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Why Do Managers Explain Their Earnings Forecasts?

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ABSTRACT

Managers often explain their earnings forecasts by linking forecasted performance to their internal actions and the actions of parties external to the firm. These attributions potentially aid investors in the interpretation of management forecasts by confirming known relationships between attributions and profitability or by identifying additional causes that investors should consider when forecasting earnings. We investigate why managers choose to provide attributions with their forecasts and whether the attributions are related to security price reactions to management earnings forecasts. Using a sample of 951 management earnings forecasts issued from 1993 to 1996, we find that attributions are more likely for larger firms, less likely for firms in regulated industries, less likely for forecasts issued over longer horizons, more likely for bad news forecasts, and more likely for forecasts that are maximum type. Furthermore, attributions are associated with greater absolute price reactions to management forecasts, more negative price reactions to management forecasts (forecast news held constant), and a greater price reaction per dollar of

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unexpected earnings. Our findings hold after control for the aforementioned determinants of attributions and after control for other firm- and forecast-specific variables that are often associated with security prices.

1. Introduction

In this study, we investigate two research questions: (1) Why do managers augment voluntary earnings forecasts with explanations for forecasted performance? (2) Do such explanations affect stock price reactions to the release of management forecasts? Many managers voluntarily disclose their forecasts without explanation. However, a substantial number of managers voluntarily choose to link forecasted performance with internal causes (i.e., their actions), external causes (i.e., the actions of parties external to the firm such as competitors, governmental regulators, and policy makers), or both. These explanations (or attributions) are potentially important information to investors who engage in strategic analysis of financial statement information. Strategic financial analysis involves understanding both a company's internal strategies and competencies and its external competitive and regulatory environment to generate profitability forecasts.[1] Attributions convey management's assessments of the links between internal and external factors and profitability forecasts. If the attributions are credible, they can enhance the usefulness of accompanying earnings forecasts either by providing additional information on known links between factors and profitability or by identifying additional factors to consider in forecasting profits.

Prior research documents that the language in a management forecast affects its usefulness to investors (as reflected in stock price reactions to management forecast disclosures). For example, language describing forecast precision (e.g., "greater than," "less than," "between," "a record year") is related to stock price reactions to management earnings forecast disclosures (Pownall, Wasley, and Waymire [1993], Baginski, Conrad, and Hassell [1993], Baginski, Hassell, and Waymire [1994]). Furthermore, this forecast precision is associated with underlying economic factors that proxy for the costs and benefits of information production (Baginski and Hassell [1997], Bamber and Cheon [1998]).

Attributions accompanying management earnings forecasts also are linked to share price reactions. Baginski, Hassell, and Hillison [2000] investigate whether attributions lack credibility because of a psychological egotism-driven bias in which managers provide internal attributions when news is good and external attributions when news is bad.[2] They provide descriptive evidence that attribution existence is associated with stock price

[1] See, for example, the strategic financial statement analysis model in Palepu, Healy, and Bernard [2000].

[2] Prior studies examining attributions in business settings find evidence of egotism bias but do not investigate whether the bias was sufficient to deter attribution credibility (Bettman and Weitz [1983], Staw, McKechnie, and Puffer [1983], Salancik and Meindl [1984]).

reactions to management forecasts in a mid-1980s sample, but they do not investigate the underlying determinants of the attributions. In contrast, we investigate the determinants of managers' decisions to provide these attributions and whether, *after* controlling for the underlying determinants, attributions help explain price reactions to management forecast disclosures.

Based on a sample of 951 management forecasts issued from 1993 to 1996, we find that managers often use attributions to explain their forecasts. Consistent with the prior research finding that voluntary disclosure is increasing in firm size (e.g., Cox [1985]), we find that managers of larger companies are more likely to issue attributions. We do not detect a relationship between a firm's prior earnings volatility and the tendency to provide an attribution. Therefore, the conclusion in Waymire [1985] and Cox [1985] that less volatile firms are more likely to issue voluntary management forecasts does not carry over to the decision to explain voluntarily a disclosed forecast. This is not surprising because, unlike earnings forecasts, attribution accuracy is not easily judged. Although many of the phenomena described in attributions are observable (foreign currency fluctuations, restructurings, etc.), the link between attributions and forecasted earnings is not easily observable. Consistent with our expectations about industry membership and attribution behavior, we find an inverse relation between regulated industry membership and the likelihood of attribution. Finally, we document that attributions are more likely for forecasts issued over shorter horizons, are more likely for bad news forecasts, and are more likely for forecasts issued in maximum-type (e.g., less than) form. It is interesting that these last conditions are similar to conditions characterizing bad news management forecasts in Skinner's [1994] study of asymmetric voluntary disclosure incentives associated with legal liability.

Our capital market tests show that attributions are incrementally informative. Attributions are associated with a greater absolute price reaction to management forecasts, more negative price reactions to management forecasts (forecast news held constant), and a greater price reaction per dollar of unexpected earnings. These findings hold after controlling for the determinants of attributions (firm size, sign of unexpected earnings in the forecast, maximum-type forecasts, regulated industry membership, forecast horizon) and control for other firm- and forecast-specific variables that are often associated with security prices (prior earnings volatility, high-tech industry membership, magnitude of unexpected earnings in the forecast, minimum- and range-type forecasts, and other information in the forecasts).

The voluntary nature of management forecasts (and accompanying attributions) places this study as part of a greater investigation of the voluntary disclosure process as a whole. Policy makers are interested in public disclosures in which results are explained. For example, the Financial Accounting Standards Board (FASB) recently issued a Steering Committee Report entitled "Improving Business Reports: Insight into Enhancing

Voluntary Disclosures (FASB [2001]). The report describes voluntary disclosure practices in various industry groups. Attributions, both internal and external, exist in each of the eight industries studied. The FASB's interest in voluntary disclosure is consistent with recent policy makers' calls for increased voluntary forward-looking disclosure, including disclosure of performance causes. However, we know little about motivations for including attributions and whether attributions are useful to investors.

Our analysis is related to studies that consider the usefulness to investors of narrative disclosures in the Management Discussion and Analysis (MD&A) section of the 10-K report (e.g., Clarkson, Kao, and Richardson [1999], Bryan [1997]), and to Francis, Schipper, and Vincent [2002], who document that intertemporal changes in price reactions to earnings releases are related to changes in other information in the releases. Similar to an MD&A disclosure in an annual report and a subset of other information in an earnings release, attributions in voluntary management forecasts are narratives, presumably designed to aid investor interpretation of a disclosure. Clearly different from MD&A disclosures, attributions in management forecasts are not required, are not explicitly linked to audited information, are not regulated as to form, and along with the forecast itself, are motivated by incentives to hasten the investor expectation adjustment process. Therefore, it is useful to policy makers to examine the factors affecting a manager's decision to provide voluntary attributions and to examine whether the attributions affect security prices.

Our work is also related to Hutton, Miller, and Skinner [2003], who also consider the impact of supplementary statements on the informativeness of management earnings forecasts. They find that managers issue qualitative disclosures (which in their coding scheme include attributions along with many other types of disclosures) with equal frequency for both good news and bad news forecasts but that they issue more verifiable forward-looking statements for good news forecasts. They find no evidence that qualitative disclosures affect security prices but do find that verifiable forward-looking statements enhance market reactions to good news forecasts. Our study differs from Hutton, Miller, and Skinner in that we consider attributions separately from other qualitative disclosures. We find that attributions are issued more often for bad news forecasts and that they are indeed associated with security market reactions. We do find, however, that the informativeness of attributions is limited to the subset of external attributions, which is consistent with Hutton, Miller, and Skinner's general finding that it is the more verifiable disclosures that affect the market's response to earnings forecasts.

The remainder of the paper is organized as follows. In section 2, we describe the general framework for identifying predisclosure conditions and forecast characteristics that are candidates for explaining the existence of voluntary forecast attributions. In section 3 we describe the sample, in sections 4 and 5 we describe tests and results relating to attribution explanation and pricing effects, respectively, and in section 6 we conclude the paper.

2. *Forecast Preconditions, Forecast Characteristics, and Voluntary Attributions*

Managers' explanations of forecasted earnings are acts of voluntary disclosure. Therefore, the economic underpinning of our analysis is the set of theoretical and empirical papers that establish a positive association between credible voluntary disclosure and higher share prices. Theoretical work links credible disclosure to higher share prices (1) through the effects of increased liquidity on reduced cost of equity capital (e.g., Amihud and Mendelson [1986], Merton [1987], King, Pownall, and Waymire [1990], Diamond and Verrecchia [1991]) and (2) through the reduction of estimation risk (e.g., Barry and Brown [1985], Coles and Lowenstein [1988], Handa and Linn [1993], Clarkson, Guedes, and Thompson [1996]). Empirical work verifies the association between quality disclosure and both direct capital market benefits (i.e., increased share prices—Botosan [1997]) and indirect capital market benefits (i.e., increases in the conditions that lead to higher share prices such as increased liquidity and increased analyst following—Lang and Lundholm [1996], Healy, Hutton, and Palepu [1999], Botosan and Harris [2000]).

Although the benefits of voluntary disclosure are well documented, voluntary disclosure of forward-looking information is also costly. Proprietary information might be revealed by the disclosure (e.g., Dontoh [1989]), and forward-looking disclosures expose managers to loss of reputation and potential litigation if the disclosure turns out to be inaccurate (Francis, Philbrick, and Schipper [1994], Skinner [1994, 1997]). Because demand for forward-looking disclosure is likely to vary both across firms and through time and the costs of disclosure are potentially high, managers are likely to supply it only when the benefits of meeting demand exceed the costs of disclosure.

We examine why managers explain their earnings forecasts, *given that the decision has been made to release a forecast publicly*. Therefore, in identifying candidate variables to explain attribution existence, we focus on the costs and benefits related to the *incremental* decision to provide an explanation for the forecast. However, we consider attributions to be a form of expanded disclosure, and therefore, plausible explanatory variables are generated from the prior literature in which the objective was to explain increased voluntary disclosure.

3. *Sample*

3.1 MANAGEMENT FORECASTS

We collected management earnings forecasts of both interim and annual results from the Dow Jones News Retrieval Service (DJNRS) for 1993 to 1996.[3] Our DJNRS search keywords are: "expects earnings," "expects net,"

[3] Within the DJNRS, we selected the broad classification Business Newswires, which included Dow Jones News Service, All Dow Jones Newswires, and Press Release Wires.

"expects income," "expects losses," "expects profits," "expects results," and three similar lists with first words "forecasts," "predicts," and "sees." To be classified as a management forecast, the article had to describe an expectation about future earnings. If the language was past tense or present tense, the article was not coded as a forecast. The forecast also had to be attributed to a company official or to the firm.

Our initial search yielded 1,519 forecasts. After discarding 130 qualitative (i.e., general impression) forecasts, 391 forecasts for which we were unable to obtain sufficient data on Compustat, and 46 duplicate forecasts (i.e., forecasts released by two sources covered by DJNRS), we ended up with 951 forecasts that had sufficient data to perform tests on attribution determinants and price reactions.[4]

Our overriding goal in management forecast selection was the desire to maximize the generalizability of our results. Accordingly, we follow the process of readily accepting measurement error in our proxies rather than discarding management forecast observations. That is, we retain management forecasts issued in imprecise forms (other than general impression-type forecasts) and management forecasts for firms that are not covered by financial analysts. We then performed robustness checks on reduced samples of firms covered by financial analysts.

We also treat two forecasts issued at the same time as two separate observations because many of the independent and dependent variable measurements are different for the two forecasts (e.g., forecast form, horizon, attribution existence, prior earnings volatility, etc.). Two forecasts are issued simultaneously in 178 instances (18.7%) of the sample. The most prevalent case is a fourth-quarter forecast and an annual forecast in the same article (90 instances; 9.5% of the sample). Robustness tests (described later) verify that our results are independent of whether we retain or discard multiple observations.[5]

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[4] Our search procedures were designed to identify press releases where the management forecast was the primary piece of information being disclosed. An article had to have the key words in the headline. It is conceivable that we could not have captured all management forecasts included with earnings announcements using this search algorithm because in such cases the earnings announcement would have been the primary source of news and our keyword searches were not designed to capture earnings announcements. Also, the number of duplicate forecasts discarded in the final stage of creating the sample is small relative to the general incidence of duplicate forecasts in the population. We eliminated most duplicate forecasts in the first stages of coding.

[5] A related issue is how we linked attributions in an article to one or more forecasts in the article. We were very careful to associate an attribution with a forecast for a given fiscal period only if the link between the causal factor and anticipated results for the fiscal period was explicit. If, for example, the company stated general plans about a restructuring but was vague on the period affected, we did not code it as an attribution. If a company disclosed anticipated results for the full year and for each of the individual quarters during the year and said only that its restructuring would favorably affect results for the year, we coded the attribution only for the full year and not for any of the individual quarters because the press release was not explicit about which quarters would benefit from the restructuring. However, if a company disclosed

EXTERNAL CAUSES	INTERNAL CAUSES
General Economic/Environmental Issues	**Product/Services Issues/Actions**
Recession/inflation	Changes in product prices
Dollar weakness/strength	Changes in product mix
Foreign currency fluctuation	Advertising/marketing
Input cost changes—increasing/decreasing costs	New products/processes/production
Change in market for product	**Organizational Issues/Actions**
General loss/gain of customers	Management techniques/strategies/plans/repositioning
Weather/catastrophe	Changes in management personnel
Order backlogs	Cost cutting/savings
Governmental/Third-Party Issues	Asset write downs
Tax law/other law changes	Going public
SEC actions/regulatory actions	Selling/buying stocks
Expropriation by foreign governments	Merger/acquisition/disposal of a business segment
Lawsuits/legal actions	Investment in plant assets
Competition action/issues	Voluntary accounting changes
Involuntary accounting changes	

FIG. 1.——Examples of internal and external attributions accompanying management earnings forecasts.

3.2 ATTRIBUTIONS

We read each management forecast article to determine whether an attribution was present. If present, the attribution was coded as either external or internal. Internal attributions refer to causal factors internal to the organization, such as strategy or management skill. External attributions refer to events outside the company, such as competition and certain economic factors. The number of potential kinds of attributions is unlimited. Accordingly, we applied a general framework for attribution classification (see figure 1 for examples).

Misclassification in this coding process introduces noise and reduces the power of the tests to document association of attributions with other phenomena. Bias, however, is unlikely because we were unaware of the levels of the other phenomena during the coding process. Two of this paper's authors coded attributions independently and then exchanged the codings so that they could be audited by the other author. Conflicts were discussed and resolved before gathering measurements on the other research variables in the study.

Table 1, panel B shows that 56.5% of forecasts contained external attributions, whereas only 43.0% of forecasts contained an internal attribution. Managers most often explained forecasts using only external attributions (29.4% of the time), followed by providing no explanation (27.6%), and using both internal and external attributions (27.0%). Managers far

anticipated results for the fourth quarter and the full year and made an attribution for the fourth-quarter results, we did extend the attribution to the full year because the quarter is part of the year. By explaining results for the quarter, the company is also partially explaining anticipated results for the year.

TABLE 1

Variable Distributions

Panel A: Continuous variables

Variable	*N*	Mean	Standard Deviation	Lower Quartile	Median	Upper Quartile
SIZE (millions)	951	1,940.05	5,181.53	72.89	284.44	1,370.07
VOL	951	16.47	116.16	0.02	0.15	1.57
DAYS	951	67.86	95.60	2	28	100
UE	951	0.012	0.086	−0.005	0.001	0.012
ABSUE	951	0.025	0.084	0.003	0.008	0.021
CAR	951	−0.028	0.114	−0.069	−0.009	0.029
ABSCAR	951	0.076	0.089	0.020	0.045	0.100

Panel B: Classification variables

Variable	Observations (%)
EXTERNAL	
External attribution present (*EXTERNAL* = 1)	537 (56.5)
No external attribution (*EXTERNAL* = 0)	414 (43.5)
Total	951 (100.0)
INTERNAL	
Internal attribution present (*INTERNAL* = 1)	409 (43.0)
No internal attribution (*INTERNAL* = 0)	542 (57.0)
Total	951 (100.0)
ATTRIBUTION	
Both internal and external present	257 (27.0)
Internal attributions only	152 (16.0)
External attributions only	280 (29.4)
At least one type of attribution provided (*ATTRIBUTION* = 1)	689 (72.4)
Neither type of attribution provided (*ATTRIBUTION* = 0)	262 (27.6)
Total	951 (100.0)
SIGNUE	
Good news (*SIGNUE* = 1)	556 (58.5)
Bad news (*SIGNUE* = 0)	395 (41.5)
Total	951 (100.0)
TYPE	
Point	255 (26.8)
Range (*RNG* = 1)	270 (28.4)
Minimum (*MIN* = 1)	290 (30.5)
Maximum (*MAX* = 1)	136 (14.3)
Total	951 (100.0)
REGULATED	
Regulated firm (*REGULATED* = 1)	41 (4.3)
Unregulated firm (*REGULATED* = 0)	910 (95.7)
Total	951 (100.0)
HIGHTECH	
High-technology firm (*HIGHTECH* = 1)	179 (18.8)
Not a high-technology firm (*HIGHTECH* = 0)	772 (81.2)
Total	951 (100.0)
SPECIAL	
Special one-time income effect mentioned (*SPECIAL* = 1)	26 (2.7)
No special item mentioned (*SPECIAL* = 0)	925 (97.3)
Total	951 (100.0)

TABLE 1 — *Continued*

Panel B: Classification variables

Variable	Observations (%)
SALESFCAST	
Sales forecast issued with earnings forecast (*SALESFCAST* = 1)	269 (28.3)
No sales forecast issued (*SALESFCAST* = 0)	682 (71.7)
Total	951 (100.0)
OTHERDISC	
Number of other disclosures issued with earnings forecast	
(*OTHERDISC* = 3)	1 (0.1)
(*OTHERDISC* = 2)	36 (3.8)
(*OTHERDISC* = 1)	202 (21.2)
No other disclosure issued (*OTHERDISC* = 0)	712 (74.9)
Total	951 (100.0)

SIZE = the market value of equity at the beginning of the period; VOL_i = variance ($EPS_{i,t-5}$; $EPS_{i,t-4}$; ... $EPS_{i,t-1}$), where *EPS* = earnings per share adjusted for share splits; *DAYS* = calendar days from forecast date to period end; $UE_i = [MF_i - (AF_i \text{ or } RW_i)]/Price_i$, where MF_i = the management forecast of *EPS* for firm *i; AF_i* = the median analyst forecast of *EPS* for firm *i* obtained from IBES for the month preceding the management forecast; RW_i = the random walk forecast (seasonal random walk forecast) of *EPS* for firm *i* for annual (interim) management forecasts; and $Price_i$ = day −2 security price for firm *i*. If *UE* is greater than or equal to 0, *SIGNUE* equals 1, and 0 otherwise. *ABSUE* = the absolute value of *UE; CAR* = the security price reaction to the management forecast over a three-day event day interval centered on the DJNRS date (day 0) using standard market model estimation techniques; *ABSCAR* = the absolute value of *CAR*. *HIGHTECH* firms belong to the following industries: drugs (SIC codes 2833–2836), research and development services (8731–8734), programming (7371–7379), computers (3570–3577), and electronics (3600–3674). *REGULATED* firms belong to the following industries: telephone (4812–4813), TV (4833), cable (4841), communications (4811–4899), gas (4922–4924), electricity (4931), water (4941), and financial (6021–6023, 6035–6036, 6141, 6311, 6321, 6331). *ATTRIBUTION* = 1 if an attribution is present, and 0 otherwise; *EXTERNAL* = 1 if an external attribution is present, and 0 otherwise; *INTERNAL* = 1 if an internal attribution is present, and 0 otherwise; *SPECIAL* = 1 if a one-time income effect is mentioned, and 0 otherwise; *SALESFCAST* = 1 if a sales forecast is issued with the earnings forecast, and 0 otherwise; *OTHERDISC* = the number of other disclosures issued with the earnings forecast.

less frequently explained a forecast with an internal attribution in isolation (16.0%).[6]

The data suggest that managers have a preference for external attributions over internal attributions. In many cases, it is likely that the news conveyed in most earnings forecasts could be explained using either internal or external attributions. For example, investors who are attempting to value an automaker could forecast external conditions in the supplier market for raw steel and the effect of the expected steel price (an external condition) on the automaker's profits. The investor could assess the automaker's general strategy (e.g., low-cost producer requiring high sales volume or quality differentiation with high margins), forecast how the automaker selects specific operational strategies to deal with steel input price increases (e.g., purchase lower cost plastic substitutes, change the production mix to favor products with lower steel content, increase auto wholesale prices), and forecast the effects of the strategic actions (internal conditions) on the automaker's

[6] In Baginski, Hassell, and Hillison [2000], graduate student coders using the same classification framework established the following pattern in a sample from the 1983-1986 period (presented in the order of incidence in our sample): external only (19.8%), no explanation (34.6%), internal and external (27.3%), and internal only (18.2%). The ordering is the same except that external-only attribution is far less frequent in the period 10 years before our sample period.

profits. If managers publicly release forecasted earnings resulting from the combination of external forces and their internal plans, they might explain any change in earnings in terms of the external forces, their internal plans, or both.

If a manager can explain a forecast using either internal or external attributions, which will be supplied? Certainly either type of attribution could help analysts and investors interpret the management forecast. However, investors and analysts are more easily able to verify the accuracy of conditions described in most external attributions. External attributions primarily relate to easily observable economic conditions and government actions. Internal attributions are generally about unobservable (to the investor) actions and plans. Because the economic conditions described in external attributions are easier to corroborate contemporaneously, they are likely to be more credible. Additionally, couching explanations of profitability in terms of easily observable phenomena may increase the saliency of the disclosure. On the other hand, internal attributions may convey proprietary information (Dontoh [1989]) because they are timely disclosures of strategic plans and actions. This condition would suggest either that managers try to avoid providing the subset of internal attributions that convey proprietary information or, that when managers do provide them, the costly internal attributions are viewed as highly credible.

In summary, costs and benefits (i.e., credibility) exist for including both types of attributions; therefore, it is unclear how managers choose between attribution types. Although our primary interest lies with understanding whether any type of attribution is provided, more insight into the attribution process can be obtained from descriptive evidence on the two types of attributions. Accordingly, whenever we perform tests to explain attribution incidence or to assess how the attributions affect security price reactions to management forecasts, we provide supplemental descriptive evidence for external attributions and internal attributions considered separately.

4. Determinants of Attributions Issued with Management Earnings Forecasts

4.1 MODEL AND VARIABLE MEASUREMENT

We estimate the following logistic regression model in which *ATTRIBUTION* equals 1 when an attribution is present, and 0 otherwise:

$$
\begin{aligned}
& ATTRIBUTION_i = \alpha_0 \\
\text{predisclosure conditions:} \quad & + \alpha_1 LSIZE_i + \alpha_2 RVOL_i + \alpha_3 REGULATED_i \\
& + \alpha_4 HIGHTECH_i \\
\text{forecast characteristics:} \quad & + \alpha_5 SIGNUE_i + \alpha_6 RABSUE_i + \alpha_7 MIN_i \\
& + \alpha_8 MAX_i + \alpha_9 RNG_i + \alpha_{10} DAYS_i \\
\text{other information:} \quad & + \alpha_{11} SPECIAL_i + \alpha_{12} OTHERDISC_i \\
& + \alpha_{13} SALESFCAST_i \\
\text{year effects:} \quad & + \alpha_{14} YEAR1994_i + \alpha_{15} YEAR1995_i \\
& + \alpha_{16} YEAR1996_i + \varepsilon_i. \qquad (1)
\end{aligned}
$$

Each variable, its measurement, and its expected relationship with attributions are described in the following sections. Note that forecasts are the unit of analysis in equation (1). We believe that attribution incidence is an inseparable combination of both a firm's disclosure policy and its current news. That is, the policy, to some extent, is based on the nature of current news. To draw an analogy between explaining and forecasting, consider King, Pownall, and Waymire [1990], who draw on the idea that forecasting policy evolves from the desire to correct incorrect market expectations. This implies the existence of a policy to correct market expectations but that the policy is observable only if current news possessed by management is different from prevailing market expectations. Accordingly, we choose the forecast release as the unit of analysis rather than the firm, allowing both firm- and release-specific variables to explain attribution choice.[7]

4.1.1. LSIZE. In explaining voluntary disclosures in the management forecast arena, several conditions in the predisclosure period are used to measure the expected benefits and costs of disclosure. Firm size is a general measure for the amount of information produced about a firm, presumably because it captures investor demand for information production.[8] For example, Cox [1985] documents a positive association between firm size and management forecast incidence. Countless other studies show a high positive association between financial analyst following (a proxy for information production) and firm size. Kasznik and Lev [1995] also argue that firm size is associated with economies of scale in disclosure and the need to disclose to deter litigation. If attributions are another form of information production, we expect that attribution incidence is increasing in firm size. We measure firm size (*LSIZE*) as the log of the market value of equity at the beginning of the period for which the forecast is provided:

$$LSIZE_i = \log(PRICE_{i,t} * SHARES_{i,t}). \tag{2}$$

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[7] If we believed that attribution behavior is driven by firm-specific characteristics, we could redefine the dependent variable to be equal to 1 if a firm ever made an attribution, and 0 if a firm never made an attribution, and we could examine whether firm-level independent variables (size, volatility, regulate, and high tech) explain the policy to ever issue an attribution. The release-specific variables would be suppressed because they vary intertemporally within the firm. Then, in a second stage, we could test whether current news drives the attribution decision (firm held constant) in a within-firm, time-series analysis of forecast behavior, encountering the common problem that management forecasts are sporadic, and sufficiently long time-series samples for a reasonable number of firms are not available. The tests that we report in the paper allow for firm- and release-specific determinants of attributions. They address the question of why an attribute is provided under the philosophy that a firm's disclosure policy is at least somewhat dependent on current news.

[8] An alternative, and highly correlated, proxy for the demand for information is financial analyst following. Financial analyst following measures the interest in a given company; the extent to which private information search occurs; and, given the benefits of analyst following, the extent to which managers produce information to corroborate or supplement the results of private information search. We obtain similar results in our attribution explanation tests if we substitute financial analyst following for firm size.

Consistent with most prior research using the firm size variable, the log is taken because of the substantial skewness of the firm size distribution as shown in table 1, panel A. We expect that larger firms issue attributions more often ($\alpha_1 > 0$).

4.1.2. RVOL. Waymire [1985] and Cox [1985] document that earnings volatility is a predisclosure condition that suppresses voluntary management forecast disclosure because of management's fear of committing forecast errors. If fear of inaccuracy carries over to any voluntarily disclosed explanations of more volatile earnings, we expect forecast attribution to be decreasing in prior earnings volatility ($\alpha_2 < 0$). However, two conditions work against earnings volatility as an explanatory variable. First, we model voluntary attributions as a second-stage decision. The set of disclosed forecasts may have a level of earnings volatility that is sufficiently low so that earnings volatility has little explanatory power for the subsequent decision to explain the forecast.[9] Second, unlike earnings forecasts, attribution accuracy is not easily judged. Although many of the acts depicted in attributions are observable (foreign currency fluctuations, restructurings, etc.), the link between attributions and forecasted earnings is not easily observable.

We measure prior earnings volatility (*VOL*) by computing a historic measure of the variability in (split-adjusted) earnings per share (*EPS*) over five prior years:

$$VOL_i = \text{variance}(EPS_{i,t-5}; EPS_{i,t-4}; \ldots EPS_{i,t-1}). \tag{3}$$

Although not as severely skewed as firm size, we use a ranked measure (*RVOL*) in our tests to reduce the influence of outliers in the right tail of the distribution.

4.1.3. REGULATED and HIGHTECH. Membership in certain industries has also been linked to disclosure tendencies. Regulated firms provide a great deal of information throughout the year to regulatory agencies, thus generally reducing the demand for additional information such as management forecasts and accompanying attributions (Kasznik and Lev [1995], Baginski, Hassell, and Kimbrough [2002]). Therefore, we expect fewer attributions for regulated firms ($\alpha_3 < 0$).

Firms in high-tech industries are generally associated with greater risk for shareholders in terms of both cash flows and opportunistic choice of accounting methods. Kasznik and Lev [1995] argue that high-tech firms will disclose more to fend off investor litigation. Accordingly, we expect more frequent attributions for high-tech firms ($\alpha_4 > 0$).

REGULATED is coded 1 when a firm belongs to the following industries: telephone (SIC codes 4812–4813), TV (4833), cable (4841), communications (4811–4899), gas (4922–4924), electricity (4931), water (4941), and

[9] Also, Waymire [1985] notes that when firms with higher earnings volatility disclose management forecasts, they appear to do so later in the period, when earnings is probably known with greater certainty.

financial (6021–6023, 6035–6036, 6141, 6311, 6321, 6331), and 0 otherwise. Consistent with lower information demand for regulated firms, table 1, panel B shows that only 41 (4.3%) management forecast observations are for regulated firms.

HIGHTECH is coded 1 when a firm belongs to the following industries: drugs (2833–2836), research and development services (8731–8734), programming (7371 –7379), computers (3570–3577), and electronics (3600–3674), and 0 otherwise. Table 1, panel B shows that 179 forecasts (18.8%) are issued by high-tech firms.

4.1.4. SIGNUE. We expect that certain forecast characteristics also affect the demand for attributions and, hence, the benefits to firms of providing attributions. Two characteristics of the unexpected earnings conveyed by the management forecast are the sign of the news and the magnitude of the news. Given the relatively strong expected price impact of bad management forecast news (Patell [1976], McNichols [1989], Baginski, Hassell, and Waymire [1994]), investors are likely to demand an explanation for unexpected bad news ($\alpha_5 < 0$). We compute unexpected earnings (*UE*) conveyed in the forecasts as follows:

$$UE_i = [MF_i - (AF_i \text{ or } RW_i)]/Price_i, \tag{4}$$

where MF_i = the management forecast of *EPS* for firm *i*, AF_i = the median analyst forecast of *EPS* for firm *i* obtained from IBES for the month preceding the management forecast, RW_i = the random walk forecast (seasonal random walk forecast) of *EPS* for firm *i* for annual (interim) management forecasts, and $Price_i$ = day −2 security price for firm *i*.[10] Forecasted earnings are explicit for point management forecasts. For range forecasts, we use the midpoint of the range; for minimum- and maximum-type forecasts, we use the disclosed lower or upper bound. Median *UE* is 0.001, but mean *UE* is 0.012 (table 1, panel A) because of several larger values of *UE*. If *UE* is greater than or equal to 0, *SIGNUE* equals 1, and 0 otherwise. Panel B shows that 556 (58.5%) of the management forecasts convey good earnings news (*SIGNUE* = 1).

4.1.5. ABSUE. Forecasts containing the largest changes from prevailing earnings expectations are also likely to lead to demands for more explanation. Accordingly, we expect attribution incidence to increase in the absolute unexpected earnings conveyed in a management forecast ($\alpha_6 > 0$). An attenuating factor, however, is that the magnitude of the shock is also a proxy for contemporaneously measured earnings variability, which has been shown to depress disclosure (Waymire [1985], Baginski, Hassell, and Kimbrough [2002]).

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[10] We use the analyst forecast if available (72.7% of the time), and the random walk forecast otherwise.

ABSUE is the absolute value of *UE* conveyed by the management forecast. Because of the skewness of *ABSUE* (note that table 1, panel A reports a mean *ABSUE* greater than the 75th percentile), our desire to retain observations with larger values, and our primary interest in its ordinal relationships with attributions, we use ranked *ABSUE* (*RABSUE*) in our tests.

4.1.6. MIN, MAX, and RNG. Baginski and Hassell [1997] find that managers credibly convey the expected uncertainty in their beliefs about earnings by issuing imprecise (i.e., other than point) management forecasts. Baginski, Conrad, and Hassell [1993] document that investors and analysts act as if the uncertainty conveyed in imprecise forecasts is credible. We expect that the benefits to providing attributions in management forecasts are increasing in the imprecision of the forecast. Our prediction is based on the notion that managers wish to adjust expectations by issuing forecasts (Ajinkya and Gift [1984]). However, Baginski, Conrad, and Hassell [1993] document that investors and analysts engage in less belief adjustment when management forecasts are imprecise. To enhance investors' and analysts' ability to form earnings expectations, managers can convey what they believe are the underlying causes of current earnings changes. Also, uncertainty in the investment community caused by imprecise management forecasts is likely to lead to a demand for explanations. We expect attribution incidence to increase in all imprecise forecast forms—minimum-type, maximum-type, and range forecasts (α_7, α_8, and $\alpha_9 > 0$).

MIN, *MAX*, and *RNG* equal 1 for minimum, maximum, and range forecasts, respectively, and 0 otherwise. Table 1, panel B shows that only 26.8% of the forecasts are point forecasts; thus, nearly three fourths of our management forecast observations are in one of the imprecise forms.

4.1.7. DAYS. Finally, we expect fewer attributions over longer horizons because external and internal conditions that affect profits arise over time, and the links between these conditions and forecast performance may not be well known earlier in the period ($\alpha_{10} < 0$). Working against our ability to document an effect that is consistent with this prediction is the likely increased usefulness of providing an attribution (if one is known by the managers) with an uncertain longer horizon forecast. This is less of an issue in a multiple regression because uncertainty is captured by the imprecise forecast forms (minimum, maximum, range). *DAYS* equals the number of calendar days between the management forecast date and the end of the period. Table 1, panel A shows that the mean (median) forecast horizon is 67.86 (28) days.

4.1.8. Remaining Variables. We control for three other measures of additional information disclosures within the management forecast article. As shown in table 1, panel B, *SPECIAL* equals 1 in the 26 cases (2.7% of the sample) in which managers mentioned a one-time charge against earnings in the management forecast, and 0 otherwise. *OTHERDISC* equals the number of other disclosures in the forecast release. Four types of additional disclosures account for the majority of the other disclosure cases: asset changes (61 disclosures), product-related disclosures (56 disclosures), earnings announcements (44 disclosures), and changes in capital or ownership (46 disclosures). Finally, *SALESFCAST* equals 1 in the 269 cases (28.3% of the sample) in which managers provided a sales forecast with the management earnings forecast, and 0 otherwise. We make the assumption that these additional disclosures are intended to aid the interpretation of earnings forecasts. We make no sign prediction for these additional disclosure variables, however, because attributions may either complement or substitute for the additional disclosures.[11]

We also control for year effects by setting *YEAR1994, YEAR1995,* and *YEAR1996* equal to 1 if the forecast was released in the indicated year, and 0 otherwise. Macroeconomic factors may make attributions more or less evident in a given year. It is also possible that a highly visible external event occurs in a given year and a manager feels compelled to address it with an earnings forecast.

4.2 RESULTS

The results of estimating equation (1) appear in table 2. The left-hand side of the table gives the predicted sign for each independent variable and reports a series of simple logistic regressions to show the relation of each variable with attributions.[12] The right-hand side of the table reports the multiple logistic regression test with all variables included.

Several variables are associated with attributions in the expected direction. Firm size (*LSIZE*) is positively related to attributions (*p*s = .012 and .019 in the simple and multiple regression specifications, respectively). Regulated firms (*REGULATE*) provide fewer attributions (*p*s = .048 and .076). The sign of unexpected earnings (*SIGNUE*) is negatively related to attributions (*p*s = .002 and .005), indicating that attributions are provided more often with bad news forecasts. Attributions are provided more often with maximum (*MAX*) forecasts ($p = .001$ in both specifications) and less often for longer horizon forecasts (i.e., when *DAYS* is larger; *p*s = .039 and .093). These variables jointly proxy for the costs and benefits of providing additional

[11] The large majority of the sales forecasts are good news forecasts if compared with a comparable prior period. Forecasted sales increases occurred 229 times (85.1% of the 269 sales forecasts), forecasts of flat sales occurred 14 times (5.2%), and forecasts of decreasing sales occurred only 26 times (9.7%). Hutton, Miller, and Skinner [2003] find that other verifiable forward-looking disclosures enhance the price reaction to a good news management earnings forecast.

[12] We also performed simple chi-square tests on the relation between each categorical independent variable and attributions, and we performed simple two-sample *t*-tests (and Wilcoxon rank-sum tests) on the means (and medians) of each continuous variable to test for differences between cases in which attributions are and are not provided. These tests confirm the results reported for the simple logistic regression tests, which we report to reduce the number of tables.

TABLE 2

Determinants of Attribution Existence

Dependent variable: *ATTRIBUTIONS*	Predicted Sign	Simple Logistic Regressions[b] ($n = 951$) Coefficient Estimate	(p-value)	Multiple Logistic Regression[a] ($n = 951$) Coefficient Estimate	(p-value)
Intercept	none	—	—	0.665	(0.053)
Predisclosure information environment					
LSIZE	+	0.083	(0.012)	0.092	(0.019)
RVOL	−	0.000	(0.575)	0.000	(0.522)
REGULATE	−	−0.547	(0.048)	−0.493	(0.076)
HIGHTECH	+	0.225	(0.122)	0.138	(0.244)
Forecast-related variables					
SIGNUE	−	−0.410	(0.002)	−0.400	(0.005)
RABSUE	+	−0.000	(0.888)	−0.000	(0.644)
MIN	+	−0.276	(0.960)	0.068	(0.360)
MAX	+	1.101	(0.001)	1.134	(0.001)
RNG	+	0.142	(0.194)	0.266	(0.089)
DAYS	−	−0.001	(0.039)	−0.001	(0.093)
Other information in the forecast					
SPECIAL	none	−0.160	(0.710)	−0.207	(0.641)
OTHER	none	−0.031	(0.818)	0.024	(0.862)
SALESFCST	none	−0.023	(0.885)	0.005	(0.973)
Year effects					
YEAR1994	none	−0.134	(0.415)	−0.183	(0.368)
YEAR1995	none	0.178	(0.307)	0.039	(0.855)
YEAR1996	none	−0.169	(0.330)	−0.223	(0.289)
Model chi-square		—	—	43.88	(0.001)

The p-values are one-tailed when a sign expectation is provided.

[a]Model:

$$\begin{aligned} ATTRIBUTION_i = {} & \alpha_0 + \alpha_1 LSIZE_i + \alpha_2 RVOL_i + \alpha_3 REGULATED_i + \alpha_4 HIGHTECH_i + \alpha_5 SIGNUE_i \\ & + \alpha_6 RABSUE_i + \alpha_7 MIN_i + \alpha_8 MAX_i + \alpha_9 RNG_i + \alpha_{10} DAYS_i + \alpha_{11} SPECIAL_i \\ & + \alpha_{12} OTHERDISC_i + \alpha_{13} SALESFCAST_i + \alpha_{14} YEAR1994_i + \alpha_{15} YEAR1995_i \\ & + \alpha_{16} YEAR1996_i + \varepsilon_i \end{aligned}$$

[b]Model:

$$ATTRIBUTION_i = \alpha_0 + \alpha_1 (\textit{the single indicated independent variable})_i + \varepsilon_i.$$

LSIZE = the log of market value of equity at the beginning of the period; VOL_i = variance ($EPS_{i,t-5}$; $EPS_{i,t-4}$; … $EPS_{i,t-1}$), where *EPS* = earnings per share adjusted for share splits; *DAYS* = calendar days from forecast date to period end; $UE_i = [MF_i - (AF_i \text{ or } RW_i)]/Price_i$, where MF_i = the management forecast of *EPS* for firm *i;* AF_i = the median analyst forecast of *EPS* for firm *i* obtained from IBES for the month preceding the management forecast; RW_i = the random walk forecast (seasonal random walk forecast) of *EPS* for firm *i* for annual (interim) management forecasts; and $Price_i$ = day −2 security price for firm *i*. If *UE* is greater than or equal to 0, *SIGNUE* equals 1, and 0 otherwise. *ABSUE* = the absolute value of *UE; CAR* = the security price reaction to the management forecast over a three-day event day interval centered on the DJNRS date (day 0) using standard market model estimation techniques; *ABSCAR* = the absolute value of *CAR. HIGHTECH* firms belong to the following industries: drugs (SIC codes 2833–2836), research and development services (8731–8734), programming (7371–7379), computers (3570–3577), and electronics (3600–3674). *REGULATED* firms belong to the following industries: telephone (4812–4813), TV (4833), cable (4841), communications (4811–4899), gas (4922–4924), electricity (4931), water (4941), and financial (6021–6023, 6035–6036, 6141, 6311, 6321, 6331). *ATTRIBUTION* = 1 if an attribution is present, and 0 otherwise; *EXTERNAL* = 1 if an external attribution is present, and 0 otherwise; *INTERNAL* = 1 if an internal attribution is present, and 0 otherwise; *SPECIAL* = 1 if a one-time income effect is mentioned, and 0 otherwise; *SALESFCAST* = 1 if a sales forecast is issued with the earnings forecast, and 0 otherwise; *OTHERDISC* = the number of other disclosures issued with the earnings forecast; *YEAR199x* = 1 if the forecast is issued in 199x, and 0 otherwise.

disclosure. Particularly interesting is that, taken as a whole, these conditions seem highly related to the costs of avoiding legal liability. Skinner [1994] documents additional disclosure for bad news firms over short horizons. A negative unexpected earnings (*SIGNUE* = 0) and a maximum-type forecast (*MAX* = 1) are both indicators of bad news in our study. Firm size (*LSIZE*) is related to deep pockets, and smaller values for *DAYS* represent short horizons.[13]

Table 3 repeats the table 2 regression analysis but limits the analysis to the 689 cases in which an attribution was made. The objective is to determine whether the same relations detected for attributions exist for external attributions and internal attributions. We do not make sign predictions for this test because we do not have theory or prior empirical results that motivate anything other than an exploratory analysis. External attributions (*EXTERNAL*) are more likely for larger firms (*LSIZE*, $p = .044$), more likely for *smaller* deviations of the management forecast news from prior expectations (*RABSUE*, $p = .026$), more likely for maximum-type forecasts (*MAX*, $p = .096$), less likely for special items (*SPECIAL*, $p = .003$), and less likely in 1994 and 1996 (ps = 0.093 and 0.010, respectively). Not a single variable is associated with internal attributions (*INTERNAL*) in the same way. Internal attributions are more likely for *larger* deviations of the management forecast news from prior expectations (*RABSUE*, $p = .001$), more likely for good news (*SIGNUE*, $p = .042$), less likely for minimum-type (*MIN*) and maximum-type (*MAX*) forecasts (ps = 0.012 and 0.057), and more likely for special items (*SPECIAL*, $p = .046$). Although exploratory in nature, these tests suggest that attribution type might be a choice and, possibly, that attribution type has differential meaning to both managers and investors.[14]

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[13] Because our sample has 600 firms, we expect that multiple observations for the same firm should not result in a substantial amount of dependence. However, given the potential for low time-series variation in the firm-specific variables, we reran the attribution tests on two subsamples to investigate whether our results are robust to the potential dependence problem. In one subsample, we required observations for a given firm to be more than one year apart, discarding observations that were close in the time series. We also replicated the results requiring observations to be more than two and three years apart. In a second subsample, we discarded all but one observation per firm. The observation allowed to stay in the sample was selected by a sorting on output from a random number generation to ensure that the retained observations were diversified (randomly) across years, forecast horizons, forecast types, and so on. Our conclusions are robust across these additional tests.

[14] We also examined whether attributions are associated with a firm's propensity to access common equity markets or the amount of information asymmetry before the forecast. We drew a substantially smaller subset of our sample in which firms were covered by at least three analysts before the forecast. For each observation, we identified whether the firm's split-adjusted common shares had increased during the prior five-year period by more than 20% (and replicated the test calculating share increases for one, two, three, and four years prior). We also gathered the standard deviation of financial analyst forecasts before the management forecast. We did not find an association between attributions and (1) substantial share increases, (2) standard deviation of analyst forecasts (in either raw or ranked form), or (3) standard deviation of analyst forecasts deflated by mean analyst forecast (in either raw or ranked form) in a multiple logistic regression including the other independent variables in equation (1).

TABLE 3

Exploratory Analysis of Determinants of Attribution Type: External and Internal

		Multiple Logistic Regression ($n = 689$) Dependent Variable: *EXTERNAL*		Multiple Logistic Regression ($n = 689$) Dependent Variable: *INTERNAL*	
	Predicted Sign	Coefficient Estimate	(p-value)	Coefficient Estimate	(p-value)
Intercept	none	1.157	(0.009)	0.029	(0.937)
Predisclosure information environment					
LSIZE	none	0.113	(0.044)	−0.006	(0.843)
RVOL	none	0.000	(0.302)	−0.000	(0.733)
REGULATE	none	0.499	(0.392)	0.593	(0.210)
HIGHTECH	none	−0.092	(0.702)	−0.140	(0.491)
Forecast-related variables					
SIGNUE	none	−0.279	(0.165)	0.077	(0.042)
RABSUE	none	−0.001	(0.026)	0.001	(0.001)
MIN	none	0.308	(0.240)	−0.572	(0.012)
MAX	none	0.526	(0.096)	−0.487	(0.057)
RNG	none	0.136	(0.516)	−0.050	(0.824)
DAYS	none	−0.001	(0.387)	−0.000	(0.626)
Other information in the forecast					
SPECIAL	none	−1.499	(0.003)	1.524	(0.046)
OTHER	none	0.034	(0.850)	0.134	(0.390)
SALESFCST	none	0.079	(0.719)	0.259	(0.171)
Year effects					
YEAR1994	none	−0.456	(0.093)	0.193	(0.383)
YEAR1995	none	−0.033	(0.905)	−0.105	(0.629)
YEAR1996	none	−0.090	(0.010)	0.324	(0.102)
Model chi-square		40.98	(0.001)	39.71	(0.001)

The p-values are one-tailed when a sign expectation is provided.
Model:

$$\begin{aligned} EXTERNAL(or\ INTERNAL)_i = {} & \alpha_0 + \alpha_1 LSIZE_i + \alpha_2 RVOL_i + \alpha_3 REGULATED_i + \alpha_4 HIGHTECH_i \\ & + \alpha_5 SIGNUE_i + \alpha_6 RABSUE_i + \alpha_7 MIN_i + \alpha_8 MAX_i + \alpha_9 RNG_i + \alpha_{10} DAYS_i \\ & + \alpha_{11} SPECIAL_i + \alpha_{12} OTHERDISC_i + \alpha_{13} SALESFCAST_i + \alpha_{14} YEAR1994_i \\ & + \alpha_{15} YEAR1995_i + \alpha_{16} YEAR1996_i + \varepsilon_i. \end{aligned}$$

LSIZE = the log of market value of equity at the beginning of the period; VOL_i = variance ($EPS_{i,t-5}$; $EPS_{i,t-4}$; ... $EPS_{i,t-1}$), where *EPS* = earnings per share adjusted for share splits; *DAYS* = calendar days from forecast date to period end; $UE_i = [MF_i - (AF_i \text{ or } RW_i)]/Price_i$, where MF_i = the management forecast of *EPS* for firm *i*; AF_i = the median analyst forecast of *EPS* for firm *i* obtained from IBES for the month preceding the management forecast; RW_i = the random walk forecast (seasonal random walk forecast) of *EPS* for firm *i* for annual (interim) management forecasts; and $Price_i$ = day −2 security price for firm *i*. If *UE* is greater than or equal to 0, *SIGNUE* equals 1, and 0 otherwise. *ABSUE* = the absolute value of *UE*; *CAR* = the security price reaction to the management forecast over a three-day event day interval centered on the DJNRS date (day 0) using standard market model estimation techniques; *ABSCAR* = the absolute value of *CAR*. *HIGHTECH* firms belong to the following industries: drugs (SIC codes 2833–2836), research and development services (8731–8734), programming (7371–7379), computers (3570–3577), and electronics (3600–3674). *REGULATED* firms belong to the following industries: telephone (4812–4813), TV (4833), cable (4841), communications (4811–4899), gas (4922–4924), electricity (4931), water (4941), and financial (6021–6023, 6035–6036, 6141, 6311, 6321, 6331). *ATTRIBUTION* = 1 if an attribution is present, and 0 otherwise; *EXTERNAL* = 1 if an external attribution is present, and 0 otherwise; *INTERNAL* = 1 if an internal attribution is present, and 0 otherwise; *SPECIAL* = 1 if a one-time income effect is mentioned, and 0 otherwise; *SALESFCAST* = 1 if a sales forecast is issued with the earnings forecast, and 0 otherwise; *OTHERDISC* = the number of other disclosures issued with the earnings forecast; *YEAR199x* = 1 if the forecast is issued in 199*x*, and 0 otherwise.

5. *Attributions and Market Prices*

5.1 ATTRIBUTIONS AND ABSOLUTE PRICE MOVEMENTS AT THE FORECAST DATE

We now turn our attention to the question of how equity prices are affected by the presence of attributions in management forecasts. If attributions are not credible and the market can so detect, attributions and price reaction will not be associated. Alternatively, if attributions enhance the credibility, or by expanded explanation, the precision of forecasts, price reactions to the unexpected earnings conveyed by forecasts with accompanying attributions will be stronger.

Initially, we adopt the approach in Francis, Schipper, and Vincent [2002] in which the effects of disclosures are measured in terms of absolute security price variability. We define *ABSCAR* as the absolute value of security price reaction to the management forecast over a three-day event-day interval centered on the DJNRS date (day 0) using standard market model estimation techniques.[15] We test whether attributions are associated with increases in *ABSCAR* as an indication of effects on security pricing by estimating the following cross-sectional, ordinary least squares model:

$$\begin{aligned}
ABSCAR_i = \;& \gamma_0 \\
\text{effect of attributions} \quad & + \gamma_1 ATTRIBUTION \\
\text{predisclosure conditions:} \quad & + \gamma_2 LSIZE_i + \gamma_3 RVOL_i + \gamma_4 REGULATED_i \\
& + \gamma_5 HIGHTECH_i \\
\text{forecast characteristics:} \quad & + \gamma_6 SIGNUE_i + \gamma_7 RABSUE_i + \gamma_8 MIN_i \\
& + \gamma_9 MAX_i + \gamma_{10} RNG_i + \gamma_{11} DAYS_i \\
\text{other information:} \quad & + \gamma_{12} SPECIAL_i + \gamma_{13} OTHERDISC_i \\
& + \gamma_{14} SALESFCAST_i + \varepsilon_i. \qquad (5)
\end{aligned}$$

We expect $\gamma_1 > 0$, which indicates that attributions increase price variability at the management forecast announcement date. We also estimate the model with separate *EXTERNAL* and *INTERNAL* variables in the place of the *ATTRIBUTION* variable so that the price reactions to the two types of disclosures are not constrained to be the same. Two issues need to be considered when interpreting the results on this variable. First, recall that we limit our coding to attributions that are explicitly linked to a forecast. Therefore, this is not a test of the pricing effects of statements made in an article that are not linked to a management earnings forecast. Second, even though attributions and unexpected earnings are modeled as two separate independent variables, a significant γ_1 does not necessarily mean that attribution pricing effects are independent of unexpected earnings in the

[15] We estimate market model parameters over a 200-day period ending 31 trading days before the management forecast using an equally weighted market return. The 3-day price reaction is the cumulative abnormal return, defined as actual return on each day minus the expected return given by applying the previously estimated market model parameters to the actual market return.

forecast. That is, attributions may enhance price reactions to unexpected earnings or cause price reactions independent of unexpected earnings. The advantages of this approach are that we do not have to specify directional effects of attributions on security prices and that we avoid the complexity of intercept and slope shifts on not only the attribution variables but the control variables as well.

With respect to the effects of predisclosure information environment on the market reactions, we expect $\gamma_2 < 0$, indicating that price reactions to earnings-related announcements are smaller in absolute value for large firms (Atiase [1985]). We expect prior earnings volatility to indicate less earnings permanence and, hence, lower price reactions to the management forecast news ($\gamma_3 < 0$). We expect the amount of information already available about regulated firms to depress stock price reactions ($\gamma_4 < 0$) and the highly uncertain predisclosure information environment surrounding high-tech firms to enhance the effect on stock prices of forecast disclosure ($\gamma_5 > 0$).

With respect to the characteristics of the management forecast, we expect stronger reactions to unexpected bad news in a management forecast ($\gamma_6 < 0$), consistent with prior research findings (e.g., McNichols [1989, figure 2]), and that absolute price reactions are increasing in absolute unexpected earnings conveyed in the forecast ($\gamma_7 > 0$). Baginski, Hassell, and Waymire [1994] find particularly strong price reactions for minimum and maximum forecasts. Accordingly, we expect $\gamma_8 > 0$ (minimum-type forecasts are associated with stronger price reactions) and $\gamma_9 > 0$ (maximum-type forecasts are associated with particularly strong price reactions). Because of the greater amount of uncertainty present in longer range forecasts, we expect $\gamma_{11} < 0$.

With respect to the effect of other information on stock prices, we do not expect price reactions to special items ($\gamma_{12} = 0$), but we expect other disclosures and sales forecasts to increase price reactions to the forecast disclosure package (both $\gamma_{13} > 0$ and $\gamma_{14} > 0$).

Table 4 presents three sets of results. First, we estimate simple regressions for each independent variable. The results are as expected for the primary variable of interest, *ATTRIBUTIONS,* which is positively related to absolute security price changes ($p = .006$). Note however, that although *EXTERNAL* is positively related to absolute security price changes ($p = .001$), *INTERNAL* is insignificant.

Many of the control variables exhibit the expected relationships with absolute price reactions. Absolute price reactions are lower for larger firms (*LSIZE*, $p = .001$), more volatile earnings firms (*RVOL*, $p = .001$), and regulated firms (*REGULATE*, $p = .004$). High-tech firms experience greater price reactions (*HIGHTECH*, $p = .001$), and price reactions are greater for bad news forecasts (*SIGNUE*, $p = .001$), greater for larger absolute earnings surprises (*RABSUE*, $p = .043$), greater for maximum-type forecasts (*MAX,* $p = .001$), and lower for long-horizon forecasts ($p = .056$).

The second set of columns reports multiple regression results. The relationships documented in the simple regressions are confirmed in a multiple

TABLE 4

Association of Forecast Attributions with Absolute Price Reactions

		Simple Regression[a] (N = 951)		Multiple Regression[b] (N = 951)		Multiple Regression[c] (N = 951)	
	Predicted Sign	Coefficient Estimate	(p-value)	Coefficient Estimate	(p-value)	Coefficient Estimate	(p-value)
Intercept		—	—	0.113	(0.001)	0.114	(0.001)
Attributions							
ATTRIBUTION	+	0.015	(0.006)	0.010	(0.058)		
EXTERNAL	+	0.019	(0.001)			0.018	(0.001)
INTERNAL	+	0.001	(0.781)			−0.003	(0.711)
Predisclosure information environment							
LSIZE	−	−0.009	(0.001)	−0.007	(0.001)	−0.007	(0.001)
RVOL	−	−0.001	(0.001)	−0.000	(0.044)	−0.000	(0.037)
REGULATE	−	−0.038	(0.004)	−0.025	(0.034)	−0.025	(0.033)
HIGHTECH	+	0.024	(0.001)	0.017	(0.010)	0.017	(0.009)
Forecast-related variables							
SIGNUE	−	−0.033	(0.001)	−0.027	(0.001)	−0.026	(0.001)
RABSUE	+	0.000	(0.043)	0.000	(0.021)	0.000	(0.015)
MIN	+	−0.016	(0.995)	−0.002	(0.629)	−0.003	(0.687)
MAX	+	0.035	(0.001)	0.033	(0.001)	0.032	(0.001)
RNG	none	0.010	(0.126)	0.017	(0.027)	0.016	(0.032)
DAYS	−	−0.000	(0.056)	−0.000	(0.710)	−0.000	(0.772)
Other information in the forecast							
SPECIAL	none	−0.026	(0.142)	−0.019	(0.243)	−0.015	(0.388)
OTHER	+	0.001	(0.420)	0.005	(0.187)	0.005	(0.186)
SALESFCST	+	0.006	(0.189)	0.001	(0.417)	0.001	(0.427)
Adjusted R^2		—	—	0.103	(0.001)	0.109	(0.001)

The *p*-values are one-tailed when a sign expectation is provided.

[a]Model:

$$ABSCAR_i = \gamma_0 + \gamma_1(\textit{the single indicated independent variable})_i + \varepsilon_i.$$

[b]Model:

$$\begin{aligned} ABSCAR_i = {} & \gamma_0 + \gamma_1 ATTRIBUTION + \gamma_2 LSIZE_i + \gamma_3 RVOL_i + \gamma_4 REGULATED_i + \gamma_5 HIGHTECH_i \\ & + \gamma_6 SIGNUE_i + \gamma_7 RABSUE_i + \gamma_8 MIN_i + \gamma_9 MAX_i + \gamma_{10} RNG_i + \gamma_{11} DAYS_i + \gamma_{12} SPECIAL_i \\ & + \gamma_{13} OTHERDISC_i + \gamma_{14} SALESFCAST_i + \varepsilon_i. \end{aligned}$$

[c]Model:

$$\begin{aligned} ABSCAR_i = {} & \gamma_0 + \gamma_{11} EXTERNAL + \gamma_{12} INTERNAL + \gamma_2 LSIZE_i + \gamma_3 RVOL_i + \gamma_4 REGULATED_i \\ & + \gamma_5 HIGHTECH_i + \gamma_6 SIGNUE_i + \gamma_7 RABSUE_i + \gamma_8 MIN_i + \gamma_9 MAX_i + \gamma_{10} RNG_i \\ & + \gamma_{11} DAYS_i + \gamma_{12} SPECIAL_i + \gamma_{13} OTHERDISC_i + \gamma_{14} SALESFCAST_i + \varepsilon_i. \end{aligned}$$

LSIZE = the log of market value of equity at the beginning of the period; VOL_i = variance ($EPS_{i,t-5}$; $EPS_{i,t-4}$; ... $EPS_{i,t-1}$), where *EPS* = earnings per share adjusted for share splits; *DAYS* = calendar days from forecast date to period end; $UE_i = [MF_i - (AF_i \text{ or } RW_i)]/Price_i$, where MF_i = the management forecast of *EPS* for firm *i*; AF_i = the median analyst forecast of *EPS* for firm *i* obtained from IBES for the month preceding the management forecast; RW_i = the random walk forecast (seasonal random walk forecast) of *EPS* for firm *i* for annual (interim) management forecasts; and $Price_i$ = day −2 security price for firm *i*. If *UE* is greater than or equal to 0, *SIGNUE* equals 1, and 0 otherwise. *ABSUE* = the absolute value of *UE*; *CAR* = the security price reaction to the management forecast over a three-day event day interval centered on the DJNRS date (day 0) using standard market model estimation techniques; *ABSCAR* = the absolute value of *CAR*. *HIGHTECH* firms belong to the following industries: drugs (SIC codes 2833–2836), research and development services (8731–8734), programming (7371–7379), computers (3570–3577), and electronics (3600–3674). *REGULATED* firms belong to the following industries: telephone (4812–4813), TV (4833), cable (4841), communications (4811–4899), gas (4922–4924), electricity (4931), water (4941), and financial (6021–6023, 6035–6036, 6141, 6311, 6321, 6331). *ATTRIBUTION* = 1 if an attribution is present, and 0 otherwise; *EXTERNAL* = 1 if an external attribution is present, and 0 otherwise; *INTERNAL* = 1 if an internal attribution is present, and 0 otherwise; *SPECIAL* = 1 if a one-time income effect is mentioned, and 0 otherwise; *SALESFCAST* = 1 if a sales forecast is issued with the earnings forecast, and 0 otherwise; *OTHERDISC* = the number of other disclosures issued with the earnings forecast.

regression setting. The adjusted R^2 of the model is 0.103. The only differences between these and the simple regression results are that range (*RNG*) forecasts are significantly and positively related to absolute security price reactions ($p = .027$), and the forecast horizon variable (*DAYS*) is no longer significant. Of primary importance, *ATTRIBUTIONS* is positively related to absolute security price changes ($p = .058$).

The third set of columns reports the multiple regression without constraining the coefficients on internal and external attributions to be equal. As in the simple regressions, these results indicate that external attributions are driving the results ($p = .001$). The coefficient on internal attributions is insignificant.[16]

5.2 AN ALTERNATIVE MODEL RELATING ATTRIBUTIONS TO PRICE MOVEMENTS

Although our results suggest that attributions are related to security prices, equation (5) cannot detect whether attributions convey information independent of the unexpected earnings conveyed in the management forecast or whether attributions enable a more precise interpretation of unexpected earnings, and, hence, a higher earnings response coefficient. To gain further insight into this issue, we estimate an alternative model relating attributions to price movements in which the three-day cumulative abnormal return, *CAR*, is the dependent variable:[17]

$$
\begin{aligned}
CAR_i &= \tau_0 + \tau_1 RUE_i \\
\text{effect of attributions:}\quad & + \tau_2 ATTRIBUTION_i \\
& + \tau_3 ATTRIBUTION * RUE_i \\
\text{effect of forecast type:}\quad & + \tau_4 MIN_i + \tau_5 MAX_i + \tau_6 RNG_i \\
\text{effect of other information:}\quad & + \tau_7 SPECIAL * RUE_i + \tau_8 OTHERDISC * RUE_i \\
& + \tau_9 SALESFCAST * RUE_i + \mu_i. \qquad (6)
\end{aligned}
$$

---

[16] Considering equation (1) (a disclosure model) in combination with equation (5) (a disclosure effects model) raises the possibility of self-selection bias when estimating equation (5) (see Leuz and Verrecchia [2000] for an analogous pair of models). To address this issue, we used the Heckman (1978) approach to correcting self-selection bias by reestimating equation (1) using PROBIT, computing the inverse Mills ratio from PROBIT parameter estimates, and including the inverse Mills ratio as an additional independent variable in reestimations of several variants of equation (5). Correcting for self-selection bias does not appear to be necessary. The inverse Mills ratio is not significant in the primary reestimation of equation (5). The inverse Mills ratio becomes significant if *LSIZE* is dropped from the model, but the coefficient on *ATTRIBUTIONS* remains significant. When the procedure is repeated for *EXTERNAL* (or *INTERNAL*) as the PROBIT dependent variable, and equation (5) is estimated with separate coefficients on *EXTERNAL* and *INTERNAL*, the inverse Mills ratio is significant, but the coefficient on *EXTERNAL* (*INTERNAL*) remains significant (insignificant).

[17] We estimated extended versions of this model (1) with slope and intercept shifts for the forecast form variables, (2) using all variables in prior regressions with slope and intercept shifts, (3) using all variables except for variables for which regression diagnostics indicate mild collinearity, and (4) various combinations thereof. The results on the attribution-related variables are robust to these alternative specifications. Therefore, we report the simpler version of the model.

In this model, τ_2 captures the association of attributions with security prices independent of the unexpected earnings computed directly from the management forecast, and τ_3 captures the effect on the earnings response coefficient of the attribution existence. We expect $\tau_3 > 0$ if attributions increase the precision of the unexpected earnings signal. Prior research (e.g., Pownall, Wasley, and Waymire [1993], Baginski, Hassell, and Waymire [1994]) generally finds $\tau_4 > 0$ (minimum-type forecasts are, on average, viewed as good news), $\tau_5 < 0$ (maximum-type forecasts are, on average, viewed as bad news), and $\tau_6 = 0$ (range forecasts are not, on average, viewed as more good news or bad news). Special items included in unexpected earnings should decrease the earnings response coefficient ($\tau_7 < 0$), whereas we expect other disclosures and sales forecasts to enhance the precision of the earnings signal ($\tau_8 > 0$ and $\tau_9 > 0$).

Table 5 presents ordinary least squares estimates of five versions of equation (6).[18] Model 1 includes only ranked unexpected earnings (*RUE*) as an independent variable. Cheng, Hopwood, and McKeown [1992] document the improvement in explanatory power from using the rank transformation on unexpected earnings. The coefficient on *RUE* is significant and positive, as expected ($p = .001$; adjusted $R^2 = 0.069$), indicating a positive ordinal relationship between unexpected earnings in the management forecast and cumulative abnormal returns in the forecast period. Model 2 adds intercept and slope shift coefficients based on whether an attribution is present. The intercept shift is significant and negative ($p = .002$), indicating that attributions are associated with negative price reactions, earnings held constant. The slope shift is significant and positive ($p = .036$), indicating that attributions enhance the price reaction per dollar of unexpected earnings. The adjusted R^2 equals 0.078. Model 4 includes the remainder of the control variables, with the primary effect being a slight weakening of the attribution slope shift. Models 3 and 5 are the analogs to models 2 and 4, but the slope and intercept shifts on external and internal attributions are not constrained

[18] Ordinary least squares estimation on short-window price reactions using pooled cross-sectional and intertemporal observations is appropriate for a management forecast sample because observations are not concentrated in event time. However, as indicated in the sample selection section, we treat two forecasts issued at the same time as two separate observations because many of the independent and dependent variable measurements are different for the two forecasts. Two forecasts are issued simultaneously in 18.7% of the sample. The most prevalent case is a fourth-quarter forecast and an annual forecast in the same article (9.5% of the sample). It is probably safe to ignore the clustering of these observations in event time because Bernard [1987] shows that the extent of *t*-statistic standard-error bias from correlated market model residuals depends on the average correlation, and our sample has more than 80% of the observations in nonoverlapping three-day windows. Nevertheless, we reestimated equation (6) twice, once discarding 18.7% of our sample and once discarding only 9.5% of our sample. Our conclusions regarding the attribution-related variables' effects on security prices are unchanged.

TABLE 5

Effects of Forecast Attributions on the Market's Pricing of Unexpected Earnings Conveyed in Management Forecasts (Full Sample, N = 951)

	Predicted sign	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	none	−8.010	−4.238	−4.391	−3.694	−3.622
		(0.001)	(0.002)	(0.001)	(0.016)	(0.008)
RUE	+	0.011	0.007	0.007	0.006	
		(0.001)	(0.003)	(0.001)	(0.010)	
ATTRIBUTION	none		−4.959		−3.755	
			(0.002)		(0.021)	
ATTRIBUTION * *RUE*	+		0.005		0.004	
			(0.036)		(0.064)	
INTERNAL	none			−1.301		−0.009
				(0.364)		(0.506)
INTERNAL * *RUE*	+			0.001		0.001
				(0.301)		(0.343)
EXTERNAL	none			−5.154		−4.377
				(0.001)		(0.002)
EXTERNAL * *RUE*	+			0.006		0.006
				(0.012)		(0.015)
MIN	+				1.267	1.315
					(0.086)	(0.079)
MAX	−				−6.351	−6.291
					(0.001)	(0.001)
RNG	none				−2.048	−1.945
					(0.029)	(0.038)
SPECIAL * *RUE*	−				−0.002	−0.002
					(0.282)	(0.266)
OTHER * *RUE*	+				0.002	0.001
					(0.085)	(0.082)
SALESFOR * *RUE*	+				0.002	0.002
					(0.045)	(0.048)
Adjusted R^2		0.069	0.078	0.081	0.126	0.129
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

The table reports coefficients × 100. The *p*-values are one-tailed when a sign expectation is provided.

Model:

$$CAR_i = \tau_0 + \tau_1 RUE_i + \tau_2 ATTRIBUTION_i + \tau_3 ATTRIBUTION * RUE_i + \tau_4 MIN_i + \tau_5 MAX_i + \tau_6 RNG_i + \tau_7 SPECIAL * RUE_i + \tau_8 OTHERDISC * RUE_i + \tau_9 SALESFCAST * RUE_i + \mu_i.$$

$UE_i = [MF_i - (AF_i \text{ or } RW_i)]/Price_i$, where MF_i = the management forecast of earnings per share (*EPS*) for firm *i*; AF_i = the median analyst forecast of *EPS* for firm *i* obtained from IBES for the month preceding the management forecast; RW_i = the random walk forecast (seasonal random walk forecast) of *EPS* for firm *i* for annual (interim) management forecasts; and $Price_i$ = day −2 security price for firm *i*. *RUE* = the ranked value of *UE*; *CAR* = the security price reaction to the management forecast over a three-day event day interval centered on the DJNRS date (day 0) using standard market model estimation techniques; *ATTRIBUTION* = 1 if an attribution is present, and 0 otherwise; *EXTERNAL* = 1 if an external attribution is present, and 0 otherwise; *INTERNAL* = 1 if an internal attribution is present, and 0 otherwise; *SPECIAL* = 1 if a one-time income effect is mentioned, and 0 otherwise; *SALESFCAST* = 1 if a sales forecast is issued with the earnings forecast, and 0 otherwise; *OTHERDISC* = the number of other disclosures issued with the earnings forecast.

to be equal. Once again, the intercept and slope shifts are significant for external attributions only.[19]

In table 6, we take a final look at how attributions relate to earnings response coefficients. We form six portfolios of equal size based on the absolute value of unexpected earnings. We report median *ABSUE* for each portfolio, and we regress *CAR* on unranked *UE* within each portfolio.[20] Prior research documents a nonlinearity in this specification (Freeman and Tse [1992]), possibly because extreme values of *ABSUE* are transitory. Consistent with this nonlinearity, the earnings response coefficient is decreasing as the *ABSUE* magnitude increases from portfolio 1 to portfolio 6. If we reestimate the earnings response coefficient both for cases where no attribution is provided and for cases where an attribution is provided, the earnings response coefficient is always higher where an attribution is present. That is, attributions enhance the earnings response coefficient *within* porfolios of different absolute unexpected earnings. This finding provides comfort that attributions are not simply proxying for the nonlinearity in earnings response coefficients.

Table 6 also reports reestimation of the model for type of attribution, external and internal. Recall from table 3 that external attributions are more likely for smaller *ABSUE*, and internal attributions are more likely for larger *ABSUE*. This condition represents an alternative explanation for why we find that external attributions enhance the unexpected earnings-returns relation whereas internal attributions do not (table 5)—simply that external attributions are issued more often when earnings shocks are smaller and likely more permanent. Table 6 contradicts this alternative explanation. Although external attributions are issued more often in the smaller *ABSUE* portfolios, the earnings response coefficient enhancement occurs in the larger *ABSUE* portfolios 3 through 6. In contrast, internal attributions are equally likely to be associated with earnings response coefficient increases

[19] As noted in the sample selection section, we retained as many observations as possible to maximize the generalizability of our results. A cost of this approach is the potential measurement error in unexpected earnings conveyed in the management forecast caused by mismeasurement of the preceding earnings expectation (i.e., use of the random walk model when analysts do not cover the firm) and mismeasurement of the management forecast (i.e., retaining imprecise forecasts in the sample). Accordingly, we reestimated equation (6) twice, once with firms not followed by analysts discarded ($n = 691$ remaining) and once discarding ambiguous management forecast news where, as defined in Baginski, Hassell, and Waymire [1994], ambiguous good news disclosures include range estimates where the midpoint exceeds expected earnings but the lower bound is below expected earnings, and minimum estimates less than or equal to expected earnings; and ambiguous bad news disclosures include range estimates where the midpoint is less than expected earnings but the upper bound exceeds expected earnings, and maximum estimates where the upper bound is greater than or equal to expected earnings ($n = 696$ remaining). The results on the attribution-related variables are robust to these alternative specifications.

[20] We use unranked unexpected earnings to preserve the nonlinearity documented by Freeman and Tse [1992].

TABLE 6

Earnings Response Coefficients for Different Levels of Absolute Unexpected Earnings

		β_1 estimate						
Portfolio	Median *ABSUE*	All Observations	No Attribution	Attribution Is Present	No External Attribution	External Attribution Is Present	No Internal Attribution	Internal Attribution Is Present
1	0.0004	19.203	17.170	20.131	24.636	15.474	21.883	14.895
2	0.0027	8.942	4.555	9.429	11.301	7.434	7.479	10.236
3	0.0062	5.817	4.129	6.349	1.451	7.854	5.737	6.413
4	0.0108	5.249	4.006	5.611	3.553	5.961	5.405	5.107
5	0.0213	1.108	0.506	1.256	0.807	1.299	0.783	1.534
6	0.0533	0.153	0.049	0.190	0.087	0.190	0.169	0.118

Model: $CAR_i = \beta_0 + \beta_1 UE_i + \varepsilon_i$

$UE_i = [MF_i - (AF_i \text{ or } RW_i)]/Price_i$, where MF_i = the management forecast of earnings per share (*EPS*) for firm i; AF_i = the median analyst forecast of *EPS* for firm i obtained from IBES for the month preceding the management forecast; RW_i = the random walk forecast (seasonal random walk forecast) of *EPS* for firm i for annual (interim) management forecasts; and $Price_i$ = day −2 security price for firm i. *ABSUE* = the absolute value of *UE*. *CAR* = the security price reaction to the management forecast over a three-day event day interval centered on the DJNRS date (day 0) using standard market model estimation techniques.

(portfolios 2, 3, and 5) as they are with earnings response coefficient decreases (portfolios 1, 4, and 6).

6. Summary, Limitations, and Conclusions

We document that attribution incidence is related in predictable ways to a set of variables that jointly proxy for the costs and benefits of additional voluntary disclosure. Managers of larger firms and firms in less regulated industries are more likely to explain their earnings forecasts. Explanations are less likely to accompany forecasts issued over longer horizons, and explanations are more likely for bad news forecasts and for maximum-type forecasts. We also show that security price reactions are affected by the existence of attributions, although this finding is driven by external attributions. These results are consistent with the usefulness of (at least external) attributions to investors.

The generalizability of our results is potentially limited by data requirements and the likely effects of noise in our variable measurements. First, we must rely on *Wall Street Journal* and *Barrons* editors and reporters to convey unbiasedly management's attributions in published articles and on our ability to identify accurately attributions. At a minimum, this measurement error in the dependent variable lowers the explanatory power of the attribution incidence model. Editorial bias that is systematically related to our independent variables might also affect our inferences. This argument extends to the classification of attributions as being internal or external. Our preliminary evidence indicates an effect of attribution type on the usefulness of attributions to investors. Clearly, our understanding of voluntary disclosure can be enhanced by more refined (and potentially different) attribution classification schemes.

Second, economics-based theories of attribution do not exist. Accordingly, we characterize attributions as incremental voluntary disclosures, and we rely on past empirical work in voluntary management forecast disclosure to select variables to explain management's decision to explain an earnings forecast.

Finally, continuing discovery of the richness of cross-sectional differences in the kinds of management forecast disclosures requires the researcher to choose ever more complex functional forms of models relating unexpected forecast news to security price reactions. Although we cannot claim that our model captures the full richness of management's voluntary disclosures and the information environments surrounding those disclosures, we perform numerous supplemental tests and use alternative models to detect whether attributions affect the association of management earnings forecasts and security prices.

Despite these limitations, it is encouraging to find that, even with difficult-to-measure data and incomplete theories, we are able to document attribution effects on security prices, and the effects appear robust to alternative models and variable measurements. Furthermore, by including imprecise management forecast observations for which noisy unexpected earnings measurement is a foregone conclusion, it is possible that we have understated the usefulness of attributions. However, it might be that explanations for forecasts have the greatest benefit for samples that include a broad set of forecast types, horizons, and earnings change magnitudes.

The evidence in this paper suggests that a voluntary expansion of the financial reporting model to include explanations for forecasted results is useful to equity investors. Future research can assess cross-sectional differences in the credibility of explanations as well as identify what information in the explanations is most useful to investors.

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