Seemingly Inconsistent Analyst Revisions[1]

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Abstract

We study seemingly inconsistent analyst revisions - cases where an analyst issued an original target price and earnings estimate on the same date, then that same analyst updated each of those estimates on the same future date, but did so in opposite directions. Contrary to an assumption in prior literature that inconsistencies among analysts' various outputs stem from conflicts of interest, we provide evidence that these seemingly inconsistent revisions are largely driven by economic and accounting-related reasons. Specifically, we find that shorter horizon earnings forecasts, quarterly earnings forecasts, and forecasts preceded by reported losses and large expenditures on R&D or advertising are more likely to be inconsistent with the direction of target price revisions. We also demonstrate that when analysts provide inconsistent revisions, investors' reaction to subsequent realized earnings is muted, suggesting that, investors also perceive a disconnect between earnings and firm value in these cases. We show that earnings forecasts and target prices are both more accurate when their revisions are directionally inconsistent with one another, indicating that seemingly inconsistent revisions are not a sign of low-quality analyst output. Finally, we document that the market's response to analyst forecast revisions depends critically on the nature of concurrent target price revisions. In fact, the earnings forecast revision is only perceived as incrementally informative relative to the target price revision when the two signals move in opposite directions.

1. Introduction

A large body of literature examines the relation among different analyst outputs, arguing that a desire by analysts to either generate trading behavior or obtain investment banking business can conflict with their desire to issue accurate outputs. A common assumption in this literature is that inconsistency among an analyst's outputs provides evidence that the analyst suffers from such conflicts of interest. (Lin and McNichols 1998; Chen and Chen 2009; Brown and Huang 2013; Malmendier and Shanthikumar 2014). In this study we examine the validity of that assumption by studying the determinants of seemingly inconsistent analyst outputs, and whether seemingly inconsistent outputs reflect obviously conflicted or lower-quality outputs.

Prior papers employ different schemes for classifying analysts' outputs as internally inconsistent. These include observing two outputs where one is high relative to other analysts and the other is low relative to other analysts (Lin and McNichols 1998; Brown and Huang 2013; Malmendier and Shanthikumar 2014), or observing a weak link between a stock recommendation and a calculated measure of intrinsic value based on earnings estimates (Chen and Chen 2009). We focus on the internal consistency between revisions in an analyst's earnings estimates and contemporaneous revisions in that analyst's target price estimates.[1] Specifically, we define an analyst's revision as inconsistent if that analyst revised both a previously-issued target price and a previously-issued earnings estimate on the same date for the same firm (where both the original target price and earnings estimate were also issued on the same date), and the target price revision is directionally opposite the earnings estimate revision.

[1] We focus on the relation between earnings estimates and target prices, rather than stock recommendations, for a few reasons. First, we argue that there is a more direct link between an analyst's earnings estimates and his or her target price estimate, compared to the link between earnings estimates and stock recommendations. Second, stock recommendations are issued significantly less frequently than target price estimates and, when they are issued, are very often reiterations, and therefore lack a clear directional interpretation. Third, stock recommendations can be viewed as a coarse measure of target prices (relative to current stock price), while the target price itself provides a more continuous measure. Finally, target prices tend to generate the strongest market response out of all analyst outputs, yet we know relatively little about the process by which those target prices are generated.

We investigate whether these seemingly inconsistent revisions reflect evidence of low-quality analyst output and/or analysts' conflicts of interest or, alternatively, whether they're driven by economic and accounting-related factors. We do so by analyzing both the determinants of such revisions and how the *ex post* accuracy of target price estimates and earnings estimates varies as a function of their internal (in)consistency. Finally, we examine how investors respond to the combined bundle of analyst revisions (i.e., both target price and earnings estimates), and how that reaction varies with the consistency between the two signals.

We start by documenting that seemingly inconsistent revisions are quite common in the post-Global Settlement era[2] – approximately 22% of earnings revisions issued concurrently with target price revisions are directionally different from the target price revision.[3] We then investigate the determinants of inconsistent revisions in target prices and earnings estimates. Consistent with prior literature, we find that if a firm has recently issued either debt or equity, analysts are more likely to issue inconsistent revisions. On its own, this relationship might support the assumption that inconsistent analyst outputs indicate analysts' conflicts of interest.

However, we also investigate whether inconsistent revisions are more likely when the firm's accounting earnings do not effectively measure real changes in firm value (e.g., when the firm invests in research and development costs or when earnings estimates relate to short-term estimates), and when changes in market-wide discount rates alter the pricing of the firm's earnings. In these cases, inconsistent analyst revisions could be a natural outcome of unbiased analysts' efforts. We find evidence in support of this notion. Revisions in longer-horizon and

[2] The Global Settlement refers to a 2003 settlement between several regulatory agencies and ten top investment banking firms in response to alleged conflicts of interest within those banks that led to the issuance of misleading information to investors. Further information can be found at http://www.finra.org/industry/2003-global-settlement.

[3] As we discuss in Section 3, we retain only observations where both the original earnings estimate and the revised earnings estimates relate to the same fiscal period, the original earnings estimate and target price are issued on the same date. We allow for multiple earnings estimates (for different fiscal periods) on the same date, as long as they meet the above criteria, and discard observations where the analyst introduced estimates for other fiscal periods during the revision period.

annual earnings forecasts are less likely to directionally differ from target price revisions, consistent with the fact that earnings and returns are more highly correlated over longer windows (Easton et al. 1992). Inconsistent signals are more likely for firms that generated losses in the prior year, because losses are less informative about firm value than profits (Hayn 1995), and more likely for firms with higher R&D and advertising spending in the prior year as those expenditures are likely to translate into value in future periods but be reflected as a decrease in current period earnings (Lev and Zarowin 1999).

We also find that changes in market-wide discount rates affect the likelihood of inconsistent signals, particularly when the revisions occur over longer windows (i.e., a longer period between the original and the updated estimates). This is to be expected, as a higher earnings estimate capitalized at a lower multiple could lead to a lower target price. Also intuitive is the fact that the relative pre-revision levels of the analyst's target price and earnings estimate matter; when the analyst's target price is *below* consensus target price and the earnings estimate is *above* the consensus earnings estimate (or vice versa), that analyst is more likely to issue directionally inconsistent revisions to those measures.

Next, we ask whether the equity market's response to earnings news is more likely to be directionally inconsistent with the sign of the news when analysts are releasing inconsistent revisions. We expect that if internally inconsistent analyst output is a function of analysts' conflicts and strategic behavior, there would be no reason for investors to exhibit similar behavior when they interpret firms' earnings announcements. On the other hand, if inconsistent signals are driven by accounting and economic factors, we expect those same factors to lead to greater discrepancy between earnings news and investors' assessments of firm value. We find that short-window earnings announcement period returns are more likely to be directionally

different from the firm's earnings surprise for those firms with the highest proportion of analysts issuing inconsistent signals.[4] We also find that earnings response coefficients are smaller for those same firms. These results again suggest that accounting and economic factors play at least some role in explaining inconsistent analyst revisions.

Our next analysis examines whether seemingly inconsistent analyst revisions reflect lower-quality output, in terms of the accuracy of either the target price or the earnings estimate. We measure the accuracy of both the earnings estimates and target prices and find no evidence that inconsistent signals imply lower-quality signals. In fact, we find the opposite – earnings estimates are more accurate in cases of inconsistent revisions, and the same is true for target prices (the evidence for target prices accuracy is weaker and depends upon exactly how we measure target price accuracy). These findings again suggest that inconsistent revisions are not solely driven by conflicts of interest, and may even represent higher quality information than consistent revisions.

Finally, we focus on the market's response to seemingly inconsistent analyst signals. Prior research shows that when analysts issue multiple contemporaneous signals (e.g., earnings estimates, target prices, recommendations), each signal appears to convey incremental information (Feldman et al. 2012; Asquith et al. 2005). We find a similar result in our data when we analyze the full sample. We then perform the same test for the subsample of internally inconsistent observations. We expect that if analysts are systematically manipulating one of their measures (as in Malmendier and Shanthikumar 2014), investors will disregard that signal and respond only to the truthfully-disclosed measure. On the other hand, if both signals represent

[4] We note that the significance of this relation depends upon how we classify firms based on the extent of inconsistent analysts.

truthful analyst disclosure (despite their seeming inconsistency), we expect that investors will respond positively to the news in both outputs. We find evidence for the latter.

We also show that this result (i.e., measurable responses to both contemporaneous analysts' outputs) is restricted to the subsample of seemingly inconsistent revisions. When the revisions are inconsistent, the investor response to each signal is positive and significant. On the other hand, when the signals are directionally consistent (e.g., both the target price and the earnings estimate is revised upwards), there is no detectable incremental response to the earnings estimate revision. When analysts issue consistent revisions, the information in the target price revision seems to fully subsume the information in the earnings estimate revision.

As for why inconsistent signals seem to be associated with higher quality estimates of both target prices and earnings, we offer the following conjecture: Early target price research concludes that analysts often generated target prices by simply applying a multiple to their earnings estimates (either some appropriate price/earnings multiple or a PEG ratio that took growth rates into account), rather than employing a more complex valuation process (e.g., a residual income model or DCF) (Bradshaw 2004; Brown et al. 2015). A possible explanation for seemingly inconsistent analyst outputs, and the fact that these inconsistent outputs have become more common over time, is that analysts are tending to use more complex valuation models that rely upon a richer set of inputs. The use of more complex models, especially those relying upon inputs other than just earnings, would naturally lead to a greater likelihood that earnings forecast revisions differ from target price revisions, and would plausibly generate more accurate estimates (Gleason et al. 2013).

We offer exploratory evidence in support of this conjecture. First, we show that estimates of non-earnings items (e.g., Sales, EBIT, CapEX) have become more common over time and,

importantly, that inconsistent signals are more likely in those cases where the analyst has issued estimates for more of those non-earnings measures. Moreover, we find that both earnings estimates and target prices are more accurate when the analyst issues more non-earnings estimates. Although exploratory in nature, these patterns are consistent with our conjecture that both seemingly inconsistent analyst outputs and higher quality analyst outputs are a consequence of analysts explicitly estimating more non-earnings metrics.

We contribute to the existing analyst literature in several ways. First, we show that inconsistent analyst signals are associated with several accounting-related and economic factors in intuitive ways. Moreover, these inconsistent signals seem to be associated with higher-quality (more accurate) estimates. One implication is that inconsistent signals should *not* be viewed as *prima facie* evidence of strategic or suboptimal analyst behavior, as some prior research implies. We also show that the information content of analysts' earnings revisions depends critically upon the nature of concurrent target price revisions. When issued in conjunction with target price revisions, earnings revisions appear to have no incremental information content unless they directionally disagree with concurrently-issued target prices.

Our paper also emphasizes the importance of controlling for target price revisions when assessing investor response to earnings revisions, since the two outputs are often issued simultaneously. For example, many studies have looked at how investors respond to earnings estimates (e.g., Clement and Tse 2003; Keung 2010), without considering concurrently issued target prices; our results suggest that this omission could have material effects on inferences. Finally, our paper provides more information on the interrelation between different analyst outputs, and sheds light on the "black box" by which analysts convert their estimates into valuations. Based on our results, we speculate that valuation process may be changing over time,

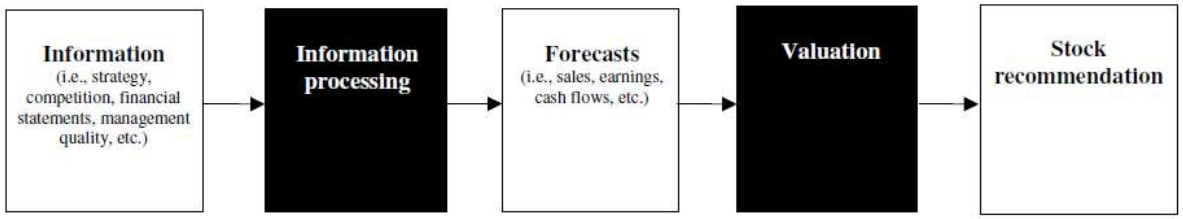
where valuation models are incorporating more non-earnings inputs. But we leave a full investigation of that speculation to future research.

2. Prior Research

2.1. Relation between different analyst outputs

Security analysts generate three main outputs for investors – earnings estimates, target prices, and buy/sell/hold recommendations. There is an intuitive relation among these outputs, illustrated in Figure 1 of Bradshaw (2009), reproduced below. In this schematic, analysts generate estimates of future earnings (and other metrics), convert those estimates into an estimated firm value (target price) through some valuation process, and then generate a recommendation to buy, sell, or hold the stock based on how that estimated fair value compares to the current stock price.

FIGURE 1
Simple Schematic of Analyst Information Processing



A substantial literature has explored the characteristics of each of these outputs, and how analysts derive them. Not surprisingly, this literature finds positive relations among the various analyst outputs. Bandyopadhyay et al. (1995) study the relation between earnings estimates and analysts' target prices for a sample of Canadian firms and find that forecasted earnings explains between 30-60% of the variation in forecasted prices, depending on the horizon of the forecasted

earnings. Bradshaw (2004) documents that analysts' recommendations can be explained by estimated fair values based on forecasted earnings.[5] Ertimur et al. (2007) show that analysts' stock recommendations are more profitable when their earnings estimates are more accurate, suggesting that those earnings estimates are useful in deriving those recommendations.

Although these measures are positively related with one another, they are not redundant signals. For example, Francis and Soffer (1997) study market reactions to analyst reports and show that investors respond to both earnings estimate revisions and stock recommendation revisions; neither measure subsumes the other. Francis and Soffer (1997) note that earnings estimates may be incrementally informative to recommendations, even though recommendations should incorporate the information within those estimates, because the recommendations are categorical rather than continuous, and thus represent information loss. Similarly, Feldman et al. (2012) show that investors respond to all three types of outputs – revisions in recommendations, target price estimates, and earnings estimates – but that the response to target price (and recommendation) revisions is stronger than responses to revised earnings estimates. More importantly, they show that each signal provides information that is incremental to the other two.

Notwithstanding the previous discussion, prior literature also suggests that analysts do not always maintain consistency across their outputs. Bradshaw (2002) studies a sample of 103 analyst reports and finds a positive correlation between disclosed target prices (relative to observed stock prices) and their stock recommendations. However, not all of the analyst reports disclosed a target price. In those cases where the target price was not disclosed, there does not appear to be a relation between a pseudo target price (applying an industry multiple to the firm's estimated earnings) and the analyst's recommendation. One interpretation of this result is that

[5] Bradshaw (2004) notes that the valuations based on present value models (e.g., residual income) do not appear to be related to recommendations, while valuations based on multiples (e.g., the PEG ratio) are strongly related.

analysts issued stock prices that they knew to be inconsistent with their own (undisclosed) estimate of firm value.[6]

2.2. Conflicting analyst outputs as a sign of cognitive bias or incentives

The existence and consequences of conflicts of interest in the sell-side analyst industry have been debated over the last two decades (see Mehran and Stulz (2007) for a survey). As part of this debate, researchers have used a variety of factors as evidence that these conflicts lead to strategically biased behavior. For example, investment-banking affiliated analysts issue more favorable growth forecasts and recommendations (Lin and McNichols 1998; Dugar and Nathan 1995) and are slower to downgrade their recommendations (O'Brien et al. 2005) than unaffiliated analysts; and analysts appear to be able to generate trading volume for their brokerage firm by issuing positive stock recommendations (Irvine 2004). More recently, Malmendier and Shanthikumar (2014) offer another proxy as evidence of strategic analyst behavior – analysts issuing relatively low earnings estimates at the same time as those analysts issue relatively positive stock recommendations, which they refer to as analysts speaking "in two tongues".

Following the 2003 Global Analyst Research Settlement (the settlement), the effect of analysts' conflicts of interest seemed to dissipate: Recommendations became more closely aligned with intrinsic value estimates (Barniv et al. 2009; Chen and Chen 2009), and the distribution of stock recommendations became more balanced, as analysts were more willing to issue Hold and Sell recommendations (Kadan et al. 2009). Corwin et al. (2017) provide evidence that the settlement had a more significant effect on curtailing affiliation bias for the 12 large

[6] Bradshaw offers other interpretations as well, including the possibility that analysts may not disclose target prices when they have less confidence in their valuation inputs.

investment banks sanctioned in the settlement, but that there is strong evidence of bias for non-sanctioned banks both before and after the settlement.

One conclusion from these studies is that individual analysts' outputs became more internally consistent after the settlement, implying that the settlement had been effective in curbing analysts' biased behavior.[7] Broadly speaking, researchers have often characterized internal consistency in analysts' outputs as a natural and desirable attribute; as Bradshaw (2011) notes, "Clearly, recommendations should be linked in some manner to analysts' valuations" and thus "rational behavior by analysts would mean that their own earnings forecasts are correlated with their valuations that provide the basis for their stock recommendations" (p. 30). As another example, Kanne et al. (2012) study target prices issued with stock recommendations and characterize the two signals as confirming one another when they move in the same direction.

Motivated by this line of reasoning, we examine the determinants and consequences of seemingly inconsistent revisions. Our goal is to determine whether these revisions likely reflect lower quality or incentive-driven analyst behavior, or if they seem to have more benign origins. In particular, we focus on the relation between earnings estimates and target prices, and do so for several reasons. First, while much of the prior literature has focused on the relation between stock recommendations and earnings estimates, we believe there is a tighter link between target prices and earnings estimates than between stock recommendations and earnings estimates; recommendations require an assessment of how estimated fair value relates to current stock price, while target prices should be generally unaffected by stock price.[8] Moreover, prior

[7] As Barniv et al. (2009) characterize it – analysts practice what they preach when their earnings forecasts are consistent with a stock recommendation based on those forecasts.

[8] There is an argument that the causality does not go from target price estimate to recommendation, but rather the opposite direction. That is, analysts first determine what recommendation they want to issue for a particular firm, then they choose a target price that, relative to the current stock price, justifies that recommendation. We believe this causality is less likely in our sample, in the post Global Settlement period, because analysts have less incentive to strategically issue recommendations.

research suggests that target prices are often linear functions of earnings estimates, justified based on appropriate P/E ratios or PEG ratios (Bradshaw 2002; Asquith et al. 2005). If target prices are simply estimated as a simple multiple of estimated earnings, it should be relatively uncommon for the direction of the earnings estimate revision to differ from the target price revision.[9]

Second, we know relatively less about target prices than we do about recommendations or earnings estimates. In the earlier figure, Bradshaw characterizes the two black boxes as "the most interesting" steps in the analyst process. Our goal in studying the relation between earnings estimates and target prices is to better understand more about the second black box (how earnings estimates are translated into estimated target prices).

Third, target prices seem to have more influence on investors than earnings estimates. Asquith et al. (2005) study investor response to all components of analyst reports and find that target price revisions contain information incremental to that in earnings estimate revisions and recommendation revisions. Moreover, they find that the response to a target price revision is greater than the response to an earnings estimate revision of the same percentage change. Feldman et al. (2012) and Kanne et al. (2012) draw similar conclusions in their data.

3. Sample Data

We start by identifying target price revisions – pairs of sequential target price estimates made by the same analyst for the same firm. For each target price revision, we then identify any

[9] It is true that an analyst could revise the earnings estimate and the earnings multiple in different directions. However, we expect that higher multiples are warranted by firms with higher anticipated earnings growth. All else equal, it would be unlikely to simultaneously revise upwards the estimated future earnings, but revise downwards to appropriate multiple.

earnings estimates issued by that same analyst that were issued/revised on the same dates. To illustrate, consider the following analyst outputs:

Date	Item	Date
6/15/2016	Target price	$45
6/15/2016	Earnings estimate for fiscal year 2016	$1.25
9/1/2016	Target price	$50
9/1/2016	Earnings estimate for fiscal year 2016	$1.22

In this case, we would start with the target price revision based on the 6/15/2016 and 9/1/2016 target price estimates. We would then match that target price revision to the pair of estimates for the 2016 fiscal year, and we would classify the revision in target price as inconsistent with the revision in earnings estimates, because the target price increased while the earnings estimate was lowered from 6/15/2016 to 9/1/2016. Each target price revision may have multiple matching earnings estimate revisions, depending on how many fiscal periods the particular analyst issued estimates for.

We then exclude observations for which analysts introduced other earnings estimates during the revision window. For example, consider this series of events:

Date	Item	Date
6/15/2016	Target price	$45
6/15/2016	Earnings estimate for fiscal year 2016	$1.25
9/1/2016	Target price	$50
9/1/2016	Earnings estimate for fiscal year 2016	$1.22
9/1/2016	Earnings estimate for fiscal year 2017	$3.00

In this case, the analyst has not only revised an existing 2016 earnings estimate, but also introduced a 2017 earnings estimate. We would eliminate this observation because the analyst is not solely updating existing estimates, but is also introducing new information. The introduction of new information makes it difficult to assess the response to the revision because we cannot disentangle the revision from the new information that comes out simultaneously. (Figure 1

shows several examples of possible sequences, and how we would choose to retain or drop observations in each case.) Finally, we exclude observations where the analyst issues a revised estimate (either target price or earnings) that exactly equals the prior estimate, as such a revised estimate could not be easily classified as either consistent or inconsistent with other concurrent revisions. This last situation is relatively uncommon though, as only about 2% of otherwise-qualifying observations include a reiteration, rather than a new estimate.

This process results in 377,019 unique target price revision events that have at least one concurrent earnings revision on the same dates. This sample represents 36% of the total number of target price revisions that occur during our sample period. The 377,019 target price revisions result in 1,771,386 pairs of revisions of both the target price and an earnings estimate. The distribution of these revisions is presented in Table 1, Panel A. For this set of observations, target prices are more likely to be revised upwards than downwards (54.3% to 45.7%), which reflects the general tendency for stock prices to increase over time.[10] In contrast, earnings estimates tend to be revised downward more often than upwards (54.2% to 45.8%), which is consistent with prior research generally documenting an on-average walkdown in analysts' earnings estimates as the earnings announcement date approaches (Richardson et al. 2004).

Our focus is on the extent to which these revisions are directionally consistent with one another. In our sample, 77.6% of revisions are directionally consistent, split about equally between upward revisions in both target price and earnings estimates (38.8%) and downward revisions in both (38.8%). The remaining 22.4% of revisions are inconsistent with one another, and are noticeably asymmetric. Of the 405,654 inconsistent revisions, 279,298 (69%) reflect

[10] In expectation, an analyst would increase the target price for a non-dividend-paying stock by the cost of equity each year. In our sample, the median revision window (i.e., time between the initial and the updated estimate) is 284. When we examine the determinants of inconsistent analyst signals, we examine the full sample as well as the set of revisions issued after a relatively brief window (less than 90 days).

increased target prices paired with decreased earnings estimates, while only 126,356 (31%) reflect decreased target prices paired with increased earnings estimates.

In Panel B, we show the split between consistent and inconsistent revisions over time. (Figure 2 provides this data graphically.) In the early part of our sample (immediately following the analyst regulations), roughly 16-20% of analyst revisions are inconsistent. That number grows to about 26-29% in the most recent years of our sample period. Thus, the act of issuing seemingly conflicting revisions is prevalent throughout our sample, and is more common in recent years. In untabulated results, we also find that this pattern is not unique to any particular industry. When we classify covered firms into the 12 Fama French industries, we find that conflicting analyst revisions within industry range from about 18% (Business Equipment) to about 33% (Utilities).

4. Results

4.1. What drives inconsistent revisions?

We start by exploring the factors associated with seemingly inconsistent analyst revisions. We identify possible determinants based on prior research, discussions with sell-side analysts, and reading a sample of analyst reports featuring conflicting revisions. We subjectively group these potential determinants into the several categories.

The first category of potential determinants represents situations where current accounting earnings are likely to be less useful in estimating firm value. When earnings are less value relevant, we expect a greater likelihood that analysts revise earnings estimates in one direction, and a target price in another direction. We use the following proxies to capture circumstances where a firm's earnings are less likely to fully capture changes in firm value:

- When the firm experiences significant variation in profitability, so that no single period's earnings are necessarily a good reflection of long-term earnings. We measure this variation as the standard deviation of firm's Return on Assets, *Std. Dev (ROA)*.

- When the firm experiences a loss (Hayn 1995). We use a binary variable, *Loss*, based on a whether or not the firm was profitable in the most recent fiscal year before the analyst's revised estimates.

- When the firm has greater investments in intangible assets. We use three different measures to capture this general construct: *R&D/Advertising* as the combined amount spent on Research & Development and Advertising in the prior period, scaled by total assets; *Book-to-market*, equal to the book value of firm assets divided by the market value of those assets; and *Intangibles*, equal to recognized Intangible Assets scaled by total assets.

The previous factors are all firm-level characteristics. We also expect some estimates to conflict with target price revisions more often than other estimates based on the nature of the estimate. In our sample, there is significant variation in the horizon of earnings estimates, with the horizon at the 10^{th} percentile being 63 days out and the horizon at the 90^{th} percentile being 693 days out. Just as earnings explain a larger proportion of returns over long windows (Easton et al. 1992), we expect that revisions in longer-horizon estimates will be more likely to be consistent with target price revisions. We use two variables to capture this notion: *Log(Horizon)*, the natural logarithm of the number of days between the revised forecast and the fiscal period end date, and *Annual Estimate*, a binary variable equal to 1 for estimates of annual periods.

The second category is based on the analyst's discount rate, or earnings multiple. The argument that revisions in earnings estimates and target price should be directionally consistent implicitly assumes that the pricing function/earnings multiple is held constant. But that is obviously not the case – prices change because of changes in the risk free rate or the risk premium, even if future cash flows are unchanged. We expect that when market-wide multiples have changed during the revision period, we are more likely to observe conflicting outputs. For

example, an analyst may increase an individual firm's estimated earnings, but apply a lower earnings multiple due to a decline in market-wide multiples, so that the net effect on the target price is negative.[11] We account for this effect by including the absolute value of the value-weighted market return during the revision period, |*Market Return*|. This variable would capture both changes in the risk-free rate and changes in the market-wide risk premium during the revision period. We expect that larger absolute returns are more likely to lead to revised multiples, leading to conflicting analyst revisions. We also include changes in the individual analyst's long term growth forecast for the given firm (*ΔLTG Forecast*) which should capture changes in the firm specific risk premium. Again, we expect the larger the change in the firm specific risk premium the more likely to lead to conflicting analyst revisions.

A third category is based on whether or not the firm has accessed the capital markets for financing over the prior year. Prior literature supports the assertion that one of the sources of conflicts of interest is a tendency by analysts to issue overly optimistic research for firms around new equity and debt offerings (Bradshaw et al. 2006). If these conflicts of interest are partially responsible for conflicting analyst revisions we would expect recent issuances of either debt or equity to increase the likelihood of an inconsistent revision. We include the variable *Debt Issue* which is an indicator equal to one if the firm issued any debt during the previous fiscal year, as well as the variable *Stock Issue* which is an indicator variable equal to one if the number of common shares outstanding for the firm increased by more than 10% over the prior fiscal year. Both of these variables are expected to be positively related to the likelihood of inconsistent revisions if conflicts of interest play a role in this behavior.

[11] Note that this phenomena should apply to changes in market-wide or industry-wide multiples, but we do not expect changes firm-specific multiples to lead to conflicting analyst outputs. This is because, all else equal, increases in earnings estimates should lead to higher earnings multiples because higher multiples are justified by higher anticipated earnings growth. So the change in multiple would have the same directional effect on target price as the change in the earnings estimate, and lead to consistent revisions.

A final category is based on the analysts' individual characteristics and environment. If seemingly inconsistent revisions are a sign of a lower quality analyst, we expect that *Analyst Tenure* and portfolio size, *Analyst Coverage*, (which we expect to be positively correlated with analyst quality) will be associated with the likelihood of observing those conflicting revisions. Because we are looking at analysts' *revisions*, rather than simply analysts' *estimates*, we also take into account the possibility that a conflicting signal is driven by the initial estimate, rather than the revision. In other words, the analyst in question may have originally issued a target price and earnings estimates that were hard to reconcile with one another, and the subsequent revision brought each output to a more appropriate level. To capture this factor, we construct a dummy variable equal to 1 for the following cases: the original analyst's earnings estimate was above (below) the median for all analysts covering that firm, but the target price estimate was below (above) the median for all analysts covering that firm. We expect that when analysts had divergent views about estimated earnings versus target prices, *Pre-Revision Inconsistency*, their subsequent revisions are more likely to be directionally different.

We provide descriptive statistics of all these variables in Table 2. We provide the results of our determinants model in Table 3. Column (1) presents results for the full sample, column (2) includes only those observations where the revision was made relatively quickly after the initial estimate (i.e., less than 90 days), and column (3) includes analyst fixed effects.[12] We find mixed evidence that accounting factors play an important role in predicting inconsistent analyst revisions. On one hand, we find that inconsistent signals are significantly more likely for shorter-horizon estimates (coefficient estimates on *Log(Horizon*) and *Annual Estimate*) and revisions following the reporting of a loss (coefficient estimates on *Loss*), or significant expenditures on

[12] Due to the incidental parameters problem when we include analyst fixed effects in column (3) we estimate an OLS regression as opposed to a logistic regression, which is used in columns (1) and (2).

R&D and Advertising (coefficient estimate on *R&D/Ads*). On the other hand, we find no significant association between the remaining accounting variables meant to capture the extent of the firm's profit variation, intangible assets, and growth opportunities.

The results for |*Market Return*|, our proxy for changes in market-wide multiples, differ depending on what sample we use. If we use the full sample, we find a positive and significant relation between absolute market returns and the likelihood of issuing inconsistent revisions. On the other hand, we find no evidence of that relation in the sample of shorter-window revisions. As for the difference between the two columns, we offer the following possible explanation: While market-wide multiples would normally be an important factor in estimating target prices, some analysts' revisions will be made in response to firm-specific events and not because the appropriate multiple has changed. When analysts issue a revised target price soon after issuing their prior estimate, that revision is more likely to be due to a firm-specific event, such as a restructuring announcement or new product. In these cases, changes in market-wide multiples would have little to do with the analyst's update.

Finally, we find evidence consistent with prior literature that inconsistent analyst outputs are more likely to occur shortly after a firm has accessed the capital market. We also find little evidence that analyst quality, at least based on our two proxies, plays a role in predicting inconsistent analyst revisions. We find a significant relation for only one of the two proxies (*Analyst Tenure*), and only for the sample of shorter-window revisions in column (2).

One question that comes up for variables like *Log(Horizon)* is whether it is truly the horizon of the estimate that matters, or whether some correlated factor generates the negative relation we observe in Table 3. For example, it may be the case that certain analysts choose to issue longer horizon estimates, and those analysts have a greater tendency to issue conflicting

revisions. Or, alternatively, the covered firm has some unobservable attribute that leads to conflicting revisions. In order to better determine whether horizon is a driving factor behind conflicting revisions, we take advantage of one feature of our data. For any given target price revision by a single analyst for a single firm, we may have multiple earnings estimates (covering different fiscal periods) for that same analyst and the same firm at the same time.

We test for the effect of horizon while controlling for all analyst and firm characteristics by using a conditional logistic model, which effectively includes a fixed effect at the analyst-firm-target price revision level. In cases where the analyst issued only a single estimate, the observation would be excluded. Similarly, in cases where all of the earnings revisions were consistent (or all were inconsistent) with the sign of the target price revision, those observations would be excluded as well. But if the analyst revised multiple earnings estimates, and only some of them were inconsistent with the target price revision, we can cleanly identify the effect of estimate horizon.

Table 3, Panel B shows the results. Column (1) of the regression includes only a single variable, *Log(Horizon)*, other than the fixed effects, and a substantially smaller number of observations than in Panel A.[13] Column (2) also includes the independent variable *Annual Estimate* as this measure also varies within target price revision events as the same analyst can issue both a quarterly and an annual earnings revision with the same target price revision for one firm. Across both columns the inference is clear. We continue to identify a significant negative relation between both *Log(Horizon)* and *Annual Estimate* and the likelihood of an inconsistent revision. These results confirm that longer-horizon earnings estimates are more likely to be consistent with target price revisions.

[13] Note that all other independent variables (both firm and analyst characteristics) would be subsumed by the fixed effects in this regression.

4.2. Do investors react similarly when responding to earnings announcements?

We next ask whether investors seem to act similar to analysts in terms of how they interpret earnings information. If analysts' inconsistent revisions reflect analyst-specific factors (e.g., incentives or analyst quality), then we would not expect a correlation between the types of covered firms that are the subject of inconsistent revisions and the way that investors respond to earnings information. On the other hand, if inconsistent analyst revisions are the natural product of accounting and economic factors, then we would expect those same factors to cause a wedge between a firm's earnings and how investors value the firm. That is, if firm economics lead analysts to view target prices and earnings estimates as weakly linked, we expect investors to behave in a similar way.

We perform two tests, both focused on short-window earnings announcement returns. First, we examine whether the sign of the earnings surprise differs from the sign of the contemporaneous stock return. We perform a logistic regression where the dependent variable is equal to 1 when the sign of the earnings surprise is not equal to the sign of the market-adjusted 3-day stock return surrounding the earnings announcement. Our construct of interest is the likelihood of analysts issuing inconsistent revisions for the firm. We measure this in two ways. First, we use the percentage of target price/earnings estimate revisions issued for that firm in the last 12 months that were inconsistent. Second, we use a binary variable equal to 1 if that percentage is in the top quartile of all firm-year observations.

Results of this test are presented in Panel A of Table 4. The variable of interest, *Inconsistent Analysts*, is positively associated with the likelihood of earnings announcements generating a short-window return that differs in sign from the earnings surprise. However, the

statistical strength of this association depends upon how we measure that variable. When we define *Inconsistent Analysts* as a discrete variable (Column 1), the coefficient estimate is significantly different from 0 at the $p<0.05$ level. When we define *Inconsistent Analysts* as the percentage of inconsistent revisions in the prior 12 months (Column 2), the coefficient is not statistically significant at even the $p= 0.10$ level.

The control variables all have the expected signs. Larger magnitude earnings surprises are less likely to have conflicting returns. When earnings surprises are close to 0, it's more common for the returns to differ from the sign of the surprise. When the earnings surprise is negative, there is less likely to be conflicting (positive) returns; investors are likely to view earnings surprises equal to or slightly above zero as the product of earnings management, and respond negatively to small positive earnings surprises, but not respond positively to small negative earnings surprises. Larger firms are less likely to have conflicting returns, because earnings are more likely to be value relevant. Similarly, firms with volatile earnings are more likely to have conflicting returns because the current period's earnings surprise is less likely to be reflective of future earnings. High book-to-market firms are more likely to have conflicting returns because they may be financially distressed.

We next test whether earnings response coefficients vary with the likelihood of conflicting analyst signals. We expect that if analysts' target price revisions differ in sign from their earnings estimate revisions due to an economically weak link between price and earnings, then investors' price responses to actual earnings will be weaker. In Table 5, we show the results of a typical ERC regression, where 3-day earnings announcement stock returns are regressed on earnings surprises and other control variables. Our primary variable of interest is the interaction term *Earnings Surprise* Inconsistent Analysts*, where we use the same two measures to identify

the extent of inconsistent revisions. Consistent with our expectations, this interaction term is negative for both measures (at the 1% significance level in Column 1 and the 10% significance level in Column 2), indicating that investors place a lower valuation weight on earnings surprises for the same firms where analysts are more likely to have target price revisions that differ from earnings estimate revisions. Overall, the results in Table 4 and Table 5 provide further evidence that accounting and economic factors are associated with weaker links between firms' earnings and valuations, which is naturally associated with analysts' revisions that appear to be internally inconsistent.

4.3. Are inconsistent revisions a sign of lower-quality revisions?

Next, we attempt to more directly investigate whether inconsistent revisions indicate lower-quality, or even strategically-issued, estimates, as some prior studies imply. We do this by examining the accuracy of both revised target prices and revised earnings forecasts. If inconsistent revisions are a result of strategically-issued analyst outputs, then we would expect to find that one, if not both, of the outputs is less accurate when the revisions are directionally inconsistent than when they both move in the same direction. If, on the other hand, there are accounting or economic reasons for revisions to move in opposite directions we would not predict any differential accuracy of inconsistent versus consistent revisions.

To test whether inconsistent target price revisions are more accurate, we rely on two measures examined in Bradshaw et al. (2013). First, we examine the absolute difference between the revised target price and the actual stock price 12 months after the release of the target price (|*TP_Error*|). The target prices we examine in this paper are all 12 month ahead target prices, so if the stock price 12 months after the issuance of the target price is closer to the target price, we interpret that as a more accurate estimate. Second, we code an indicator variable equal to 1 if the

stock price met or exceeded the target price at any time during the subsequent 12 months, and 0 if it did not (*TP_MetAny*).

We regress each of these accuracy measures on *Inconsistent* as well as firm level controls and firm and calendar year fixed effects. Table 6 reports the results of these regressions. Columns (1) and (2) present the results with |*TP_Error*|, and *TP_MetAny* as the dependent variables, respectively, including one observation for each target price-forecast horizon pair. Columns (3) and (4) present results when we aggregate observations to the target price revision level. Here, we replace *Inconsistent* with *%Inconsistent* (the percentage of earnings forecasts released with that target price revision that were inconsistent) as the independent variable of interest. Across both samples we find a negative and significant coefficient estimate on the measure of inconsistency when |*TP_Error*| is the dependent variable, suggesting that along this dimension of accuracy target price revisions are actually *more* accurate when they disagree with the direction of the contemporaneous earnings forecast.

We take a similar approach to assess the accuracy of earnings forecasts. We first regress the absolute value of forecasted earnings per share minus actual earnings per share times 100 divided by stock price (*Forecast Accuracy*) on *Inconsistent*, control variables, and firm and year fixed effects. Table 7 Column (1) reports the results of this regression which shows a negative and significant coefficient estimate on *Inconsistent*. This finding suggests that earnings forecasts are also *more* accurate when they disagree with the direction of the contemporaneous earnings forecast. Columns (2) and (3) take advantage of the data structure similar to what is done in Table 3 Panel B and include a target price revision event fixed effects. Both columns continue to report a negative and significant coefficient estimate on *Inconsistent* further validating the results in Column (1).

4.4. Does investor response to analyst revisions vary with the consistency of those revisions?

We next focus on how investors respond to analysts' revisions, and whether that response varies with the internal consistency of those revisions. We regress the short-window stock market response on analysts' target price revisions and earnings estimate revisions, and include firm and year fixed effects. To allow for easier comparison across coefficients, we standardize the independent variables by subtracting the sample mean and dividing by the sample standard deviation for each independent variable.

Table 8 presents the results of this analysis. Column (1) shows the results for the full sample. Consistent with the results in Asquith et al. (2005) and Feldman et al. (2012), we find that investor response is significantly associated with both the target price revision and the earnings estimate revision. Moreover, the response to the target price revision is more than ten times larger than the response to the revision in the same analyst's earnings estimate. Of course, the lower weight on the earnings signal isn't surprising – if the analyst's valuation already incorporates the earnings information, the information in the target price would subsume the information in the earnings estimate.

In Columns (2) and (3), we separate the sample into those revisions that are directionally inconsistent (Column 2) and those that are directionally consistent (Column 3). If inconsistent revisions are a function of analysts strategically biasing one of the outputs then we would expect investors to decrease their reliance on, or even ignore, that signal. Similarly, if consistent revisions reflect the truthful disclosure of both estimates, we would expect investors to respond strongly to the information in each signal. However, that is not what we find. In both subsamples, the response to the target price revision is significantly positive. That relation is

stronger when the two signals are consistent with each other (0.029 in Column 3 vs. 0.02 in Column 2); investors respond more strongly to the information in target prices when the earnings estimates revisions are in the same direction. This result is consistent with the results in Kecskés et al. (2016), who show that the market response to analyst recommendation revisions is stronger when those revisions are issued with earnings estimates revised in the same direction.

However, the investor response to earnings estimate revisions is strikingly different across the two columns. When the two signals are inconsistent with one another (Column 2), there is a significantly positive association between the stock market response and the earnings estimate revision. On the other hand, when the earnings estimate is consistent with the target price revision (Column 3), there is no detectable association between the earnings revision and the stock market response.

Our interpretation of these results is that inconsistent analyst revisions do not reflect strategically biased estimates that are consequently downweighted by investors. Instead, our results suggest that investors perceive both the target price and the earnings estimate revisions as conveying credible information. When the two signals are inconsistent with one another, investors respond to both. Otherwise, the information in the target price revision subsumes the information in the earnings estimate. As a result, earnings estimate revisions issued in conjunction with target price revisions are only incrementally informative when the revisions are directionally inconsistent. Consistent with our findings in prior tests, this result provides additional evidence in support of the idea that seemingly inconsistent revisions are actually of higher quality than consistent revisions.

Columns (4) and (5) highlight one important implication of this finding. Here we show the results of regressing the 3-day return on only the earnings estimate revision, for the same two

subsamples. In Column (5) (the consistent revisions subsample), we see the expected positive and significant relation, an upward (downward) revision in earnings estimate by an analyst is correlated with a corresponding upward (downward) movement in stock price. However, in Column (4), for the subsample of inconsistent analyst revisions, we find a significantly *negative* relation between the earnings update and the stock market response. One obvious conclusion is that researchers investigating the response to earnings revisions, and how those revisions vary with different factors, should carefully consider the role of concurrent target price revisions, and how those target price revisions relate to the earnings revisions.

4.5. Why are inconsistent revisions more accurate?

The fact that inconsistent earnings estimate revisions and target price revisions are more accurate may initially seem counter-intuitive for at least two reasons. First, as highlighted in Figure 1 of Bradshaw (2009) earnings estimates should be one input into the valuation process and prior literature documents a positive association between earnings estimates and target prices in the cross section (Bandyopadhyay et al. 1995; Bradshaw 2004; Ertimur et al. 2007). Second, some of the prior research explicitly views inconsistent analyst outputs as *prima facie* evidence of analysts' bias or conflicts of interest, which would suggest these inconsistent revisions might be of *lower* quality, not higher quality (Lin and McNichols 1998; Chen and Chen 2009; Brown and Huang 2013; Malmendier and Shanthikumar 2014).

One possible explanation for our documented relations builds on the fact that earnings estimates are not necessarily the only input to analysts' target price calculations. That is, even though analysts often use simple earnings multiples to generate target prices, it may be the case that some analysts employ richer models that incorporate non-earnings metrics like book value,

profit margins, or even off-balance sheet items. Conflicting revisions may indicate that analysts are using more than a simple earnings multiple to value the firm. Valuation models that employ a variety of inputs, rather than a single earnings number, will naturally be less tied to estimates of the single earnings number, and revisions in those valuations will be more likely to be inconsistent with the revisions in the earnings number.

We perform the following exploratory analysis to assess this possible explanation. We calculate the number of different non-EPS metrics that the individual analyst forecasts for a given firm at any time over the prior 12 months (*N_Analyst Outputs*). We first include this variable in our determinants model. The result of that regression (similar to the regression shown in Table 3) is shown in Table 9, Panel A. We see that the coefficient estimate on *N_Analyst Outputs*, is positive and significant. This result suggests that the more outputs an analyst chooses to explicitly estimate, the more likely that analyst is to issue a seemingly inconsistent revision. That result would be consistent with analysts who use more complex valuation models being more likely to issue seemingly inconsistent revisions.

We then include this same variable in our forecast and target price accuracy tests. In Table 9, Panel B, we show that both earnings estimates and target prices are more accurate when the analyst explicitly issues more non-earnings estimates. Again, these results are consistent with the idea that forecasting a richer set of information is correlated with forecasting more accurate information. We caution that this evidence is only exploratory, and that a more complete investigation of this conjecture is beyond the scope of our current paper.

5. Conclusion

This paper investigates seemingly inconsistent analyst revisions of target prices and earnings forecasts, where both outputs are released on the same date and are then revised on the same date, but the revisions are in opposite directions. We first highlight that these seemingly inconsistent revisions are relatively common, making up more than 20% of the target price revisions in our sample. We then provide evidence that, contrary to the idea that inconsistent analyst outputs represent evidence of the conflicts of interest or strategic behavior by analysts, these seemingly inconsistent revisions are at least partially driven by accounting and economic factors. We go on to show that both outputs in these seemingly inconsistent revisions are more accurate, on average, than consistent revisions. Finally, we show that the market response to analyst revision outputs depends critically on the relation between the outputs. Specifically, we show that the market only places incremental weight on an earnings forecast revision that is released concurrently with a target price revision if the two move in opposite directions.

The evidence presented here results in two main takeaways that can be useful to future research. First, we show that inconsistencies among an individual analyst's different outputs is not, on its own, evidence that the analyst is acting strategically or that he is subject to conflicts of interest. It is entirely possible, and even likely, that those inconsistencies have arisen for rational, economic reasons. Second, we highlight the importance of considering concurrent revisions in target prices when investigating the market's reaction to earnings forecast revisions. Our evidence suggests that failing to do so results in a negative and significant coefficient estimate on the earnings forecast revision when that revision is directionally inconsistent with a concurrent target price revision.

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Figure 1 – Identifying Target Price/Earnings Estimate Pairs

Row #	Initial Date	Interim Date	Revision Date	# of valid observations
1	TP, Q1, Y1, Y2		TP, Q1, Y1, Y2	3
2	TP, Q1, Y1, Y2	Y2	TP, Q1, Y1, Y2	3
3	TP, Y1, Y2		TP, Y1	1
4	TP, Y1, Y2	Y2	TP, Y1	0
5	TP, Y1, Y2	Q1	TP, Y1, Y2	0
6	TP, Y1	Y2	TP, Y1	0

TP = Target Price
Q1 = 1 quarter ahead earnings forecast
Y1 = 1 year ahead earnings forecast
Y2 = 2 year ahead earnings forecast

Figure 1 Notes: This figure illustrates six different patterns in time during which target prices and earnings forecasts can be issued and revised, and shows which observations are included in our sample. When TP, Q1, Y1 or Y2 is listed in the column under either 'Initial Date', 'Interim Date', or 'Revision Date' it means that analyst output was released on that date. We begin constructing our sample by identifying an initial target price release and a subsequent revision of that target price. As such, there are no instances where a target price is revised between the initial date and the revision date, but there are instances where earnings forecasts are revised between these two dates. In order for a target price revision observation to be included in the final sample no earnings forecast may be released from the day after the initial date, up to and including the revision date for a horizon that was not also forecasted on both the initial date and the revision date.

Row 1 is an example of a valid pattern that results in 3 observations in the sample (i.e. TP/Q1, TP/Y1, & TP/Y2). Row 2 highlights that revisions between the two dates are allowed as long as the forecast horizon is also estimated on both the initial date and the revision date. Row 3 highlights that not all forecast horizons released on the initial date must be released on the revision date. However, row 4 demonstrates that any horizon forecasted on the initial date but the not revised date cannot be revised during the interim period. Finally, rows 5 and 6 show that any forecast during the interim period, whether it be for a horizon inside the longest horizon forecasted on both dates (e.g. Row 5) or outside the longest horizon forecasted on both dates (e.g. Row 6) negates all observations linked to that target price revision from inclusion in the sample.

Figure 2 – Inconsistent Output by year

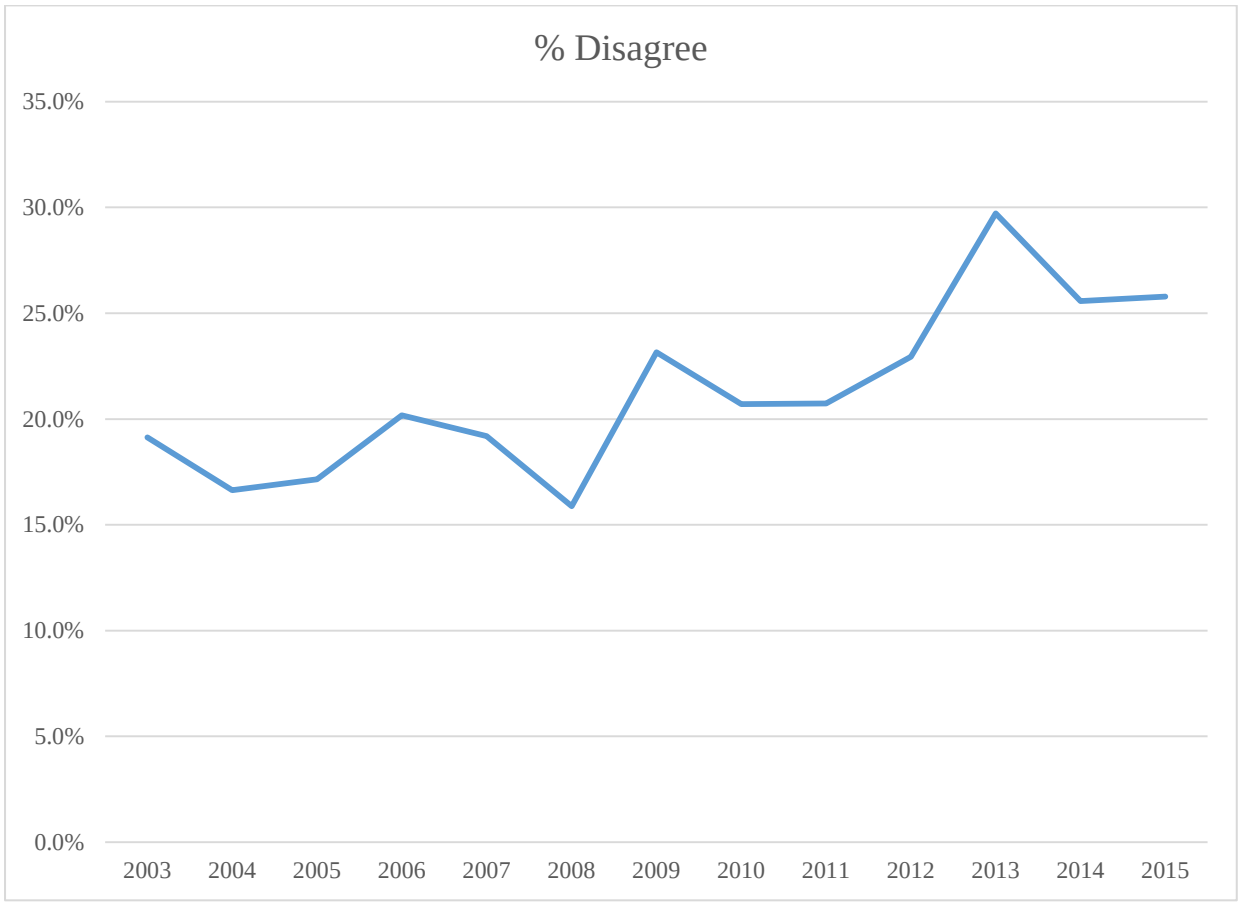

Figure 2 Notes:
This figure shows the frequency of observations where analysts issued directionally-inconsistent target price and earnings estimate revisions on the same date. Observations are classified as directionally-inconsistent if the target price was increased on the same date that an earnings estimate was lowered (or vice versa), where both the prior estimates were also issued on the same date.

Table 1 – Sample distribution
Panel A: Frequency of upward/downward revisions in target prices and earnings estimates

	Earnings Estimate Revised Down	Earnings Estimate Revised Up	Total
Target Price Revised Down	700,634 (38.8%)	126,356 (7.0%)	826,990 (45.7%)
Target Price Revised Up	279,298 (15.4%)	701,773 (38.8%)	981,071 (54.3%)
Total	979,932 (54.2%)	828,129 (45.8%)	1,808,061 (100%)

Consistent	1,402.407	77.6%
Inconsistent (shaded cells)	405,654	22.4%
Total	1,808,061	100.0%

Panel B: Inconsistent revisions by year

Year	Consistent	Inconsistent	Total	% Inconsistent
2003	25,672	6,051	31,723	19.1%
2004	52,140	10,400	62,540	16.6%
2005	61,539	12,690	74,229	17.1%
2006	68,492	17,265	85,757	20.1%
2007	83,178	19,739	102,917	19.2%
2008	132,306	25,001	157,307	15.9%
2009	117,357	35,372	152,729	23.2%
2010	116,140	30,204	146,344	20.6%
2011	151,402	39,652	191,054	20.8%
2012	144,174	43,038	187,212	23.0%
2013	133,685	56,656	190,341	29.8%
2014	151,085	52,134	203,219	25.7%
2015	165,237	57,452	222,689	25.8%
Total	1,402,407	405,654	1,808,061	22.4%

Notes: Panel A of this table presents the frequency of upward and downward earnings forecast and target price revisions in a 2x2 matrix. Shaded cells in the off diagonal are observations that we refer to as inconsistent revisions. Panel B presents the breakdown of consistent and inconsistent revision observations by year. The last column of Panel B shows the percentage of revisions each year that are inconsistent where there is an upward target price revision and a downward earnings forecast revision or vice versa.

Table 2 – Univariate Statistics

	Mean	Std Dev	10th Pctl	Median	90th Pctl
Inconsistent	0.224	0.417	0	0	1
Horizon	346.273	268.795	63	291	693
Ln_Horizon	5.496	0.930	4.143	5.673	6.541
R&D/Advertising	0.042	0.068	0.000	0.008	0.133
Book-to-Market	0.634	0.277	0.264	0.627	0.996
Intangibles	0.159	0.186	0.000	0.082	0.450
Std Dev. (ROA)	0.059	0.083	0.006	0.031	0.136
Annual Estimate	0.399	0.490	0	0	1
Loss	0.159	0.365	0	0	1
|Market Return|	0.051	0.051	0.006	0.038	0.107
Pre-Revision Inconsistency	0.353	0.478	0	0	1
ΔLTG Estimate	-0.039	1.924	0.000	0.000	0.000
Debt Issue	0.597	0.490	0	1	1
Stock Issue	0.163	0.369	0	0	1
Analyst Tenure	13.059	8.835	3	11	27
Log(Analyst Coverage)	2.732	0.553	2.079	2.833	3.296
N_Analyst Outputs	7.329	3.735	2	7	12

Notes: This table presents descriptive statistics for the variables included in the determinants regression. *Inconsistent* is an indicator variable equal to 1 for earnings forecast revisions that move in the opposite direction from the target price revision and 0 otherwise. *Horizon* is the number of days between the revised forecast and the fiscal period end date of the period being forecast. *Log(Horizon)* is the log of *Horizon.* Accounting variables are measured as of the end of the most recent fiscal year prior to the release of the initial forecast date. *R&D/Advertising* is the sum of R&D expenditures and Advertising divided by total assets. *Book-to-market* is the book value of assets divided by the book value of assets minus the book value of equity plus the market value of equity. *Intangibles* is total intangible assets divided by total assets. *Std. Dev(ROA)* is the standard deviation of annual ROA over the previous 5 fiscal years. *Annual Estimate* is an indicator variable if the earnings forecast is for an annual fiscal period and 0 if the forecast is for a quarterly fiscal period. *Loss* is an indicator if the firm reported a loss in the prior fiscal year and 0 otherwise. |*Market Return*| is the absolute value of the value weighted market return between the date of the initial forecast date and the forecast revision date. *Pre-Revision Inconsistency* is an indicator variable if the initial target price was above the median consensus target price and the initial earnings forecast was below the median consensus earnings forecast or vice versa and 0 if both were either above or below the median consensus. *ΔLTG Estimate* is the most recent long term growth estimate made by the analyst as of the revision date minus the most recent long term growth estimate issued no more than 90 days prior to the initial estimate date. *Debt Issue* is an indicator variable equal to one if the firm issued debt during the prior fiscal year and zero otherwise. *Stock Issue* is an indicator variable equal to one if the total shares outstanding increased by 10% or more over the prior fiscal year and zero otherwise. *Analyst Tenure* is the number of years since the analyst first showed up in the IBES database covering

any firm. *Log(Analyst Coverage)* is the natural log of the total number of firms that an analyst provides at least one earnings forecast for during the same calendar year. *N_Analyst Outputs* is the number of different metrics forecasted by the analyst for the specific firm excluding EPS (e.g. book value per share, cash flow per share, EBITDA, etc.).

Table 3 – Determinants of Inconsistent Signals
Panel A: Full Sample

Dependent Variable: *Inconsistent* Indicator variable equal to 1 if the earnings estimate revision is directionally opposite concurrent target price revision.

Independent Variable	All Observations (1)	Within 90 Days (2)	All Observations (3)
Log(Horizon)	-0.119***	-0.113***	-0.022***
	(0.005)	(0.006)	(0.001)
R&D/Ads	0.483***	0.575**	0.082***
	(0.179)	(0.229)	(0.023)
Book-To-Market	0.017	0.079	0.022***
	(0.061)	(0.053)	(0.006)
Intangibles	0.007	-0.065	-0.003
	(0.068)	(0.077)	(0.006)
Std. Dev(ROA)	-0.064	-0.019	0.011
	(0.113)	(0.105)	(0.014)
Annual Estimate	-0.244***	-0.276***	-0.045***
	(0.013)	(0.015)	(0.003)
Loss	0.152***	0.155***	0.022***
	(0.030)	(0.037)	(0.004)
|Market Return|	2.141**	0.718	0.341*
	(0.851)	(0.956)	(0.166)
ΔLTG Forecast	0.003	0.003	0.000
	(0.002)	(0.002)	(0.000)
Pre-Revision Inconsistency	0.071***	0.074***	0.007***
	(0.014)	(0.015)	(0.002)
Debt Issue	0.108***	0.119***	0.007**
	(0.019)	(0.021)	(0.002)
Stock Issue	0.062***	0.078***	0.006*
	(0.021)	(0.019)	(0.003)
Analyst Tenure	-0.001	-0.002**	
	(0.001)	(0.001)	
Log(Analyst Coverage)	0.018	0.010	
	(0.014)	(0.016)	
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	No
Analyst fixed effects	No	No	Yes
Observations	1,525,334	1,084,049	1,667,178
Psuedo R-squared	0.023	0.024	0.050

Table 3 – Determinants of Inconsistent Signals
Panel B – Conditional Logistic Model

Dependent Variable: *Inconsistent* Indicator variable equal to 1 if the earnings estimate revision is directionally opposite concurrent target price revision.

Independent Variable	(1)	(2)
Log(Horizon)	-0.295***	-0.212***
	(0.003)	(0.003)
Annual Estimate		-0.517***
		(0.007)
Target price revision FE	Yes	Yes
Observations	674,476	674,476
Pseudo R-square	0.019	0.031

Notes: This table presents the results of regressions of the variable *Inconsistent* on several potential determinants. Panel A presents results of a logistic regression which includes both year and Fama French 12 industry fixed effects in Columns (1) and (2). Column (1) presents results for the full sample. Column (2) presents results for only those revisions that happen within 90 days of the initial estimate date. Column (3) of Panel A presents results of an OLS regression for the full sample and includes both year and analyst fixed effects. Panel B presents results of the estimation of a Conditional Logit Model. This model is similar to including target price revision fixed effects. Only variables that vary within target price revision event are included in the model as all other variation is subsumed by the structure of the Conditional Logit. Only observations where there are multiple earnings forecasts revisions for the same target price revision and at least one of those earnings forecast revisions agrees with the direction of the target price revision and at least one disagrees can be included in the model. Definitions of all variables can be found in the notes to Table 1. ***, **, and * represent statistical significance of the coefficient estimate at the 1%, 5%, and 10% level, respectively, for two-tailed tests.

Table 4 – Investor Response to Earnings Information: Likelihood that 3-Day Earnings Period Stock Return Directionally Differs from Earnings Surprise

Dependent Variable: *SUE_Ret_Disagree* is an indicator variable equal to 1 if the sign of the earnings surprise is opposite of the sign of the 3-day cumulative abnormal return around the earnings announcement date.

	Inconsistent Analysts Measure			
	Top Quartile of Inconsistent Revision		% of Inconsistent Revision	
	(1)		(2)	
Inconsistent Analysts	0.032	**	0.034	
	(0.016)		(0.033)	
|*Earnings Surprise*|	-10.282	***	-10.271	***
	(0.817)		(0.817)	
Negative Earnings Surprise	-0.341	***	-0.340	***
	(0.015)		(0.015)	
Log(Market Value)	-0.011	**	-0.011	**
	(0.005)		(0.005)	
Earnings Volatility	2.482	***	2.481	***
	(0.287)		(0.287)	
Book-to-Market	0.076	***	0.075	***
	(0.010)		(0.010)	
Quarter Fixed Effects	Yes		Yes	
Observations	96,102		96,102	
Pseudo R-Square	0.010		0.010	

Notes: This table presents the results of logistic regressions where the dependent variable is *SUE_Ret_Disagree*. Both columns include quarter fixed effects. Column (1) presents results using an indicator variable equal to 1 if the percentage of analyst revisions made for that firm during the past year that are inconsistent is in the top quartile of all firms across the full sample as the measure of *Inconsistent Analysts.* Column (2) presents results using the continuous measure of the percentage of those forecast revisions that are inconsistent as the measure of *Inconsistent Analysts*. |*Earnings Surprise*| is the absolute value of the difference between actual earnings per share for the quarter and the median consensus analyst estimate of earnings per share deflated by the stock price 2 days before the earnings announcement. *Negative Earnings Surprise* is an indicator variable equal to 1 if the earnings surprise is negative and 0 otherwise. *Log(Market Value)* is the log of the market value of equity measure two days before the earnings announcement. *Earnings Volatility* is the standard deviation of the firm's prior 12 quarters of earnings deflated by average total assets. *Book-to-market* is the book value of assets divided by

the book value of assets minus the book value of equity plus the market value of equity. ***, **, and * represent statistical significance of the coefficient estimate at the 1%, 5%, and 10% level, respectively, for two-tailed tests.

Table 5 – Investor Response to Earnings Information: Earnings Response Coefficients

Dependent Variable: *CAR3* is the 3-day cumulative abnormal return around the earnings announcement date.

	Inconsistent Analysts Measure			
	Top Quartile of Inconsistent Revision		% of Inconsistent Revision	
	(1)		(2)	
Earnings Surprise	2.691	***	2.681	***
	(0.199)		(0.201)	
Inconsistent Analysts	-0.001	**	-0.004	***
	(0.001)		(0.001)	
*Earnings Surprise*Inconsistent Analysts*	-0.208	***	-0.244	*
	(0.070)		(0.133)	
Negative Earnings Surprise	-1.816	***	-1.817	***
	(0.096)		(0.096)	
Log(Market Value)	0.001	***	0.001	***
	(0.000)		(0.000)	
Earnings Volatility	-0.129	***	-0.129	***
	(0.014)		(0.014)	
Book-to-Market	-0.003	***	-0.003	***
	(0.000)		(0.000)	
*Log(Market Value)*Earnings Surprise*	0.080	***	0.082	***
	(0.026)		(0.026)	
*Earnings Volatility*Earnings Surprise*	-6.560	***	-6.600	***
	(0.946)		(0.940)	
*Book-to-Market*Earnings Surprise*	-0.169	***	-0.166	***
	(0.019)		(0.019)	
Quarter Fixed Effects	Yes		Yes	
Observations	96,102		96,102	
R-Square	0.067		0.067	

Notes: This table presents the results of regressions where the dependent variable is *CAR3*. Both columns include quarter fixed effects. Column (1) presents results using an indicator variable equal to 1 if the percentage of analyst revisions made for that firm during the past year that are inconsistent is in the top quartile of all firms across the full sample as the measure of *Inconsistent Analysts.* Column (2) presents results using the continuous measure of the percentage of those forecast revisions that are inconsistent as the measure of *Inconsistent Analysts*. *Earnings Surprise* is the actual earnings per share for the quarter minus the median consensus analyst

estimate of earnings per share deflated by the stock price 2 days before the earnings announcement. *Negative Earnings Surprise* is an indicator variable equal to 1 if the earnings surprise is negative and 0 otherwise. *Log(Market Value)* is the log of the market value of equity measure two days before the earnings announcement. *Earnings Volatility* is the standard deviation of the firm's prior 12 quarters of earnings deflated by average total assets. *Book-to-market* is the book value of assets divided by the book value of assets minus the book value of equity plus the market value of equity. ***, **, and * represent statistical significance of the coefficient estimate at the 1%, 5%, and 10% level, respectively, for two-tailed tests.

Table 6 – Target Price Accuracy

Dependent Variables: |*TP_Error*| is the absolute difference between the revised target price and the actual stock price 12 months after the release of the target price. *TP_MetAny* is an indicator variable equal to 1 if the stock price met or exceeded the target price at any time during the 12 months after the release of the target price, and 0 otherwise.

Independent Variable	|TP_Error| (1)	TP_MetAny (2)	|TP_Error| (3)	TP_MetAny (4)
Inconsistent	-0.010***	0.010		
	(0.003)	(0.017)		
%Inconsistent			-0.016***	0.018
			(0.004)	(0.024)
Log(Market Value)	-0.040*	-0.028**	-0.043*	-0.036**
	(0.021)	(0.014)	(0.022)	(0.014)
Book-to-Market	0.049	0.010	0.057	-0.003
	(0.033)	(0.114)	(0.033)	(0.112)
ROA	-0.055**	0.358***	-0.046*	0.338***
	(0.024)	(0.111)	(0.024)	(0.103)
Std. Dev(ROA)	-0.056	-0.739***	-0.033	-0.819***
	(0.079)	(0.179)	(0.082)	(0.200)
Obs. Level	Forecast	Forecast	TP	TP
Firm FE	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes
Year FE	Yes	No	Yes	No
Observations	1,695,717	1,774,736	355,394	372,627
R-squared/Psuedo R-squared	0.342	0.050	0.339	0.049

Notes: This table presents the results of regressions where the dependent variable is |*TP_Error*| in Columns (1) and (3) and *TP_MetAny* in Columns (2) and (4). All columns include firm and year fixed effects. Columns (1) and (2) present results with each individual earnings forecast revision as a unique observation. Columns (3) and (4) present results with one observation for each target price revision event. *Inconsistent* is an indicator variable equal to 1 for earnings forecast revisions that move in the opposite direction from the target price revision and 0 otherwise. *%Inconsistent* is the percentage of earnings forecast revisions released concurrently with the target price revision that are directionally inconsistent with the target price revision. *Log(Market Value)* is the log of the market value of equity measure two days before the earnings announcement. *Book-to-market* is the book value of assets divided by the book value of assets minus the book value of equity plus the market value of equity. *ROA* is the return on assets. *Std. Dev(ROA)* is the standard deviation of annual ROA over the previous 5 fiscal years. ***, **, and * represent statistical significance of the coefficient estimate at the 1%, 5%, and 10% level, respectively, for two-tailed tests.

Table 7 – Earnings Forecast Accuracy

Dependent Variables: |*Forecast Error*| is the absolute value of forecasted earnings per share minus actual earnings per share times 100 divided by stock price 2 days before the forecast revision date.

	|Forecast Error|		
Independent Variable	(1)	(2)	(3)
Inconsistent	-0.294***	-0.443***	-0.087**
	(0.057)	(0.055)	(0.029)
Log(Horizon)	1.203***		1.386***
	(0.092)		(0.112)
Log(Market Value)	-0.444		
	(0.288)		
Book-to-Market	2.237***		
	(0.352)		
ROA	-2.266***		
	(0.608)		
Std. Dev(ROA)	-1.473		
	(1.692)		
Firm FE	Yes	No	No
Year FE	Yes	No	No
Target price revision FE	No	Yes	Yes
Observations	1,697,455	1,667,022	1,665,879
R-squared	0.556	0.763	0.774

Notes: This table presents the results of regressions where the dependent variable is |*Forecast Error*|. Column (1) presents results with firm and year fixed effects. Columns (2) and (3) present results with target price revision event fixed effects. In these columns all variables that do not vary within an individual target price revision event are subsumed by the fixed effect. *Inconsistent* is an indicator variable equal to 1 for earnings forecast revisions that move in the opposite direction from the target price revision and 0 otherwise. *%Inconsistent* is the percentage of earnings forecast revisions released concurrently with the target price revision that are directionally inconsistent with the target price revision. *Log(Market Value)* is the log of the market value of equity measure two days before the earnings announcement. *Book-to-market* is the book value of assets divided by the book value of assets minus the book value of equity plus the market value of equity. *ROA* is the return on assets. *Std. Dev(ROA)* is the standard deviation of annual ROA over the previous 5 fiscal years. ***, **, and * represent statistical significance of the coefficient estimate at the 1%, 5%, and 10% level, respectively, for two-tailed tests.

Table 8 – Investor Response to Analyst Revisions

Dependent Variable: *CAR3_Revise* is the 3-day cumulative abnormal return around the analyst forecast and target price revision date.

	(1)	(2)	(3)	(4)	(5)
	Full Sample	Inconsistent	Consistent	Inconsistent	Consistent
Target Price Revision	0.025***	0.020***	0.029***		
	(0.002)	(0.002)	(0.003)		
Earnings Estimate Revision	0.002***	0.004***	-0.001	-0.008***	0.017***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	1,801,862	403,895	1,397,611	403,895	1,397,611
R-squared	0.144	0.129	0.165	0.104	0.122

Notes: This table presents the results of regressions where the dependent variable is *CAR3_Revise*. All columns include firm and year fixed effects. *Target Price Revision* is the standardized value of the revised target price minus the initial target price scaled by the stock price 2 days before the revision date. *Earnings Estimate Revision* is the standardized value of the revised EPS forecast minus the initial EPS forecast scaled by the price 2 days before the revision date. To standardize both variables we subtract the sample mean and divide by the sample standard deviation for the full sample of observations. Column (1) presents results for the full sample. Columns (2) and (4) present results for the sample of revisions that are inconsistent. Columns (3) and (5) present results for the sample of revisions that are consistent. ***, **, and * represent statistical significance of the coefficient estimate at the 1%, 5%, and 10% level, respectively, for two-tailed tests.

Table 9 – Effect of the Number of Outputs Estimated by Analysts
Panel A: Determinants of Inconsistent Signals
Dependent Variable: *Inconsistent* Indicator variable equal to 1 if the earnings estimate revision is directionally opposite concurrent target price revision.

Independent Variable	All Observations (1)	Within 90 Days (2)
Log(Horizon)	-0.122***	-0.116***
	(0.005)	(0.006)
R&D/Ads	0.490***	0.583**
	(0.178)	(0.228)
Book-To-Market	0.020	0.082
	(0.061)	(0.054)
Intangibles	0.002	-0.072
	(0.069)	(0.078)
Std. Dev(ROA)	-0.057	-0.011
	(0.111)	(0.104)
Annual Estimate	-0.240***	-0.270***
	(0.013)	(0.015)
Loss	0.153***	0.156***
	(0.030)	(0.037)
|Market Return|	2.144**	0.708
	(0.853)	(0.953)
ΔLTG Forecast	0.003	0.003
	(0.002)	(0.002)
Pre-Revision Inconsistency	0.070***	0.072***
	(0.014)	(0.015)
Debt Issue	0.106***	0.117***
	(0.018)	(0.021)
Stock Issue	0.062***	0.078***
	(0.021)	(0.019)
N_Analyst Outputs	0.011***	0.013***
	(0.002)	(0.002)
Analyst Tenure	-0.001	-0.002***
	(0.001)	(0.001)
Log(Analyst Coverage)	0.017	0.010
	(0.014)	(0.016)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	1,525,240	1,083,980

Psuedo R-squared	0.023	0.025

Panel B: Effect on Target Price and Earnings Forecast Accuracy

Dependent Variables: |*TP_Error*| is the absolute difference between the revised target price and the actual stock price 12 months after the release of the target price. *TP_MetAny* is an indicator variable equal to 1 if the stock price met or exceeded the target price at any time during the 12 months after the release of the target price, and 0 otherwise. |*Forecast Error*| is the absolute value of forecasted earnings per share minus actual earnings per share times 100 divided by stock price 2 days before the forecast revision date.

Independent Variable	|TP_Error| (1)	TP_MetAny (2)	|TP_Error| (3)	TP_MetAny (4)	|Forecast_Error| (5)
Inconsistent	-0.009***	0.008			-0.291***
	(0.003)	(0.017)			(0.057)
%Inconsistent			-0.016***	0.016	
			(0.004)	(0.024)	
N_Analyst_Outputs	-0.002***	0.020***	-0.001***	0.015***	-0.028**
	(0.000)	(0.003)	(0.000)	(0.002)	(0.009)
Log(Market Value)	-0.040*	-0.029**	-0.043*	-0.036**	-0.443
	(0.021)	(0.014)	(0.022)	(0.014)	(0.288)
Book-to-Market	0.049	0.011	0.057	0.001	2.236***
	(0.033)	(0.115)	(0.033)	(0.113)	(0.352)
ROA	-0.055**	0.348***	-0.046*	0.330***	-2.265***
	(0.024)	(0.110)	(0.024)	(0.101)	(0.607)
Std. Dev(ROA)	-0.055	-0.731***	-0.033	-0.808***	-1.460
	(0.079)	(0.179)	(0.082)	(0.199)	(1.692)
Log(Horizon)					1.207***
					(0.093)
Obs. Level	Forecast	Forecast	TP	TP	Forecast
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No
Year FE	Yes	No	Yes	No	Yes
Observations	1,695,677	1,774,696	355,374	372,607	1,665,421
R-squared/Psuedo R-squared	0.342	0.0511	0.339	0.0494	0.560

Notes: This table presents the results of regressions including *N_Analyst_Outputs* as an independent variable. Panel A reproduces the determinants regressions found in Table 3 Panel A. Panel B reproduces the target price accuracy regressions found in Table 7 and the earnings forecast accuracy regressions found in Table 8. In both panels *Inconsistent* is an indicator variable equal to 1 for earnings forecast revisions that move in the opposite direction from the target price revision and 0 otherwise. *%Inconsistent* is the percentage of earnings forecast revisions released concurrently with the target price revision that are directionally inconsistent with the target price revision. See the notes to Tables 3, 7, and 8 for descriptions of the other

variables. ***, **, and * represent statistical significance of the coefficient estimate at the 1%, 5%, and 10% level, respectively, for two-tailed tests.