000)
Institutional Ownership		-0.468***	-0.459***
		(0.035)	(0.036)
Analyst Following		-0.004***	-0.006***
		(0.001)	(0.002)
Low-Likelihood-of-Mispricing Factor Score		-0.009	
		(0.013)	
Firm Size			0.003
			(0.009)
Firm Age			-0.001**
			(0.001)
Profitability			0.008
			(0.010)
Dividend Payer			0.028
			(0.019)
Market-to-Book			0.011***
			(0.002)
Z-Score			0.009***
			(0.001)
Observations	82,034	82,034	82,034

Table VIII
What Explains the Variation in Timing?

The table presents the second stage heckman probit regression results wherein the first stage we predict Timing, and in the second stage, we predict timing ability. We consider three proxies for timing ability: *Winner*, *Influential Winner*, and *Persistent Winner*. For brevity, we do not report the first stage results, which are similar to the results presented in Table VII. In models 1–3, where we use the *Analyst Experience Factor Scores* and *Analyst Costs Factor Scores*, we use the *Opportunities Factor Score* to predict *Timing*. In models 4–6, where we use the underlying components of the experience and cost factor scores, we similarly use the underlying components of the opportunities factor score. In models for Influential Winner, we additionally exclude both observations of firms followed by less than 4 analysts and observations having multiple recommendations on the same date just like Loh & Stulz (2011) do. Standard errors are clustered at both firm-analyst pair level. p-values are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Dependent Variable =					
Variable	**Winner**	**Influential Winner**	**Persistent Winner**	**Winner**	**Influential Winner**	**Persistent Winner**
Analyst Experience Factor Score	0.029***	0.024**	0.086***			
	(0.009)	(0.010)	(0.012)			
Analyst Costs Factor Score	-0.055***	-0.030***	0.129***			
	(0.009)	(0.011)	(0.021)			
Analyst Experience						
Market Experience				-0.001	-0.005	0.001
				(0.003)	(0.005)	(0.005)
Industry Experience: Years Covering the Industry				0.002	-0.004	0.001
				(0.004)	(0.005)	(0.005)
Industry Experience: Number of Stocks Covered in Same Industry				-0.001	0.014***	-0.003*
				(0.001)	(0.003)	(0.002)
Stock Experience				0.008**	0.047***	0.006
				(0.003)	(0.004)	(0.004)
Analyst Costs						
Number of Industries				-0.015***	0.022***	-0.017***
				(0.004)	(0.007)	(0.006)
Number of Stocks Covered				0.000	0.001	0.003
				(0.001)	(0.003)	(0.002)
Observations	24,445	14,944	24,445	24,445	14,944	24,445

Table IX
Robustness

The table provides results from several robustness tests. Panel A considers alternative definitions of *Timing*. Panel B considers alternative estimation windows for announcement returns and post-revision drift.

		Downgrades			Upgrades		
		Timing (A)	Non-Timing (B)	(A) - (B)	Timing (C)	Non-Timing (D)	(C) - (D)
		A. Alternative Definitions of Timing					
1.	Only ΔPT=0						
	a. Announcement CAR	-3.4%***	-4.6%***	1.2%***	2.1%***	3.7%***	-1.6%***
	b. Post-revision CAR	-0.9%***	-0.6%***	-0.3%**	-0.0%	0.3%***	-0.3%***
2.	48 hours prior to earnings						
	a. Announcement CAR	-3.4%***	-4.7%***	1.3%***	3.9%***	3.3%***	-0.6%
	b. Post-revision CAR	-0.3%	-0.6%***	0.3%	0.9%***	0.2%***	0.7%**
		B. Alternative Windows for Announcement Returns					
3.	Announcement CAR[–2,+2]	-2.6%***	-4.9%***	2.3%***	1.9%***	3.3%***	-1.4%***
4.	Announcement CAR[–3,+3]	-2.7%***	-5.1%***	2.4%***	1.6%***	3.3%***	-1.7%***