

How Do Retail Investors Evaluate the Credibility of Directionally Inconsistent Analyst Revisions? Experimental Evidence

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We are grateful to Subash Pereira for helpful conversations about sell-side analysts, Malavika Shetty for help with the experimental materials, workshop participants at Bentley University and conference participants at the 2022 AAA Accounting Behavior and Organizations Conference for their feedback. We also thank Scott Asay, Kerri-Ann Sanderson, Rosh Sinha, Tom Shohfi, Ari Yezegel, and Kirsten Fanning (discussant) for their detailed comments, and Georgia Institute of Technology and Bentley University for financial assistance.

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ABSTRACT

A significant proportion of sell-side analysts' recommendation revisions are directionally inconsistent with their earnings forecast revisions. For example, analysts revise earnings forecasts upward (downward) while simultaneously downgrading (upgrading) the recommendation. Prior research is inconclusive on whether markets view such directionally inconsistent revisions as less credible compared to consistent revisions. We experimentally investigate whether inconsistent revisions affect retail investors' judgements of analysts' competence and trustworthiness—two components of credibility. In line with predictions from attribution theory, we find inconsistent revisions reduce perceptions of trustworthiness for unaffiliated analysts, but not for affiliated analysts. This consistency \times affiliation interaction is stronger for upward recommendation revisions than for downward revisions. However, inconsistent revisions reduce investors' perceptions of analysts' competence equally for unaffiliated and affiliated analysts regardless of the direction of their recommendation. Our results suggest that retail investors' evaluation of the credibility of inconsistent revisions may differ significantly from how markets, as a whole, assess directionally inconsistent revisions.

JEL Codes: G11; G17; G24; G41; M41

Keywords: analyst; investor judgment; inconsistency; affiliation; recommendation; earnings forecast; attribution theory

Data Availability: Contact the authors.

1. INTRODUCTION

An extensive literature documents the role of sell-side analysts in well-functioning capital markets (Bradshaw et al. 2017, Merkley et al. 2017). Although the most widely researched output from sell-side analysts is the earnings estimates they produce for the firms they cover (Kothari et al. 2016, Bradshaw 2011), arguably, the most visible output produced by sell-side analysts is their recommendation to *buy*, *sell*, or *hold* stock in the firms they cover. Recommendations are particularly important to retail investors because they are unambiguous and actionable (Engelberg et al. 2019, McLean et al. 2021).¹ While models of analyst information processing suggest that analysts' earnings estimates drive their recommendations (Bradshaw 2004, 2009), a growing body of research documents that when analysts simultaneously revise their recommendations and earnings estimates, the two outputs can be *directionally inconsistent* (Brown and Huang 2013, Iselin et al. 2021). For example, analysts may lower their earnings estimate for a firm while simultaneously upgrading the firm's stock from a *hold* to a *buy*. The purpose of this study is to investigate how retail investors assess the credibility of inconsistent analyst revisions.²

Understanding how retail investors react to inconsistent analyst revisions is important for at least two reasons. First, prior research finds that retail investors actively seek out analyst recommendations, earnings estimates, and price targets (Lawrence et al. 2017, McLean et al. 2021). Yet, Malmendier and Shantikumar (2014) suggest that retail investors fixate on recommendations and, largely, ignore analysts' earnings estimates. If so, investors should ignore any inconsistency

¹ Kothari et al. (2016) comment on the disproportionate focus on analysts' earnings forecasts in prior academic research while McLean et al. (2021) underscore the importance of recommendations relative to earnings estimates for investors noting that: "moving a recommendation from a *buy* to a *strong buy* gives the investor a clear course of action. In contrast, increasing a quarterly EPS forecast from \$0.15 to \$0.20 does not explicitly communicate an investment action." (p. 2).

² We use the term "*inconsistent analyst revisions*" following prior literature (e.g., Brown and Huang 2013, Iselin et al. 2021). We do not imply that a directionally inconsistent revision implies analyst irrationality. Iselin et al. identify reasons why analysts' outputs could be directionally inconsistent for rational reasons. We discuss this in our theory section.

between earnings revisions and recommendation revisions. Direct evidence on whether and how retail investors react to inconsistent forecast revisions, however, is non-existent, to the best of our knowledge. Our study aims to fill this void. In an environment where retail investors are investing directly in markets in increasing numbers (Martin and Wigglesworth 2021, The Economist 2021), the results of our study can potentially provide important insights into their behavior.

Second, prior research is inconclusive on how investors react to directionally inconsistent analyst revisions. When earnings forecasts and recommendations are simultaneously revised, a non-trivial proportion of such revisions are directionally inconsistent (Iselin et al. 2021).³ While some claim that inconsistent analyst revisions are of lower quality (Brown and Huang 2013, Huang et al. 2014), others argue that inconsistent analyst revisions are no less credible than consistent analyst revisions (Iselin et al. 2021). We contribute to this discussion by experimentally examining how retail investors assess the credibility of inconsistent analyst revisions. A controlled experimental setting allows us to measure how retail investors assess the two components of credibility—trustworthiness and competence—more directly than is possible in an archival setting.

We first draw on attribution theory to answer the question: how do investors assess analysts' overall credibility when they view an inconsistent revision from an analyst? Next, we examine how two contextual factors related to analyst credibility—analyst affiliation and the direction of analysts' recommendation revision—moderate the impact of revision consistency on investors' assessment of analyst credibility. We examine these factors because prior research suggests that they can affect retail investors' assessment of analyst credibility.⁴

³ Inconsistencies can occur between any combination of EPS, recommendation and target price pairs. Iselin et al. (2021) find inconsistent EPS/recommendation revisions occur approximately 33% of the time, inconsistent target price/recommendation revisions occur approximately 28% of the time and inconsistent target price/EPS revisions occur approximately 19% of the time.

⁴ Liu et al. (2020) find that short-term investors view earnings forecasts and the recommendations from affiliated analysts as less credible than those from unaffiliated analysts. Prior research also suggests that investors view analysts' *sell*

Research in attribution theory documents two effects relevant to our setting: (1) unexpected behavior from an actor leads to stronger dispositional attributions about the actor and (2) it is more difficult to make such dispositional attributions in the presence of ulterior motives (Gilbert and Malone 1995, Fein, Hilton and Miller 1990). We expect that inconsistent revisions will be viewed by retail investors as unexpected and this surprise, in turn, will lead to stronger (negative) assessments of analyst credibility relative to consistent revisions.⁵

For our predictions on how analyst affiliation and the direction of the analyst recommendation revision will moderate the impact of revision consistency, we decompose credibility into its two components—perceived competence and perceived trustworthiness.⁶ We do this because we expect that joint impact of revision consistency, analyst affiliation, and the direction of the recommendation revision will be different for perceptions of competence and perceptions of trustworthiness. We outline our predictions for perceptions of competence first.

An analyst's affiliation or the direction of the analyst's recommendation is not particularly informative when it comes to perceptions of the analyst's competence. An analyst's affiliation does not necessarily signify competence nor does lack of affiliation signify lack of competence. Similarly, the direction in which an analyst revises their recommendation revision (upward or downward) cannot, *per se*, tell an investor much about the analyst's competence. Therefore, we expect that an

recommendations as more credible than *buy* recommendations because *sell* recommendations are incentive-inconsistent, particularly for affiliated analysts (Hirst et al. 1995, Luo and Salterio 2021).

⁵ We recognize that there are situations when unexpected actions could lead to positive, rather than negative, reactions. Empirical evidence suggests that, in our setting, the reactions to unexpected behavior from analysts are likely to be negative. We discuss our rationale for this expectation in our theory section.

⁶ Prior literature provides validated scales which indicate that trustworthiness and competence are the two dimensions underlying the construct of credibility (McCroskey 1966, Newell and Goldsmith 2001). Further, Blankespoor et al. (2017) use these two dimensions as proxies for managers' credibility during IPO roadshows and find that perceptions of trustworthiness and competence are significantly associated with market prices.

inconsistent revision will be viewed as a negative sign of competence regardless of analyst affiliation or the direction of the recommendation revision.

By contrast, both an analyst's affiliation and the direction of the recommendation revision can inform investors' assessments of an analyst's trustworthiness. Affiliated analysts have incentives to favor the companies they cover, making their motives for revision open to question. The salience of the ulterior motives makes it difficult for an investor to unravel whether a revision genuinely represents the views of the analyst or is driven by the analyst's incentives. Accordingly, an affiliated analyst is unlikely to receive a huge boost in trustworthiness for providing a consistent revision (or take a huge hit to their trustworthiness for providing an inconsistent revision). However, because there are no salient ulterior motives to unravel when interpreting the revision of an unaffiliated analyst, we expect that the impact of inconsistency on trustworthiness will be stronger for unaffiliated analysts.⁷ In other words, we expect an affiliation \times consistency interaction on investor perceptions of analyst trustworthiness.

Turning next to the direction of the recommendation revision, when analysts revise their recommendation upward (e.g., from a *hold* to a *buy*), the question of ulterior motives is salient, particularly for affiliated analysts. However, when analysts revise their recommendation downward, ulterior motives are no longer in focus because a downward revision is, typically, incentive-inconsistent for most analysts. In this instance, responses to affiliated and unaffiliated analysts should be more similar. Accordingly, we expect that the affiliation \times consistency interaction will be stronger for upward revisions than for downward revisions. More specifically, we expect that inconsistency

⁷ To be clear, we are not implying that affiliated analysts will be viewed as more trustworthy compared to unaffiliated analysts (*a levels* prediction). Holding constant affiliation, we expect that revision consistency will impact perceptions of trustworthiness more for unaffiliated analysts than for affiliated analysts (*a changes* prediction).

will hurt credibility more for unaffiliated analysts than affiliated analysts and this effect will be stronger for upward revisions than for downward revisions.

We conduct a $2 \times 2 \times 2$ between participants experiment to test our predictions. In our experiment, participants, in the role of prospective investors, are provided information about an analyst who simultaneously revises a recommendation and an earnings estimate for a hypothetical firm, Alpha, from an initial recommendation of *hold*. We manipulate the consistency of the analyst's revision (consistent versus inconsistent), the type of analyst (affiliated versus unaffiliated), and the direction in which the recommendation is revised (upward versus downward). A revision is consistent if the earnings and the recommendation are revised in the same direction (e.g., the earnings estimate is revised upward and the recommendation is revised from *hold* to *buy*) and inconsistent if the earnings and the recommendation are revised in opposite directions. Affiliated analysts have financial ties with Alpha—the firm being analyzed—whereas unaffiliated analysts do not. An upward recommendation (a downward recommendation) revision revises the recommendation from a *hold* to a *buy* (*sell*). Our primary dependent variables are participants' assessments of the analyst's trustworthiness, competence, and credibility, *after* the revision.

As predicted, we find that inconsistent revisions decrease perceptions of analysts' credibility overall. Moreover, inconsistent revisions negatively affect perceptions of competence equivalently for affiliated and unaffiliated analysts and this result does not depend on the direction of the recommendation revision. However, inconsistent revisions decrease perceptions of analyst's trustworthiness to a greater extent for unaffiliated analysts than for affiliated analysts, particularly for upward recommendation revisions.

Our study contributes to the literature on how retail investors interpret the work-products of a vital intermediary in capital markets—analysts. Iselin et al. (2021) posit that markets, as a whole, do

not view inconsistent revisions as more (or less) credible than consistent revisions. In contrast, our experimental results suggest that retail investors, largely, view analysts who provide inconsistent revisions as less credible. We understand that analysts' inconsistent revisions can have perfectly rational reasons, but this understanding must be tempered by two important considerations. Even if the reasons for analysts' revisions are perfectly rational, retail investors do not always have access to the reasons (p. 20-21). More importantly, analysts may not always explain the inconsistency (see fn.16). To the extent that retail investors, on average, view inconsistent analysts' revisions as less credible, they may be overreacting to inconsistent revisions compared to the market as whole.

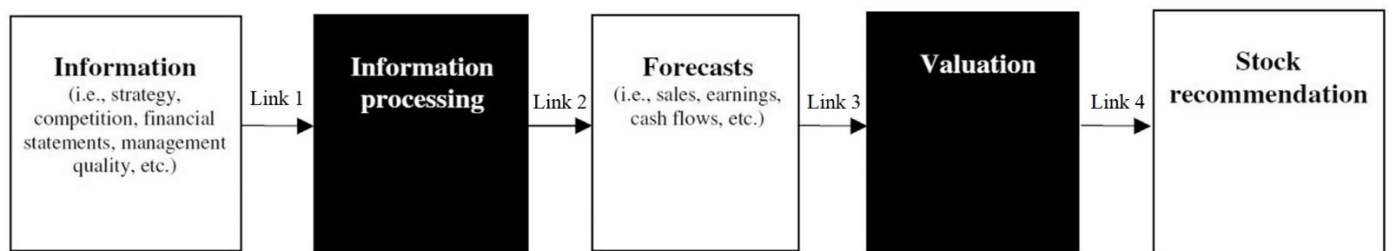
Second, our results contribute to source credibility research. While most prior work in accounting settings finds that perceptions of trustworthiness and competence move in lock step (e.g., Barton and Mercer 2005, Clor-Proell 2009, Rupaar 2017), we show that this need not always be the case. We find that investors view affiliated *and* unaffiliated analysts to be less competent when they provide an inconsistent revision. By contrast, we find that the cost of providing an inconsistent revision, in terms of diminished trustworthiness, is higher for an unaffiliated analyst than it is for an affiliated analyst, particularly for upward recommendation revisions. Collectively, our results provide novel insights into how retail investors evaluate analysts' work products.

The rest of the paper proceeds as follows. Section 2 provides background on inconsistent analyst revisions and develops our predictions on how investor reaction to inconsistency will be influenced by the type of analyst (affiliated versus unaffiliated) and the direction of recommendation revision (upward versus downward). Section 3 describes an experiment designed to test our hypotheses. Section 4 describes the results and section 5 concludes.

2. BACKGROUND AND THEORY

2.1 Background on Directionally Inconsistent Revisions

The three key quantifiable outputs produced by sell-side analysts are earnings forecasts, valuation/price targets, and their recommendation on the stocks they cover (Gleason et al. 2013). An influential model of how analysts process information to generate these three outputs (Bradshaw 2009, p.1076, adapted and reproduced below) suggests that analysts’ earnings forecasts drive valuations (link 3) which, in turn, inform analyst recommendations (link 4).



Ceteris paribus, analysts who revise their earnings expectations upward *should* have a more favorable view of the future stock price and potentially upgrade the stock (Malmendier and Shantikumar 2014).⁸ We recognize that a change in analysts’ earnings expectations, even if positive, may not always be adequate to warrant an upgrade in the recommendation because earnings are a continuous variable while recommendations are discrete. However, it would appear unusual to see earnings estimates and recommendations being revised in opposite directions. Practitioners appear to agree with the intuition that analysts’ outputs are likely to move in tandem. A reputable investment advisory firm states: “stocks most likely to outperform are the ones whose earnings estimates are being raised. And the stocks most likely to underperform are the ones whose earnings estimates are being lowered” (Zacks 2021). Yet, a growing body of empirical research documents that earnings

⁸ Malmendier and Shantikumar (p.1289) state: “if analysts believe that the next earnings will be higher than the consensus, they should issue a “buy,” given the excess returns associated with positive earnings surprises.”

expectations, price targets, and recommendations do not always move in lockstep (Brown and Huang 2013, Barth et al. 2021, Iselin et al. 2021).

Following Iselin et al. (2021), we define directionally inconsistent revisions as cases where an analyst revises one output in one direction while concurrently revising another output in the opposite direction (e.g., increasing the earnings estimate while downgrading the recommendation). As an example, on July 17, 2020, J.P. Morgan analyst Melissa Wedel downgraded LendingTree Inc., from *buy* to *hold* although she adjusted the EPS estimate upward from \$2.92 for 2020 to \$4.61 for 2021.⁹

2.2 Do Directionally Inconsistent Revisions Undermine Analyst Credibility?

Prior research that either directly or tangentially addresses this question is inconclusive. Huang et al. (2014) posit that if an analyst's recommendation and earnings forecast are revised in different directions, this inconsistency undermines the validity of the analyst's revision. Brown and Huang (2013) argue that investors can use consistency as a salient, *ex ante*, signal to identify reliable analyst reports. However, Iselin et al. (2021) contest these claims and report that they find "no evidence that investors perceive inconsistent outputs as *less valid or credible*" (p. 3, emphasis ours) and inconsistencies are not *ipso facto* evidence of lower quality or biased analyst behavior.¹⁰ Our study does not question whether inconsistent revisions are less or more valid compared to consistent analyst revisions. Rather, we focus on how retail investors respond to inconsistent revisions they

⁹ The five categories used for recommendations: *strong buy*, *buy*, *hold*, *sell*, and *strong sell*, are not standardized across sell-side analyst firms, but data aggregators (e.g., Thomson Reuters) map analyst earnings forecasts into these five categories. For example, one sell-side analyst firm may issue a "buy" rating that is equivalent to another bank's rating of "outperform". We use these five categories mentioned above for expositional convenience.

¹⁰ For instance, Iselin et al. find that revisions following management forecasts are less likely to be inconsistent for all types of inconsistent revisions (earnings-recommendation, earnings-price target, and recommendation-price target). They also find that earnings announcements are predictive of inconsistent revisions although "earnings-price target" inconsistencies are more likely while recommendation-price targets inconsistencies are less likely following an earnings announcement.

encounter, given that more often than not, they are unlikely to be aware of potential reasons for the inconsistent revisions (see pages 20-21 and fn.16).

One potential reason for conflicting results in prior research is how each set of analyses measures constructs related to credibility. Iselin et al. (2021) measure the credibility of an analyst revision based on short-term changes in option-based implied volatility. By contrast, Brown and Huang (2013) and Huang et al. (2014) use market reaction to the analyst report to measure validity or reliability. Each set of authors relies on proxy measures to derive inferences about investors' perceptions of credibility and reliability. We contribute to this research by leveraging the comparative advantage of an experimental design and measuring investors' perceptions of analyst credibility more directly.

To get a more complete view of how inconsistent revisions affect perceptions of analyst credibility, we also consider two other cues that investors use to assess analyst credibility—whether analysts are affiliated with the firms they cover and whether the revision moves the recommendation upward (from a *hold* to a *buy*) or downward (from a *hold* to a *sell*). Prior research suggests that analyst affiliation and recommendation type can influence investors' assessment of analyst credibility (Liu et al. 2020, Luo and Salterio 2021).

Following prior psychology-based research in accounting, we define the credibility of an analyst in terms of investors' beliefs about analysts' *trustworthiness* and *competence* (Mercer 2005, Hirst et al. 2007, Rupar 2017). A long literature establishes that these two dimensions underpin the construct of credibility (McCroskey 1966, Newell and Goldsmith 2001). Prior experimental research empirically links perceptions of trustworthiness and competence to measures of firm performance and investors' willingness to invest (e.g., Barton and Mercer 2005, Clor-Proell 2009, Rupar 2017), highlighting the importance of the construct of credibility to investor judgment. Archival research

links investors' perceptions of managerial competence and trustworthiness to actual stock prices during Initial Public Offerings (Blankespoor, et al. 2017). Therefore, we motivate and test our predictions about how investors are likely to assess analysts' credibility in our setting in terms of perceived trustworthiness and perceived competence.

We first draw on attribution theory to answer the broad question we are interested in—how do investors assess analysts' overall credibility when they receive an inconsistent revision from an analyst? Following this, we examine how revision consistency, analyst affiliation, and the direction of the revision jointly influence investors' assessment of the components of credibility—perceived competence and trustworthiness.

2.3 Attribution Theory, Directionally Inconsistent Revisions, and Analyst Credibility

At its core, attribution theory deals with how people make sense of other people's behavior. Gilbert and Malone (1995) argue that when people make causal attributions about an actor's behavior, they attempt to figure out how much of the actor's behavior is driven by dispositional factors (the actor's internal characteristics) and how much is driven by contextual factors (features external to the actor). In our setting, the analyst is the actor, the analyst's revision is the behavior investors observe, and investors are trying to understand how much the revision stems from the actor's dispositional factors (e.g., analyst's trustworthiness, competence) and how much stems from the context (e.g., the analyst's incentives or the economy at large).

Attribution theory suggests that unexpected actions tend to elicit stronger dispositional attributions about an actor compared to expected actions (Pyszczynski and Greenberg 1981, Stiensmeier-Pelster, Martini and Reisenzein 1995). We posit that inconsistent revisions will be viewed as unexpected and retail investors will be surprised to see analysts revise their recommendation and earnings forecast in different directions. As previously outlined, models of

analyst behavior suggest that earnings drive recommendations (Bradshaw 2004, 2009). The implicit assumption in these models is that positive (negative) revisions in earnings will lead to positive (negative) changes in recommendations. Inconsistent revisions clearly violate this expectation. Second, empirically, investors are more likely to encounter consistent rather than inconsistent revisions (Iselin et al. 2021). Therefore, we expect that investors will be surprised when they see an inconsistent revision. This surprise, in turn, is likely to undermine analyst credibility. Consistent revisions, by contrast, are likely to be viewed as less surprising and, therefore, less likely to impact analyst credibility.

Our expectation that surprise will lead to negative inferences about analyst credibility is motivated by prior research which argues that inconsistent revisions are likely to be viewed as less valid (Huang et al. 2014), more influenced by analysts' cognitive and incentive biases (Kecskes, Michaely and Womack 2017), less reliable and of a lower quality (Brown and Huang 2013). Even Iselin et al. (2021), who disagree with the view that inconsistent revisions negatively affect analyst credibility, claim that inconsistent revisions, at best, have no impact on credibility (relative to consistent revisions). Taken together, we expect that retail investors will be surprised by inconsistent analyst revisions and to the extent that this surprise impacts perceptions of analyst credibility, this impact will be negative.

H1: Inconsistent revisions decrease investors' perceptions of analyst credibility relative to consistent revisions.

In the following sections, we separate credibility into its two components as identified by prior literature: trustworthiness and competence. As discussed previously, most prior research assumes that

the two components of credibility move in lock step with each other.¹¹ Contrary to prior work, we expect that these components will be impacted differently once we consider analyst affiliation and revision direction as additional contextual cues to perceptions of analyst credibility. Specifically, we expect that analyst affiliation and revision direction provide cues that could impact analyst trustworthiness, but not competence. We lay out our hypotheses related to perceptions of competence first followed by perceptions of trustworthiness.

2.4 Directionally Inconsistent Revisions, Analyst Affiliation, Revision Direction, and Analyst Competence

For reasons outlined previously, we expect that inconsistent revisions will be viewed as more surprising compared to consistent revisions and this surprise, in turn, will negatively impact investor perceptions of analyst credibility (Kecskes et al. 2017, Brown and Huang 2013). We expect this relationship to hold for perceptions of analyst competence regardless of the affiliation of the analyst or the direction of that analyst's revision.

First, analyst affiliation does not guarantee competence nor does lack of affiliation imply lack of competence. Ertimur, Sunder and Sunder (2007) find that the differences in the relation between forecast accuracy and recommendation profitability of affiliated and unaffiliated analysts are eliminated after 2002. Bradshaw et al. (2017) argue that some documented differences between affiliated and unaffiliated analysts' outputs are statistically, but not economically significant.

Therefore, when investors view an inconsistent revision, given no other information, the

¹¹ Notable exceptions to the general idea that the two components of credibility necessarily move in lockstep are Markowitz et al. (2021) and Messier et al. (2011). Markowitz et al. (2021) find that linguistic obfuscation in corporate mission statements negatively impacts observer's perception of the firm managers trustworthiness (morality), but not competence. In a similar vein, Messier et al. (2011) compare external auditors' perceptions of internal auditors' trustworthiness (objectivity) and competence for two different types of firms: those that use the internal audit function as a training ground for positions in higher management (MTG) versus firms that disallow mobility between the audit function and management positions (NMTG). They find that external auditors perceive NMTG internal auditors as more objective compared to MTG internal auditors but see no difference in the perceived competence of the two sets of auditors.

inconsistency should serve as an equally negative cue about the competence of the analyst, regardless of affiliation. This prediction is formally stated below.

H2a: The impact of revision consistency on investor judgments of competence will not differ across affiliated and unaffiliated analysts.

Second, inconsistent revisions can occur both with upward revisions (e.g., when the recommendation moves from a *hold* to a *buy*) or with a downward revision (e.g., when the recommendation moves from a *hold* to a *sell*). *Ex ante*, the direction of a recommendation revision should not signify anything about the competence of the analyst (though it can raise questions about an analyst's trustworthiness for reasons we outline later). Supporting this expectation, Barber et al. (2001) find that, after considering transaction costs, a strategy of buying stocks rated by sell-side analysts as a *strong buy* and selling stocks rated as a *strong sell*, failed to produce abnormal returns greater than zero, suggesting that the direction of the recommendation is not indicative of analyst competence. Therefore, we present our next hypothesis in the null form.

H2b: The impact of revision consistency and analyst affiliation on investor judgments of competence will not differ across downward and upward recommendation revisions.

2.5 Directionally Inconsistent Revisions, Analyst Affiliation, Revision Direction and Analyst Trustworthiness

While prior research on attribution theory suggests that unexpected actions amplify dispositional inferences (e.g., the negative impact of inconsistent revisions on perceptions of analyst credibility and competence), related research also suggests that contextual factors can moderate such dispositional inferences (Fein et al. 1990, Fein and Hilton 1994). Specifically, Fein et al. (1990) posit that perceivers are less likely to make dispositional attributions “when contextual information

suggests that multiple rival motives could underlie an actor's decision to behave in a particular manner (p.757).”

Analyst affiliation is a contextual factor that makes it difficult for an investor to unravel the true motives underlying an analyst's revision. Affiliated analysts have competing motives: on the one hand, they have a financial incentive to pander to the firm they cover (Ljungqvist et al. 2009, Brown et al. 2015). On the other hand, analysts (both affiliated and unaffiliated) have reputational incentives to provide recommendations in line with their earnings expectations (Simon and Curtis 2011) and career incentives to produce unbiased reports (Altinkılıç et al. 2019). When an affiliated analyst provides a revision, it is difficult to determine whether the revision truly reflects the analyst's intrinsic views about the company or is a product of the analyst's financial ties with the company. A consistent revision from an affiliated analyst is unlikely to enhance the analyst's trustworthiness (given the competing motives facing the analyst). By the same token, an inconsistent revision should not particularly hurt the analyst's trustworthiness either.

By contrast, for an unaffiliated analyst, there are no salient ulterior motives or incentives for an investor to unravel. An analyst who provides an inconsistent revision makes an investor question their fundamental intuition that higher earnings should lead to a stronger recommendation. Frederickson and Miller (2004) provide evidence that nonprofessional investors extensively use earnings multiple-based valuation models when evaluating stocks. In these models, higher earnings lead to higher stock prices and, arguably, stronger recommendations (or, at the very least, not weaker recommendations). Therefore, an inconsistent revision from an unaffiliated analyst potentially leads to the question: *“How can I trust this analyst given that they have earnings and recommendations going in opposite directions?”*

Taken together, we expect that the cost of providing an inconsistent revision, in terms of diminished trustworthiness, will be higher for an unaffiliated analyst than it will be for an affiliated analyst. Our prediction, stated formally, is:

H3a: *Inconsistent revisions decrease perceptions of trustworthiness more for unaffiliated analysts than for affiliated analysts.*

Note that the contextual factors can, in and of themselves, impact dispositional attributions ascribed to the actor. For example, we fully expect that a contextual factor like analyst affiliation will independently impact analyst trustworthiness. Affiliated analysts (particularly when the affiliation is made salient) will be viewed as less trustworthy given their incentives. Therefore, we are not implying that affiliated analysts will be viewed as more trustworthy compared to unaffiliated analysts (a *levels* prediction). Holding constant affiliation, H3a predicts that revision consistency will impact perceptions of trustworthiness more for unaffiliated analysts than for affiliated analysts (a *changes* prediction).

Upward recommendation revisions (e.g., from a *hold* to a *buy*) are likely to make affiliated analysts' competing incentives even more salient because moving from a *hold* to a *buy* recommendation aligns with an affiliated analyst's motive to curry favor with management. The more salient the competing motives, the more difficult it is for an investor to unravel the impact of inconsistency versus that of the analyst's incentives when determining their perceptions of analyst trustworthiness.

A downward recommendation revision, on the other hand, diminishes the likelihood that investors will consider ulterior motives because a revision from a *hold* to a *sell* recommendation goes against an analyst's incentive to please management. While this may be particularly true for affiliated analysts, even unaffiliated analysts are reluctant to provide negative recommendations for fear of

losing access to management (Mayew 2008). Without an ulterior motive as a salient cue to the analyst's trustworthiness, inconsistency should affect affiliated and unaffiliated analysts equivalently. Therefore, the consistency \times affiliation interaction predicted in H3a should be weaker for downward recommendation revisions than for upward recommendation revisions. This leads to our next prediction:

H3b: Inconsistent revisions decrease perceptions of trustworthiness more for unaffiliated analysts than for affiliated analysts, particularly for upward recommendation revisions.

Overall, we predict that inconsistent revisions will hurt perceptions of analysts' trustworthiness and competence (and, therefore, credibility). However, once we introduce contextual factors of affiliation and revision-direction, we expect a main effect of revision consistency on perceptions of analyst competence and a three-way interaction (consistency \times affiliation \times direction) for perceptions of trustworthiness.

3. EXPERIMENT

3.1 Participants

For our experiment, we recruited 398 participants with experience trading stocks through the online research panel provider – Prolific. We used Qualtrics software to conduct the experiment. Ninety two percent of participants report that they have more than one year of experience investing in the stock market and 58% report investing experience of at least 4 years. Approximately 40% of participants report taking two or more classes in both accounting and finance. The average age of participants is 39.3 years, and participants report an average of 17.3 years of work experience. Approximately 61% of participants identify as male, 39% as female and less than 1% report other.

3.2 Design and Task

Participants in our experiment take on the role of potential investors in a hypothetical company called Alpha. Prior to beginning the experiment, we ask participants to confirm they have experience in both investing in the stock market *and* reviewing company financial statements—only those who report experience in these areas complete the experiment. Following this confirmation, we provide participants with background information on sell-side analysts and the reports they issue. We use comprehension check questions to determine participants’ understanding of this information.

Following this initial overview of analyst reports, we provide participants with background information about Alpha, which includes summary financial data for 2020 and 2021. Participants view four financial indicators: revenue, gross margin, net income, and earnings per share (EPS). The year over year change in performance improves for two indicators (revenue and net income), decreases for one indicator (gross margin) and stays the same for the fourth indicator (EPS). This mixed performance allows both an upward and a downward revision (both in recommendations and in earnings) to be perceived as equally plausible.

After reviewing prior firm performance, participants learn that Alpha is covered by five analyst firms and view the five analysts’ 2022 EPS estimates and current recommendations. The five estimates average to an EPS of \$1.12. Two of the analysts recommend *hold*, two recommend *buy*, and one recommends *sell*. This makes the consensus EPS \$1.12 and the modal recommendation *hold*. One analyst, Sam Cuthbert, has an EPS estimate of \$1.12 and a *hold* recommendation, making his recommendation/estimate pair consistent with the consensus EPS and modal recommendation.

Following this initial overview of analyst recommendations and estimates, participants learn that Sam Cuthbert has revised his recommendation and earnings estimate. At this point, we introduce our independent variables—revision consistency, analyst affiliation, and recommendation direction, discussed in the following section.

3.3 Independent Variables

Our first independent variable (Consistency) manipulates whether Sam Cuthbert's earnings and recommendation revision are consistent or inconsistent. Sam's revision is consistent when he revises his recommendation and EPS estimate in the same direction (e.g., *hold to buy* when increasing the EPS estimate). Sam's revision is inconsistent when he revises his recommendation and EPS estimate in opposite directions (e.g., *hold to buy* when decreasing the EPS estimate).

Our second independent variable (Affiliation) manipulates whether a conflict of interest exists between Sam Cuthbert's firm, Chadwick and Co., and Alpha due to an affiliation between the two companies. Participants in the affiliated (unaffiliated) condition read that: "Sam Cuthbert's firm, Chadwick & Co., has (does not have) financial ties with Alpha and expects (does not expect) to have financial ties with Alpha in the future."

Our third independent variable (Recommendation Revision Direction) manipulates whether Sam Cuthbert changes his recommendation from *hold to buy* or *hold to sell*. Sam Cuthbert issues an upward (downward) recommendation revision when his recommendation changes from *hold to buy* (*sell*).

3.4 Dependent and Process Variables

After reviewing Sam Cuthbert's revision, participants respond to two questions that elicit our primary dependent variables—participant's perceptions of analyst's trustworthiness and competence: (1) "In your view, how trustworthy is Sam Cuthbert as an analyst?" and (2) "In your view, how competent is Sam Cuthbert as an analyst?". We randomize the order of presentation of these questions across participants.¹²

¹² The order of presentation does not interact with any of our independent variables; therefore, we do not discuss it further.

Following their response to our two primary dependent variables, participants respond to additional questions that help us better understand their responses. First, we ask participants to rank factors that influenced Sam Cuthbert’s revision (we describe the details in the results section). We ask this question to better understand to what extent participants believe dispositional versus contextual factors informed the analyst’s revision. We also ask participants questions about their likelihood of searching for more information about Alpha and their likelihood of relying on the revised report. Finally, participants answer a set of demographic questions.

3.5 Design Choices

This section discusses three key design choices in our setting. Specifically, we address our decision to 1) focus on recommendations and earnings forecasts among possible analyst outputs, 2) manipulate the direction of analysts’ recommendation revision as opposed to their earnings forecast revisions, and 3) not incorporate additional information in the analysts’ report beyond our two outputs of interest.

First, we choose to examine the (in)consistency between earnings estimates and analysts’ recommendations because, empirically, these are the two analyst outputs that are most commonly inconsistent with each other. That is, recommendations and earnings forecasts are revised in opposite directions 33% of the time, whereas recommendations (earnings forecasts) and target prices are revised in opposite directions 28% (19%) of the time (Iselin et al. 2021).

Second, when manipulating the direction of inconsistency within analyst outputs we choose to focus on recommendation revisions (i.e., *hold to buy* or *hold to sell*) as opposed to earnings revisions (e.g., \$ 1.12 to 1.10 or 1.12 to 1.14). We do so because analysts’ recommendations are important to retail investors, who are the focus of our study, as recommendations are explicit, actionable, (Engelberg et al. 2019) and are seen as the “ultimate judgment” on a stock (Schipper 1991). Further,

prior research argues that retail investors (but not institutional investors) are misled by focusing excessively on recommendations and ignoring earnings (Malmendier and Shantikumar 2007, 2014). Focusing on the earnings-recommendation pair allows us to test this claim.

Finally, we choose not to incorporate additional information as part of the analyst's report for two reasons. First, we wish to more cleanly test the impact of our independent variables. Prior experimental research in accounting has not yet examined the impact of multiple analyst outputs on investor judgments. Given our interest in the (in)consistency of two analyst outputs, we chose to first manipulate the direction of these outputs as opposed to the analysts' explanation behind them. We consider this to be an initial step in understanding retail investor judgment in response to multiple analyst outputs. While we acknowledge this variable via a question about participants' intent to search out additional information (see Section 4.3.2), we leave it to future research to directly investigate how additional information affects investors' interpretation of the inconsistency between analyst recommendation and earnings forecast revisions. We expect that the results of the current study can help inform such future investigation.

Second, retail investors are not a homogenous group. They have varying levels of access to analyst recommendation, earnings revisions, and information about analyst affiliation (our manipulations). We outline these varying levels of access in Exhibit I. Some brokerages send emails to their account holders any time the analysts' consensus recommendation changes (see panel A). Other brokerages allow their account holders to receive notifications any time the consensus earnings estimate, or the consensus recommendation changes (see panel B). Finally, some data-providers allow investors to customize reports that provide revisions in earnings, recommendations, and analyst affiliations in a single report (see Panel C). Retail investors rarely have access to the full analyst reports (from sell-side analysts). Consequently, in our experiment, participants see only the

summarized, aggregated information relevant to our manipulations (i.e., we do not provide participants access to the entire analyst report).

4. RESULTS

4.1 Comprehension and Manipulation Checks

To confirm that participants correctly understand the setting in which sell-side analysts operate, we ask them two comprehension check questions prior to introducing our experimental manipulations. The first question asks whether analyst reports usually include both an earnings estimate *and* a recommendation for the stock being analyzed. The second question asks whether regulators require analysts to disclose their conflict of interest when they publish reports on companies that have financial ties with the analysts' employers. If participants carefully read our opening description and correctly understand the setting, they should answer *true* for both questions. Four out of 398 participants answer the first question incorrectly and 12 answer the second question incorrectly. Because understanding the setting is crucial to ensure a meaningful test of our hypotheses, we include only participants who answer both questions correctly.

We also ask participants three manipulation check questions to ensure they understood our manipulations as intended. The first question asks whether the analyst's firm had financial ties with the firm covered in the research report. The second question asks whether the analyst recommendation was revised from *hold* to *sell* (downward revision) or from *hold* to *buy* (upward revision). The last question asks participants whether the analyst's earnings estimate revision and recommendation revision moved in the same direction. Three hundred fifty participants answered the first question correctly (91.6%), 356 participants answered the second question correctly (93.2%), and 368 participants answered the third question correctly (96.3%). For our analyses, we do not exclude

participants who incorrectly answer manipulation check questions. This results in a final sample of 382 participants.¹³

4.2 Tests of Hypotheses

Our first hypothesis addresses investors' perceptions of analyst credibility. Participants indicate their perceptions of trustworthiness and competence on five-point scales with endpoints of (1) (Extremely Untrustworthy) and (5) (Extremely Trustworthy) and (1) (Extremely Incompetent) and (5) (Extremely Competent). In line with prior research, the credibility score is calculated as the average of the trustworthiness and competence scores (Rupar 2017). Overall, we expect inconsistent revisions will negatively impact perceptions of credibility. Univariate analysis supports this expectation. Descriptive statistics for credibility scores are presented in Panel A of Table 1. The mean credibility score for participants in the consistent revision conditions is 3.50, which is higher than the mean trustworthiness score of 3.17 for participants in the inconsistent revision conditions. We next turn to a formal test of our first prediction.

Insert Table 1 about here

H1 predicts that inconsistent revisions decrease perceptions of credibility relative to consistent revisions. To formally test H1 we run an Analysis of Variance (ANOVA) with Consistency as the independent variable and Credibility as the dependent variable. Panel B of Table 1 presents the results of this analysis. In line with H1, we observe a significant main effect for Consistency ($F_{1, 380} = 12.45$, $p < 0.01$).¹⁴ As predicted, an analyst who provides a directionally inconsistent revision is viewed as less credible than an analyst who provides a directionally consistent revision.

¹³ As noted, we exclude only those participants who incorrectly answered one (or both) comprehension check question(s). Our inferences remain qualitatively unchanged if we include these participants – the evidence supporting H3a weakens, while all other results are inferentially the same. Additionally, excluding participants who missed at least one manipulation check question does not change inferences for any of our results.

¹⁴ All reported p-values are two-tailed.

Our second hypothesis addresses investors' perceptions of analyst competence – one of the components of credibility. We expect inconsistent revisions to negatively impact perceptions of competence and univariate analysis supports this expectation. Descriptive statistics presented in Panel A of Table 2 indicates that, overall, analysts issuing inconsistent revisions are viewed as less competent than analysts issuing consistent revisions ($\mu_{\text{consistent}} = 3.69$ vs. $\mu_{\text{inconsistent}} = 3.33$).

Insert Table 2 about here

H2a predicts that inconsistent revisions decrease perceptions of competence equally for unaffiliated and affiliated analysts. To formally test H2a we run an ANOVA with Consistency and Affiliation as independent variables and Competence as the dependent variable. Panel B of Table 2 presents our results. In line with our expectation, participants view analysts issuing inconsistent revisions as less competent ($F_{1, 378} = 16.31, p < 0.01$), and this relationship does not change with analyst affiliation, i.e., the interaction between Consistency and Affiliation is insignificant ($F_{1, 378} = 0.29, p = 0.59$). We report follow-up simple effects tests in Panel C of Table 2, which are in line with the main result and show that inconsistent revisions negatively impact perceptions of competence for both affiliated and unaffiliated analysts. Overall, these results are consistent with H2a.¹⁵

Insert Table 3 about here

H2b predicts that the relationship between Consistency, Affiliation and analyst Competence should not differ based on the direction of the recommendation revision. We first run the same model used to test H2a with the addition of Recommendation Revision Direction as an independent variable. Panel B of Table 3 presents the results and indicates that the Consistency \times Affiliation \times Recommendation Revision Direction interaction is insignificant ($F_{1, 374} = 0.04, p = 0.85$), suggesting

¹⁵ However, we find that participants view affiliated analysts as less competent than unaffiliated analysts ($F_{1, 378} = 23.74, p < 0.01$). Ex ante, there is no theoretical reason for affiliated analysts to be viewed as less (or more) competent relative to unaffiliated analysts. We leave it to future research to better understand the nature of this effect.

that the negative impact of inconsistent revisions does not differ for upward and downward revisions when Competence is the dependent variable. For completeness, we run separate ANOVAs for each Recommendation Revision Direction (upward and downward) with Consistency and Affiliation as independent variables and Competence as the dependent variable (Panel C of Table 3). We also present simple effects tests for both upward and downward revisions (Panel D of Table 3). Results of these tests show no discernable differences between upward and downward recommendation revisions. Taken together, these results support H2b – inconsistent revisions negatively impact perceptions of competence equally for affiliated and unaffiliated analysts, and regardless of recommendation revision direction.

Our third hypothesis addresses investors' perceptions of analyst trustworthiness. Overall, we expect inconsistent revisions to negatively impact perceptions of trustworthiness and univariate analysis supports this expectation. Descriptive statistics for trustworthiness scores are presented in Panel A of Table 4. The mean trustworthiness score for participants in the consistent revision conditions is 3.31, which is higher than the mean trustworthiness score of 3.02 for participants in the inconsistent revision conditions. We turn next to our formal test of H3a.

Insert Table 4 about here

H3a predicts that inconsistent revisions decrease perceptions of trustworthiness more for unaffiliated analysts than for affiliated analysts. To test this prediction, we run an ANOVA with Consistency and Affiliation as independent variables and Trustworthiness as the dependent variable. Panel B of Table 4 presents the results of this analysis. We observe significant main effects for both Consistency ($F_{1, 378} = 9.36, p < 0.01$) and Affiliation ($F_{1, 378} = 163.40, p < 0.01$) as well as a marginally significant Consistency \times Affiliation interaction ($F_{1, 378} = 3.29, p = 0.07$).

Panel C of Table 4 presents follow-up simple effects tests that show the negative impact of inconsistent revisions on perceptions of trustworthiness is significant when analysts are unaffiliated ($F_{1, 378} = 11.94, p < 0.01$) but not when analysts are affiliated ($F_{1, 378} = 0.77, p = 0.38$). Taken together, these results are consistent with H3a.

Insert Table 5 about here

H3b predicts that inconsistent revisions decrease perceptions of trustworthiness more for unaffiliated analysts than for affiliated analysts, particularly given an upward recommendation revision. To test this hypothesis, we use the same ANOVA model used to test H3a with the addition of Recommendation Revision Direction as an independent variable. Panel B of Table 5 presents the results of the ANOVA. As predicted, the Consistency \times Affiliation \times Recommendation Revision Direction interaction is significant ($F_{1, 374} = 4.56, p = 0.03$).

To provide insight into the three-way interaction, we run separate ANOVAs for upward and downward recommendation revisions with Consistency and Affiliation as independent variables and Trustworthiness as the dependent variable. Panel C of Table 5 presents these results. For upward recommendation revisions we observe a significant Consistency \times Affiliation interaction ($F_{1, 188} = 8.35, p < 0.01$) and a significant main effect for Affiliation ($F_{1, 188} = 92.45, p < 0.01$), while the main effect for Consistency is no longer significant ($F_{1, 188} = 1.68, p = 0.20$). For downward recommendation revisions we observe an insignificant Consistency \times Affiliation interaction ($F_{1, 186} = 0.06, p = 0.80$), and continue to see significant main effects for Consistency ($F_{1, 186} = 9.27, p < 0.01$) and Affiliation ($F_{1, 186} = 73.52, p < 0.01$). These results suggest that while Consistency and Affiliation are important factors for perceptions of analyst trustworthiness for both upward and downward recommendation revisions, the moderating impact of Affiliation on Consistency is only significant for

upward recommendation revisions. Follow-up simple effects tests presented in Panel D of Table 5 support these findings. Taken together, these results support H3b.

4.3. Additional Analyses

4.3.1 Evidence of Underlying Theory

Two key assumptions in our reliance on attribution theory are that (1) participants will view inconsistent revisions as more surprising than consistent revisions, which leads them to make stronger dispositional attributions about the analyst, and (2) participants will have a hard time unraveling the true motives underlying an analyst's revision in the presence of ulterior motives. We test the first assumption with an out of sample experiment and the second assumption with process questions from the primary experiment.

To test whether inconsistent revisions are more surprising than consistent revisions, we recruited 117 participants through the Prolific platform and presented them with a simplified version of our primary experiment. The materials did not include information about analyst affiliation and were administered prior to running our primary experiment. We manipulated revision consistency (consistent vs. inconsistent) and the direction of the recommendation revision (upward versus downward). We asked participants to indicate how surprising they found the analyst's revision. Participants answered on a five-point scale ranging from (1) (Not at all Surprising) to (5) (Extremely Surprising). In line with our expectation, untabulated results indicate that participants assess inconsistent revisions as considerably more surprising than consistent revisions ($\mu_{\text{consistent}} = 2.39$ vs. $\mu_{\text{inconsistent}} = 3.13$, $p < 0.01$), both for upward ($\mu_{\text{consistent}} = 2.29$ vs. $\mu_{\text{inconsistent}} = 3.00$, $p = 0.04$) and for downward revisions ($\mu_{\text{consistent}} = 2.48$ vs. $\mu_{\text{inconsistent}} = 3.27$, $p = 0.02$). These data support a key component of our theory.

We collect process data at the end of our primary experiment to help test the second assumption in the theory. To better-understand how participants attribute contextual versus dispositional explanations for analysts' revision, we ask them to rank, in order of importance, three potential reasons the analyst makes the revision. They are, the analyst's: (a) desire to please the management of Alpha, (b) access to private information about Alpha, and (c) beliefs about the future financial prospects of Alpha. We code reasons (a) and (b) as contextual factors (largely resulting from the analyst's ties with Alpha) and reason (c) as a dispositional factor (largely reflective of the analyst's true beliefs).

We use chi-squared tests (untabulated) to test the extent to which participants take these three factors into account (by ranking them first) contingent on the analyst's affiliation. We find that, for affiliated analysts, participants rank all three as more-or-less equally important (a) (29%), (b) (37%) and (c) (33%) factors driving the analyst's revision – an insignificant chi-squared test suggests that the proportions are statistically indistinguishable ($\chi^2_{2, 188} = 1.78, p = 0.41$). Participants believe that unaffiliated analysts, on the other hand, are significantly more likely to make the revision due to factor (c) (63%) than factors (a) (20%) or (b) (18%) as it is more likely to be ranked most important relative to the other factors. A significant chi-squared test suggests that the proportions are significantly different than an equal distribution of responses across conditions ($\chi^2_{2, 190} = 73.63, p < 0.01$). Consistent with our theory, this evidence suggests that participants are more likely to ascribe dispositional motives for analyst revisions when assessing revisions from unaffiliated analysts than when assessing revisions from affiliated analysts.

4.3.2 Search for Additional Information

Given our assumption that participants view inconsistent revisions as surprising, it is possible that investors will choose to access additional information to better understand the unexpected report

before making a final investment decision. To assess this possibility, we asked our participants to indicate the likelihood that they would conduct more research prior to making an investment in Alpha. Untabulated results show that participants are more likely to conduct additional research about Alpha both when the revision is inconsistent and when the analyst is affiliated. However, adding this likelihood of conducting additional research as a covariate into our analyses does not alter any inferences.¹⁶

4.3.3 Reliance on the Analyst's Revision and Overall Credibility

As an alternative measure of credibility, we ask participants to indicate the extent to which they agree with the statement “I felt like I could rely on the information in Sam Cuthbert's updated report on Alpha.” Untabulated results of an ANOVA with Consistency and Affiliation as independent variables and Reliance as the dependent variable indicate a significant main effect for Consistency ($F_{1, 378} = 7.26, p < 0.01$), a significant main effect for Affiliation ($F_{1, 378} = 114.01, p < 0.01$), and an insignificant interaction between the two variables ($F_{1, 378} = 0.33, p = 0.57$). In line with our primary findings, revision consistency impacts reliance: participants are more likely to rely on an analyst's revision when the revision is consistent.

5. CONCLUSION

A significant proportion of sell-side analysts' recommendation revisions are directionally inconsistent with the analysts' earnings forecast revision. Prior research disagrees on whether investors view such inconsistent revisions as less credible. We contribute to this literature by directly measuring perceptions of trustworthiness and competence (the two dimensions of credibility) and

¹⁶ We examine 20 analyst reports from the period 2021-22 where analysts provide inconsistent revisions (earnings estimates and recommendations go in opposite directions) and find that only in four of these twenty cases, analysts explicitly address the inconsistency. While we realize the perils of generalizing based on a small sample, this evidence suggests that even if retail investors could access the full analyst reports, they may be unable to resolve the reason for the inconsistency in a significant majority of the cases.

investigating retail investors' reactions to inconsistent analyst revisions conditional on analyst affiliation and the direction of the recommendation revision. We find that inconsistent revisions reduce investors' perceptions of trustworthiness for unaffiliated analysts, but not for affiliated analysts. Further, the moderating effect of affiliation on consistency is stronger when recommendations are revised upward than when recommendations are revised downward. Inconsistent revisions reduce investors' perceptions of competence, both for unaffiliated and affiliated analysts, regardless of recommendation revision direction. Our results suggest that retail investors' evaluation of the credibility of inconsistent revisions may differ significantly from how markets, as a whole, assess directionally inconsistent revisions.

Our experiment is subject to limitations that serve as avenues for future research. First, since retail investors view inconsistent revisions as unexpected, inconsistent revisions may prompt investors to search for additional information to make sense of the inconsistency. As an initial step to understanding investor judgement in response to inconsistency, we did not provide participants in our experiment with this option. Whether (and how) the search for additional information alters investors' judgments is a question for future research.

Additionally, we investigate only one type of inconsistency—between a recommendation and an earnings forecast. In addition to earnings forecasts and recommendations, analysts also produce price targets for some of the firms they cover. In theory, our results should generalize to other types of inconsistencies (e.g., inconsistency between recommendations and target prices, or between earnings forecast and target prices). However, target prices differ from earnings estimates in two important respects. Market prices are perpetually updated whereas earnings are periodically updated. Moreover, Iselin et al. (2021) argue (and find) that the determinants of inconsistency vary depending on the specific type of inconsistency (for example, they find that the determinants of target price –

EPS inconsistency are very different from those of target price – recommendations). Together, this suggests that much remains to be understood about inconsistent analyst revisions. We leave these questions for future research.

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Exhibit 1: Retail Investors' Access to Analyst Revisions

Panel A: Interactive Brokers

InteractiveBrokers

FYI: Changes in Analyst Ratings

Dear Client,

Some investors use analyst ratings to stay informed about their investments. Analysts have changed their ratings for one or more companies in which you hold positions.

The following table displays the affected companies, the current number of analysts by rating category and, in parentheses, the recent change in the number of analysts rating the company within each rating category.

Symbol	Buy	Outperform	Hold	Underperform	Sell	Account(s)
PFE@NYSE	2(0)	10(0)	13(+1)	0(0)	0(0)	U***9794

Note: Current ratings are from Reuters and may not reflect all rating changes from other sources such as Street Insider

Panel B: TD Ameritrade

Track Your Holdings

Receive e-mail notification about information that may affect your portfolio. Check any box below to specify the types of alerts you want to receive, then select the email account.

To use the alert under Portfolio Value Reports below as a template for additional portfolio alerts, select **Copy**, then specify the alert details and delivery preferences.

Alerts are provided and delivered by Market On Demand, a separate and unaffiliated company.

Save **Cancel**

TD Ameritrade [View your portfolio](#)

Portfolio Reports

Active	Description	Frequency	Delivery
<input type="checkbox"/>	Weekly Portfolio and Markets Report Receive a downloadable PDF with analysis of your holdings, as well as a general market update. ! Before setting this alert, please review your cost-basis information.	Delivered weekly	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/>	Change in Consensus Earnings Estimate Receive notification when earnings targets change for any of your holdings.	Delivered daily	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/>	Earnings Alert Receive an earnings news alert for any of your holdings.	Delivered daily	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/>	First Call Change in Consensus Recommendations Receive an alert when any of your holdings is up or downgraded by analysts.	Varies based on holdings	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/>	Daily Portfolio Update Receive a daily roundup of any news that may affect your holdings.	Mkt Open	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/>	Stock Split in Portfolio Receive notification when a stock split is announced for any of your holdings.	Delivered daily	<input type="checkbox"/> <input type="checkbox"/>

Panel C: FACTSET

JPMorgan Chase & Co. (JPM) **\$131.25**

Report as of 14 Mar '23

Broker Outlook

EPS | Mar '23E (Q1) | 100 Day Mean



The EPS majority basis is EPS - GAAP | U.S. Dollar

Institutional Investor

Banking Relationship

Broker	Analyst	Mar '23 Est*	Modification Date	Prev Est	Rating*
Wells Fargo Securities	Mike Mayo	3.38 ↑	10 Mar '23	2.89	Buy ↑
Daiwa Securities Co. Ltd.	Kazuya Nishimura	3.71	02 Mar '23	-	Overweight →
Evercore ISI	Glenn Schorr	3.10 →	14 Oct '22	3.10	Buy →
Keefe Bruyette & Woods	David Konrad	3.58 ↑	13 Jan '23	3.35	Hold →
Oppenheimer	Chris Kotowski	3.20 ↓	13 Jan '23	3.30	Buy →
Atlantic Equities	John Heagerty	3.52	30 Jan '23	-	Hold →
Jefferies	Ken Usdin	3.71 ↑	13 Jan '23	3.66	Hold →
Wolfe Research	Steven Chubak	3.53 ↑	13 Jan '23	3.43	Hold →
Deutsche Bank Research	Matthew O'Connor	3.64 ↑	13 Jan '23	3.53	Hold ↓
RBC Capital Markets	Gerard Cassidy	3.44 ↑	13 Jan '23	3.20	Buy →
Piper Sandler Companies	R. Scott Siefers	3.24 ↑	13 Jan '23	3.05	Buy →
Seaport Global Securities	Jim Mitchell	3.71 ↑	13 Jan '23	3.65	Buy →
BMO Capital Markets	James Fotheringham	3.34 ↑	13 Jan '23	3.29	Hold →

This exhibit illustrates the varying levels of access retail investors have to analyst revisions.

Panel A provides an email from Interactive Brokers notifying an account holder that the analysts' consensus recommendation has changed on one of their holdings. The account holder has the option of obtaining additional information by logging into their account.

Panel B provides an excerpt from the webpage of TD Ameritrade that allow account holders to automatically receive notifications any time the analysts' consensus earnings estimate or the consensus recommendation changes.


Panel C exhibit provides an excerpt from a custom report for JP Morgan Chase from FactSet, an aggregator of analyst estimates and recommendations to illustrate the manipulations used in the study. This report shows that Mike Mayo from Wells Fargo Securities revised his rating (recommendation) as well as his earnings estimate for JP Morgan in the same direction (*consistent revision*) while Mathew O'Connor of Deutsche Bank Research revised his recommendation and his earnings estimates in opposite directions (*inconsistent revision*). Mike Mayo's revised his recommendation *upward* while Chris Kotowski from Oppenheimer revised his recommendation *downward*. Analysts who have a banking relationship with JPMorgan have an  icon adjacent to their name (*affiliated* vs. *unaffiliated* analysts).

TABLE 1: Investor Perception of Analyst Credibility Based on Revision Consistency**Panel A: Descriptive Statistics - Mean (standard deviation)**

Dependent Variable: Credibility	
<i>Revision Consistency</i>	Means
Consistent	3.50 (0.89) n=190
Inconsistent	3.17 (0.92) n=192

Panel B: Analysis of Variance

Dependent Variable: Credibility				
Source	<i>d.f.</i>	M.S.	F-Statistic	<i>p</i> -value
Consistency	1	10.28	12.45	<0.01
Error	380	0.83		

Table 1 provides results related to participants' credibility judgments in response to an analyst's recommendation and earnings forecast revision. Participants provide their judgments of the two components of credibility – trustworthiness and competence – on two five-point scales with endpoints of 1 (Extremely Untrustworthy) and 5 (Extremely Trustworthy) and 1 (Extremely Incompetent) and 5 (Extremely Competent). Credibility is the average of the trustworthiness and competence scores. A revision is consistent (inconsistent) if the recommendation revision and earnings estimate revision move in the same (opposite) directions. Panel A provides the descriptive statistics and Panel B includes the ANOVA table.

All reported *p*-values are two-tailed.

TABLE 2: Investor Perception of Analyst Competence Based on Revision Consistency & Affiliation

Panel A: Descriptive Statistics – Mean (standard deviation)

		Dependent Variable: Competence		
		<i>Affiliation</i>		
<i>Revision Consistency</i>	Affiliated	Unaffiliated	Row Means	
Consistent	3.45 (0.94) n=94	3.93 (0.71) n=96	3.69 (0.86) n=190	
Inconsistent	3.14 (0.93) n=96	3.52 (0.88) n=96	3.33 (0.92) n=192	
Column Means	3.29 (0.94) n=190	3.72 (0.83) n=192		

Panel B: Analysis of Variance

		Dependent Variable: Competence		
Source	<i>d.f.</i>	M.S.	F-Statistic	<i>p</i> -value
Consistency	1	12.30	16.31	<0.01
Affiliation	1	17.89	23.74	<0.01
Consistency × Affiliation	1	0.22	0.29	0.59
Error	378	0.75		

Panel C: Follow-Up Simple Effects Tests

		Dependent Variable: Competence		
Source	<i>d.f.</i>	M.S.	F-Statistic	<i>p</i> -value
Effect of consistency when affiliated	1	4.61	6.11	0.01
Effect of consistency when unaffiliated	1	7.92	10.51	<0.01
Error	378	0.75		

Table 2 provides results related to participants' competence judgments in response to an analyst's recommendation and earnings forecast revision. Participants provide their judgments on a five-point scale with endpoints of 1 (Extremely Incompetent) and 5 (Extremely Competent). A revision is consistent (inconsistent) if the recommendation revision and earnings estimate revision move in the same (opposite) directions. Participants in the affiliated (unaffiliated) conditions learn that Sam Cuthbert's firm, Chadwick & Co., has (does not have) financial ties with the target company, Alpha. Panel A provides the descriptive statistics, Panel B includes the ANOVA table, and Panel C includes the simple effects tests.

All reported p-values are two-tailed.

TABLE 3: Investor Perception of Analyst Competence Based on Revision Consistency, Affiliation and Recommendation Revision Direction

Panel A: Descriptive Statistics - Mean (standard deviation)

Dependent Variable: Competence

	Recommendation Revision: Upward			Recommendation Revision: Downward		
	<i>Affiliation</i>			<i>Affiliation</i>		
<i>Revision Consistency</i>	Affiliated	Unaffiliated	Row Means	Affiliated	Unaffiliated	Row Means
Consistent	3.52 (0.88) n=48	4.02 (0.63) n=49	3.77 (0.80) n=97	3.37 (1.00) n=46	3.83 (0.79) n=47	3.60 (0.92) n=93
Inconsistent	3.16 (0.91) n=50	3.53 (0.89) n=45	3.34 (0.92) n=95	3.11 (0.95) n=46	3.51 (0.88) n=51	3.32 (0.93) n=97
Column Means	3.34 (0.91) n=98	3.79 (0.80) n=94		3.24 (0.98) n=92	3.66 (0.85) n=98	

Panel B: Analysis of Variance

Dependent Variable: Competence				
Source	<i>d.f.</i>	M.S.	F-Statistic	<i>p</i> -value
Consistency	1	12.16	16.05	<0.01
Affiliation	1	17.92	23.65	<0.01
Recommendation Revision Direction	1	1.04	1.37	0.24
Consistency × Affiliation	1	0.21	0.27	0.60
Consistency × Recommendation Revision Direction	1	0.43	0.56	0.45
Affiliation × Recommendation Revision Direction	1	0.00	0.00	0.97
Consistency × Affiliation × Recommendation Revision Direction	1	0.03	0.04	0.85
Error	374	0.76		

Panel C: Analysis of Variance – Upward and Downward Revisions

Upward Revisions	Dependent Variable: Competence			
	Source	<i>d.f.</i>	M.S.	F-Statistic
Consistency	1	8.61	12.37	<0.01
Affiliation	1	9.13	13.11	<0.01
Consistency × Affiliation	1	0.19	0.27	0.60
Error	188	0.70		

Downward Revisions	Dependent Variable: Competence			
	Source	<i>d.f.</i>	M.S.	F-Statistic
Consistency	1	4.00	4.88	0.03
Affiliation	1	8.79	10.72	<0.01
Consistency × Affiliation	1	0.04	0.05	0.82
Error	186	0.82		

Panel D: Follow-up Simple Effects Tests

Downward Revisions	Dependent Variable: Competence			
	Source	<i>d.f.</i>	M.S.	F-Statistic
Effect of consistency when affiliated	1	1.57	1.91	0.17
Effect of consistency when unaffiliated	1	2.50	3.05	0.08
Error	186	0.82		

Upward Revisions	Dependent Variable: Competence			
	Source	<i>d.f.</i>	M.S.	F-Statistic
Effect of consistency when affiliated	1	3.19	4.58	0.03
Effect of consistency when unaffiliated	1	5.57	8.00	<0.01
Error	188	0.70		

Table 3 provides results related to participants’ competence judgments in response to an analyst’s recommendation and earnings forecast revision. Participants provide their judgments on a five-point scale with endpoints of 1 (Extremely Incompetent) and 5 (Extremely Competent). A revision is consistent (inconsistent) if the recommendation revision and earnings estimate revision move in the same (opposite) directions. Participants in the affiliated (unaffiliated) conditions learn that Sam Cuthbert’s firm, Chadwick & Co., has (does not have) financial ties with the target company, Alpha. A recommendation revision is upward (downward) if the recommendation is revised from *hold* to *buy* (*sell*). Panel A

provides the descriptive statistics, Panel B includes the ANOVA table, Panel C includes two ANOVA tables split into downward and upward recommendation revisions and Panel D presents simple effects tests.

All reported p-values are two-tailed.

TABLE 4: Investor Perception of Analyst Trustworthiness Based on Revision Consistency & Affiliation

Panel A: Descriptive Statistics - Mean (standard deviation)

		Dependent Variable: Trustworthiness		
		<i>Affiliation</i>		
<i>Revision Consistency</i>	Affiliated	Unaffiliated	Row Means	
Consistent	2.62 (1.01) n=94	3.99 (0.70) n=96	3.31 (1.11) n=190	
Inconsistent	2.50 (1.02) n=96	3.53 (0.92) n=96	3.02 (1.10) n=192	
Column Means	2.56 (1.01) n=190	3.76 (0.85) n=192		

Panel B: Analysis of Variance

Dependent Variable: Trustworthiness				
Source	<i>d.f.</i>	M.S.	F-Statistic	<i>p</i> -value
Consistency	1	7.90	9.36	<0.01
Affiliation	1	137.95	163.40	<0.01
Consistency × Affiliation	1	2.78	3.29	0.07
Error	378	0.84		

Panel C: Follow-Up Simple Effects Tests

Dependent Variable: Trustworthiness				
Source	<i>d.f.</i>	M.S.	F-Statistic	<i>p</i> -value
Effect of consistency when affiliated	1	0.65	0.77	0.38
Effect of consistency when unaffiliated	1	10.08	11.94	<0.01
Error	378	0.84		

Table 4 provides results related to participants' trustworthiness judgments in response to an analyst's recommendation and earnings forecast revision. Participants provide their judgments on a five-point scale with endpoints of 1 (Extremely Untrustworthy) and 5 (Extremely Trustworthy). A revision is consistent (inconsistent) if the recommendation revision and earnings estimate revision move in the same (opposite) directions. Participants in the affiliated (unaffiliated) conditions learn that Sam Cuthbert's firm, Chadwick & Co., has (does not have) financial ties with the target company, Alpha. Panel A provides the descriptive statistics, Panel B includes the ANOVA table, and Panel C includes the simple effects tests.

All reported p-values are two-tailed.

TABLE 5: Investor Perception of Analyst Trustworthiness Based on Revision Consistency, Affiliation and Recommendation Revision Direction

Panel A: Descriptive Statistics - Mean (standard deviation)

Dependent Variable: Trustworthiness

	Recommendation Revision: Upward			Recommendation Revision: Downward		
	<i>Affiliation</i>			<i>Affiliation</i>		
<i>Revision Consistency</i>	Affiliated	Unaffiliated	Row Means	Affiliated	Unaffiliated	Row Means
Consistent	2.46 (0.97) n=48	4.04 (0.68) n=49	3.26 (1.15) n=97	2.78 (1.03) n=46	3.94 (0.73) n=47	3.37 (1.06) n=93
Inconsistent	2.66 (0.98) n=50	3.51 (0.84) n=45	3.06 (1.01) n=95	2.33 (1.03) n=46	3.55 (0.99) n=51	2.97 (1.18) n=97
Column Means	2.56 (0.98) n=98	3.79 (0.80) n=94		2.55 (1.05) n=92	3.73 (0.89) n=98	

Panel B: Analysis of Variance

Source	Dependent Variable: Trustworthiness			
	<i>d.f.</i>	M.S.	F-Statistic	<i>p</i> -value
Consistency	1	8.18	9.75	<0.01
Affiliation	1	137.86	164.38	<0.01
Recommendation Revision Direction	1	0.04	0.04	0.84
Consistency × Affiliation	1	2.61	3.11	0.08
Consistency × Recommendation Revision Direction	1	1.58	1.89	0.17
Affiliation × Recommendation Revision Direction	1	0.02	0.02	0.88
Consistency × Affiliation × Recommendation Revision Direction	1	3.82	4.56	0.03
Error	374	0.84		

Panel C: Analysis of Variance – Upward and Downward Revisions

Upward Revisions	Dependent Variable: Trustworthiness			
Source	<i>d.f.</i>	M.S.	F-Statistic	<i>p</i> -value
Consistency	1	1.29	1.68	0.20
Affiliation	1	70.96	92.45	<0.01
Consistency × Affiliation	1	6.41	8.35	<0.01
Error	188	0.77		

Downward Revisions	Dependent Variable: Trustworthiness			
Source	<i>d.f.</i>	M.S.	F-Statistic	<i>p</i> -value
Consistency	1	8.44	9.27	<0.01
Affiliation	1	66.95	73.52	<0.01
Consistency × Affiliation	1	0.06	0.06	0.80
Error	186	0.91		

Panel D: Follow-up Simple Effects Tests

Downward Revisions	Dependent Variable: Trustworthiness			
Source	<i>d.f.</i>	M.S.	F-Statistic	<i>p</i> -value
Effect of consistency when affiliated	1	4.79	5.26	0.02
Effect of consistency when unaffiliated	1	3.67	4.03	0.05
Error	186	0.91		

Upward Revisions	Dependent Variable: Trustworthiness			
Source	<i>d.f.</i>	M.S.	F-Statistic	<i>p</i> -value
Effect of consistency when affiliated	1	1.00	1.30	0.26
Effect of consistency when unaffiliated	1	6.58	8.58	<0.01
Error	188	0.77		

Table 5 provides results related to participants’ trustworthiness judgments in response to an analyst’s recommendation and earnings forecast revision. Participants provide their judgments on a five-point scale with endpoints of 1 (Extremely Untrustworthy) and 5 (Extremely Trustworthy). A revision is consistent (inconsistent) if the recommendation revision and earnings estimate revision move in the same (opposite) directions. Participants in the affiliated (unaffiliated) conditions learn that Sam Cuthbert’s firm, Chadwick & Co., has (does not have) financial ties with the target company, Alpha. A

recommendation revision is upward (downward) if the recommendation is revised from *hold* to *buy* (*sell*). Panel A provides the descriptive statistics, Panel B includes the ANOVA table, Panel C includes two ANOVA tables split into downward and upward recommendation revisions and Panel D presents simple effects tests.

All reported p-values are two-tailed.