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Analysts' Incentives to Overweight Management Guidance When Revising Their Short-Term Earnings Forecasts

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ABSTRACT: We document that, when revising their short-term earnings forecasts in response to management guidance, analysts wishing to curry favor with management weight the guidance more heavily than predicted, based on the credibility and usefulness of the guidance. This overweighting of guidance is present prior to equity offerings and other events that could lead to investment banking business. Although analysts sacrifice their forecast accuracy by overweighting management guidance, they appear to benefit, on average, by subsequently gaining the underwriting business for their banks. Thus, while analysts wishing to please managers are optimistic in their long-term earnings forecasts, they take their cue from management when determining their short-term earnings forecasts.

Keywords: *analyst incentives; management guidance; management forecasts; analyst forecasts; analyst revisions*.

Data Availability: *The data used in this study are publicly available from the sources indicated in the text.*

I. INTRODUCTION

Analysts face many competing incentives: they not only want to be accurate to signal their skill and build their reputation, but they also want to issue optimistic long-term forecasts to please the firms they follow or to generate trading volume for their brokerage houses (Mikhail et al. 1999; Lim 2001; Hong and Kubik 2003; Cowen et al. 2006; Libby et al. 2008). Optimism is not necessarily desirable, however, for short-term forecasts (Matsumoto 2002; Richardson et al. 2004; Ke and Yu 2006). Thus, we expect analysts with incentives to please the firms

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they follow to take their cue from management when determining their short-term forecasts. Specifically, when revising their forecasts in response to management guidance, we expect that these analysts will weight the guidance more heavily than predicted based on the perceived credibility and usefulness of the guidance (hereafter, overweight management guidance).[1] Although by overweighting management guidance analysts bear the cost of reduced forecast accuracy, this behavior pleases management, as it helps align the market's expectations with those of management (e.g., Givoly and Lakonishok 1979; Ajinkya and Gift 1984; King et al. 1990; Stickel 1991).

We examine analysts' incorporation of guidance prior to equity offerings, where analysts have been shown to have strong incentives to curry favor with managers. The equity offering setting is advantageous because the benefit to analysts is straightforward (underwriting fees for their banks) and we can identify which investment banks underwrote the deal, *ex post*. In addition, we can conduct powerful cross-sectional tests by analyzing different analysts' incorporation of the same guidance, as we expect only those analysts with incentives to please management to overweight management guidance.

We find that analysts overweight management guidance for firms that subsequently announce an equity offering. After controlling for other variables that affect analysts' incorporation of guidance, such as the credibility and usefulness of the forecast, analysts on average incorporate 27 percent more of the management guidance into their revised short-term forecasts for firms that announce an equity offering in the subsequent year. This overweighting is economically significant, as, on average, analysts tend to incorporate approximately 50–80 percent of management guidance (e.g., Baginski and Hassell 1990; see current Table 4).

Although we control for a variety of determinants related to the credibility and usefulness of management guidance, it is possible that guidance prior to equity offerings is informative in ways not captured by our measures of usefulness and credibility, leading to the appearance of an overweighting of guidance. To address this possibility, we conduct two sets of tests to better distinguish between the expected incorporation of credible and useful guidance and the overweighting of guidance to please managers prior to equity offerings.

First, we examine analysts' *ex post* forecast accuracy. The incorporation of credible and useful guidance generally improves analysts' earnings forecasts. Thus, if the overweighting of guidance we observe is in response to some omitted credibility and usefulness measures, then analysts' forecasts should be more accurate as a result. In contrast, we find that analysts' *ex post* forecast errors increase by 40 percent, on average, as a result of the overweighting of management guidance prior to equity offerings. This finding is consistent with analysts bearing significant accuracy costs in order to please management.

Second, we investigate whether the weight placed on management guidance prior to equity offerings varies with analyst independence and affiliation. These cross-sectional tests use only management guidance issued by firms that announce an equity offering in the next year, thereby mitigating the endogeneity concerns associated with the equity offering. We hold variation in the credibility and usefulness of the guidance constant by requiring that both analyst types (e.g., affiliated and unaffiliated) forecast earnings for a given firm, allowing us to determine how *different analysts* respond to the *same guidance*.

Our first cross-sectional test examines differences between dependent and independent analysts. Only analysts employed by investment banks (dependent analysts) have the potential to gain

[1] To clarify, we expect analysts to revise their forecasts either upward or downward depending on management's preference, which is communicated via management guidance. We document that analysts overweight guidance in both directions in Section V.

the underwriting business for their firms. Thus, if the overweighting of guidance stems from analysts' incentives to gain underwriting business, we should find that dependent analysts, but not independent analysts, overweight management guidance prior to equity offerings. Conversely, if the underlying properties of firms issuing equity cause the overweighting, we should not observe a systematic difference by analyst type. We find that dependent analysts weight the same management guidance more heavily than independent analysts, consistent with the overweighting of guidance representing a mechanism used by analysts to curry favor with management.

Our second cross-sectional test examines differences between affiliated and unaffiliated analysts. This test allows us to condition on the *ex post* realization of gaining the underwriting fees. If managers reward analysts who overweight their guidance, we should find that those analysts employed by the banks subsequently underwriting the offerings (affiliated analysts) weight the firm's guidance more heavily than other analysts. Results are consistent with this conjecture; we find that analysts' overweighting of management guidance is associated with obtaining the underwriting business of the upcoming equity offering.[2]

We conduct several additional analyses to corroborate these findings. First, to further control for the endogeneity of an equity offering, we model the equity issuance choice and conduct a two-stage Heckman analysis. We continue to find evidence that analysts overweight management guidance prior to equity offerings. We also assess the likelihood that the inclusion of an omitted variable could overturn the results, following Frank (2000), and conclude that the probability is small.[3] Second, we document that analysts who overweight management guidance also tend to issue strong buy recommendations, a previously documented mechanism to please management (e.g., Michaely and Womack 1999), consistent with analysts simultaneously employing several tools to curry favor with management. Third, we illustrate that our conclusions do not require analysts' explicit knowledge of an equity offering. We find that analysts overweight management guidance for firms *expected* to have equity offerings. Moreover, the overweighting of guidance is more prevalent in the six months prior to the equity offering, relative to offerings announced 7–12 months in the future, consistent with analysts being more responsive when the potential payoffs are nearer (and presumably more certain). Fourth, we document that the overweighting of guidance prior to announcements of equity offerings is present for both upward and downward guidance, consistent with analysts following management in either direction in order to curry favor. Finally, we also find some evidence that analysts overweight management guidance prior to other events that provide analysts an incentive to please management: i.e., prior to debt offerings and M&A activity, where debt underwriting fees and M&A advisory fees might be gained by the analyst's employer.

To summarize, we find that analysts overweight short-term management guidance when they have an incentive to please management—preceding an equity offering. This overweighting does not appear to be a function of analysts incorporating useful information, but rather results in less accurate forecasts. The overweighting of guidance is, on average, present only when the analysts are able to gain the underwriting business and the analysts appear to benefit from this behavior by increasing their chances of gaining the subsequent underwriting business for their banks.

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[2] An alternative explanation for this result is that the subsequent underwriter is also the past underwriter, and the analysts are attempting to please management to *maintain* the underwriting business. For example, Michaely and Womack (1999) find that brokerage analysts are more optimistic in their recommendations for companies their firm has recently taken public. This plausible alternative does not alter our main conclusion. Analysts under either scenario overweight management guidance in order to please management. Moreover, Krigman et al. (2001) find that approximately one-third of lead underwriters change from deal to deal; thus, the past underwriters cannot automatically assume they will be the subsequent underwriters, further heightening their incentive to please management.

[3] Though we explore this endogeneity concern in detail in Section V, we cannot completely rule out the possibility that the endogenous nature of equity offerings drives our results.

Our study contributes to the understanding of how incentives to please management affect analysts' short-term earnings forecasts. Although analysts wishing to please managers are overly optimistic in their long-term earnings forecasts and recommendations, we document that they take their cue from management when determining their short-term earnings forecasts. The desire to please management, therefore, can result in systematic errors in analysts' short-term earnings forecasts. Although we use the setting of equity offerings to document analysts' overweighting of guidance to please management, the implications of our findings are much broader. This mechanism can be used by any analyst wishing to curry favor with management, conditional on the issuance of management guidance, whether the analyst wishes to gain bank fees (the focus of the current study), to receive preferred treatment in conference calls (Libby et al. 2008; Mayew 2008), or to please management for other reasons (e.g., Chen and Matsumoto 2006; Ke and Yu 2006).

II. MOTIVATION OF HYPOTHESIS

In general, analysts have an incentive to issue accurate earnings forecasts. Hong and Kubik (2003) find that the least accurate analysts are relegated to less desirable brokerage houses, while more accurate analysts are more likely to move up to high-status brokerage houses. Lim (2001) concludes that a positive forecast bias is the outcome of rational analysts trying to minimize their forecast error while also trying to please management. Consistent with this reasoning, Chan et al. (2003a) find that analysts consistently exceed realized growth when estimating long-term growth in earnings, and Dechow et al. (2000) find that the most optimistic long-term growth forecasts are for equity issuers.[4] This positive bias also extends to stock recommendations. For example, Dugar and Nathan (1995) document that analysts employed by investment banks issue more optimistic stock recommendations than do analysts employed by non-investment banks, and Lin and McNichols (1998) find that those analysts subsequently employed as the underwriters (affiliated analysts) issue more optimistic recommendations and long-term growth forecasts than do unaffiliated analysts.

Although optimistic recommendations and long-term forecasts are arguably Pareto-optimal, this is not the case for short-term forecasts. Blanket optimism for short-term earnings forecasts is costly if the firm misses the benchmark (e.g., Skinner and Sloan 2002) and, consistent with this, prior research has not found systematic evidence of optimism in short-term forecasts (e.g., Lin and McNichols 1998). There is no clear strategy for analysts to garner management's favor with their short-term forecasts. Some managers will be pleased by optimistic forecasts, for example, if they plan to issue equity or sell their shares before earnings are reported, if they are in danger of losing their positions, or if the firm is in danger of a debt-rating downgrade or bankruptcy. Other managers would prefer pessimistic forecasts, for instance if they face high litigation risk, if their bonuses depend on meeting the analyst forecast, or if they plan to issue equity or sell their shares after earnings are reported and want to positively surprise the market to maximize the sale price (Rogers and Stocken 2005).

In the face of these varying incentives, managers can use their guidance to move expectations to the desired levels (e.g., Ajinkya and Gift 1984; King et al. 1990; Hirst et al. 2008). Thus, rather than observing systematic optimism or pessimism in shorter-term analyst forecasts, we expect that, to curry favor with managers, analysts will take their cue from management and overweight management guidance when revising their short-term earnings forecasts, even though the overweighting will likely result in less accurate analyst forecasts.

[4] It is also possible that analysts tend to follow firms that they expect to perform well and choose not to follow firms they expect to perform poorly, leading to the appearance of *ex post* optimism (Hayes 1998; Bradshaw et al. 2006).

Several conditions must exist for analysts to overweight guidance to please managers. First, managers must want analysts' forecasts to closely mirror their own guidance. This desire on the part of managers is reasonable because, when analysts incorporate guidance, it aids in the alignment of market expectations with those of management (e.g., Givoly and Lakonishok 1979; Lys and Sohn 1990; Stickel 1991). We therefore assume that managers will desire analysts to be responsive to their guidance.

Second, managers must be able to identify and reward analysts who overweight their guidance. We assume that a manager can infer each analyst's weighting, relative to an unbiased weighting of the guidance, based on the manager's knowledge of his or her own reputation, forecast credibility, and forecast precision. Managers can reward the overweighting by giving the analyst (or associated investment bank) special consideration, for example, in the underwriter-selection process.[5] Finally, analysts must have an incentive to curry favor with management. We use upcoming equity offerings to proxy for analysts' incentives to please management. During the time period examined, underwriting departments were known to award significant bonuses to analysts who help attract new underwriting business (Cowen et al. 2006, 122). We expect analysts employed by an investment bank to have incentives to please management in this setting in order to gain the underwriting business for their firm.

In sum, we expect analysts wishing to please management to overweight management guidance when revising their short-term earnings forecasts, at the expense of their *ex post* accuracy, in order to benefit from management's special consideration—for example, by increasing the likelihood of gaining underwriting business for their investment bank.

Hypothesis: Analysts overweight management guidance when revising their short-term earnings forecasts, at the expense of their *ex post* forecast accuracy, to curry favor with management.

We conduct several analyses that jointly test our hypothesis. First, we examine whether analysts overweight management guidance when revising their short-term earnings forecasts for firms announcing an equity offering in the next year. Second, we examine whether this overweighting of guidance leads to larger analyst forecast errors. Third, we conduct cross-sectional tests to determine whether only analysts who could feasibly gain the underwriting business overweight management guidance and if this behavior appears to result in gaining the underwriting business.

III. DATA AND DESCRIPTIVE STATISTICS

Data and Sample

We use data from 1994–2005, obtaining quarterly management guidance, analyst forecasts, and actual (reported) earnings from the First Call database. We acquire information regarding the timing and underwriter of the equity offering from SDC Platinum. We obtain the necessary data for the control variables from the 2005 Quarterly and Annual Compustat File. We outline the sample selection procedure in Table 1. As Figure 1 illustrates, we consider management guidance for quarter q that was issued after the earnings announcement for quarter $q-1$ and before the earnings announcement for quarter q. We examine the analyst forecast revisions for quarter q around the corresponding management guidance. In this short-term setting, analysts cannot be systematically optimistic in their forecasts as some managers will prefer pessimistic forecasts. Thus, analysts must take their cue from management's guidance when determining what short-

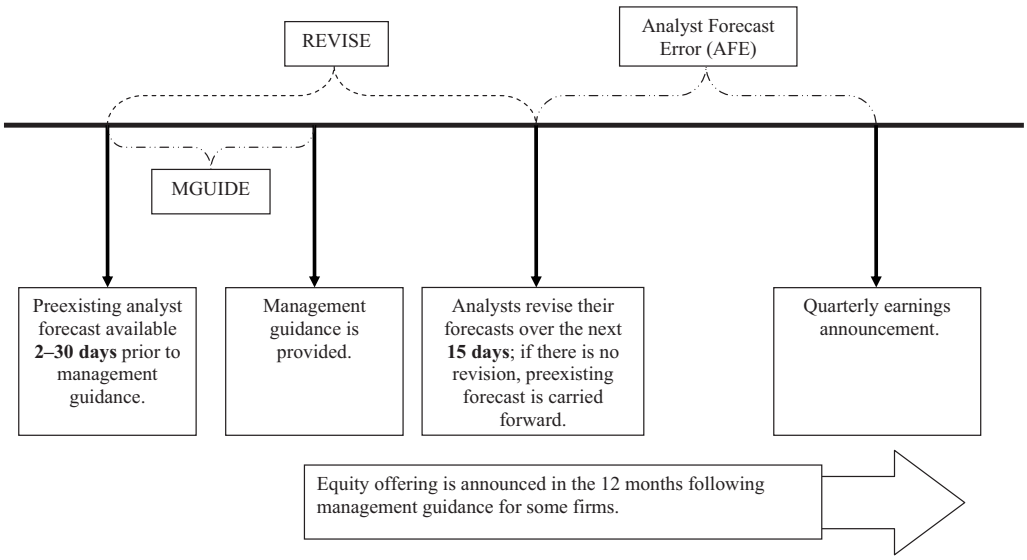
[5] Although our focus is on underwriting fees, this special consideration could also include other types of consulting fees, inside information, and conference call favoritism. Clearly, managers will also consider deal terms, underwriter quality, and other criteria when determining whom to select as underwriters. These additional features of the choice of underwriter should add noise to the tests, thereby biasing against finding evidence consistent with our hypothesis.

TABLE 1

Management Guidance Sample Selection
1994–2005

	Number of Forecasts	Number of Firms
Total Forecasts	43,885	5,983
Less:		
Non-EPS forecasts	1,291	137
Non-USD currency forecasts	295	132
Forecasts unduly affected by mergers or accounting changes	169	21
Forecasts issued before 1994	58	13
EPS forecasts made after 1994	42,072	5,680
Less:		
Qualitative forecasts	8,278	911
Point and range forecasts	33,794	4,769
Less:		
Duplicate forecasts	33	1
Forecasts missing actual earnings data	4,131	203
Forecasts with actual earnings data	29,630	4,565
Less:		
Forecasts without CUSIPs	60	32
Forecasts with missing Compustat earnings announcement dates	4,089	370
Forecasts issued before the earnings announcement date of the prior quarter	12,655	358
Forecasts issued after the earnings announcement date of the current quarter	236	44
Final management guidance sample	12,590	3,761
Less:		
Observations without analysts' preexisting forecasts	5,912	1,445
Management guidance with analysts' forecasts	6,678	2,316
Less:		
Observations without stock price data	974	554
Management guidance with stock price as a scalar	5,704	1,762
Less:		
Multiple guidance issuances (keeping the most recent guidance)	515	0
The top and bottom one percent of management guidance, analysts' revisions, and managerial reputation	204	54
Final Sample	4,985	1,708

FIGURE 1
Timeline and Variable Measurement



term earnings forecast will curry favor.[6] If a firm provides multiple forecasts for the same quarter, then we keep the most recent (last-issued) guidance.[7] The final sample contains 4,985 firm-quarter observations consisting of 1,708 unique firms.[8]

Variable Definitions and Descriptive Statistics

All variables used in the analysis are defined in Table 2, with corresponding descriptive statistics in Table 3. Our research design requires that we measure management's "suggested" revision (based on their public guidance) and analysts' subsequent forecast revisions to their short-term earnings forecast. The higher the correlation between management and analyst revisions, the greater the "weighting" of guidance by analysts. In the following section, we introduce a number of control variables that are expected to affect the weight placed on the management guidance, thereby allowing us to focus on the "overweighting" of guidance by analysts prior to equity offerings.

Management's suggested revision (*MGUIDE*) is the measure of how far the management

[6] We include pre-announcements in the sample because, in our setting, it is not clear that analysts' incentives would change within the window leading up to the earnings announcement. Specifically, we expect analysts to wish to please management throughout the quarter, including during the "pre-announcement" period. Our results do not change qualitatively when we exclude pre-announcements from our sample (not tabulated).

[7] We delete 515 instances of subsequently revised management guidance for a given firm-quarter, keeping only the most recently issued guidance in a given firm-quarter. It is possible that firms issuing multiple forecasts in a given quarter are systematically different from the rest of the sample. We find no statistical difference in analysts' incorporation of guidance for these 515 firm-quarters in the multivariate tests (not tabulated).

[8] After the sample constraints, we retain approximately 29 percent of the unique firms from the initial population. We compare the size, performance, and expected growth of the final sample to the initial population from which the sample was collected. We find that our sample is larger, more profitable, and has higher expected growth, consistent with analysts following these types of firms (Bhushan 1989; McNichols and O'Brien 1997).

TABLE 2

Variable Definitions

Variable	Description	Calculation (Compustat data item numbers in parentheses)
SEO	If the firm issued equity	An indicator variable that is set equal to 1 if the firm announces an equity offering in the year following the management guidance, and 0 otherwise.
MGUIDE	The magnitude of the revision suggested by the manager	The difference of the management earnings forecast and the preexisting median consensus analyst forecast, scaled by stock price at the beginning of the quarter. The preexisting consensus analyst forecast is the most recent consensus before the management guidance (within 2–30 days). The midpoint of the range is used for all management guidance that is provided as a range forecast.
REVISE	The magnitude of the analyst forecast revision	The difference of the revised consensus analyst forecast and the preexisting consensus analyst forecast, scaled by stock price at the beginning of the quarter. The preexisting consensus analyst forecast is the most recent consensus before the management guidance (within 2–30 days). The revised consensus analyst forecast is the updated consensus forecast issued within 15 days of the management guidance. If there is not a revised consensus analyst forecast, then *REVISE* is 0.
FREQUENCY	The number of management forecasts	The number of quarterly management forecasts issued over the previous three years.
EPS	Earnings per share	Earnings per share scaled by the stock price at the beginning of the quarter.
|*AFE*|	The absolute *ex post* analyst forecast error	The absolute value of the median consensus analyst forecast error 15 days following management guidance, scaled by the stock price at the beginning of the quarter.
AFFILIATED	Affiliated analyst	An indicator variable that is set equal to 1 if the analyst is employed by the investment bank that subsequently underwrites the equity offering, and 0 otherwise.
DEPENDENT	Analyst employed by investment bank	An indicator variable that is set equal to 1 if the analyst is employed by an investment bank, and 0 otherwise.
DOWN	Downward management guidance	An indicator variable that is set equal to 1 if the management guidance falls below the preexisting consensus analyst forecast, and 0 otherwise.
REPUTATION	Historical reputation of the manager	The average accuracy of the preceding management guidance issued in the prior three years, where the accuracy is equal to 1, 0 and −1, respectively, if the absolute value of the preexisting analyst forecast error is greater than, equal to, or less than the absolute value of the management forecast error.
AGREE	Congruent signs on management guidance and market response	An indicator variable that is set equal to 1 if the three-day abnormal (market-adjusted) return around the management guidance (−1, +1) has the same sign as the management revision, and 0 otherwise. The abnormal return is equal to the difference between the firm return and the value-weighted market return.

(continued on next page)

TABLE 2 (continued)

Variable	Description	Calculation (Compustat data item numbers in parentheses)
HORIZON	Management guidance horizon	The log of the number of days between the issuance of management guidance and the earnings announcement.
RANGE	Management guidance precision	The range of the forecast scaled by the stock price at the beginning of the quarter for a range forecast, and 0 for a point forecast.
ANALYSTS	Analyst following	The log of the number of analyst forecasts used to form the consensus analyst forecast following management guidance.
$\lvert\Delta EPS\rvert$	Earnings shocks	The absolute change in earnings per share from First Call, scaled by the stock price at the beginning of the quarter.
LOSS	Loss indicator	An indicator variable that is set equal to 1 if earnings per share from First Call is negative, and 0 otherwise.
SPECIAL ITEMS	Special items	Special items from Compustat (#32), scaled by the market value of common stock at the beginning of the quarter.
FIRM SIZE	Firm size	The log of the market value of common stock at the beginning of the quarter.
ANALYST DISPERSION	Analyst disagreement	The standard deviation of the individual analyst forecasts used to generate the consensus analyst forecast following management guidance, scaled by the stock price at the beginning of the quarter.
DEBT	If the firm issued debt	An indicator variable that is set equal to 1 if the firm announces a debt offering in the year following the management guidance, and 0 otherwise.
M&A	If the firm had an M&A	An indicator variable that is set equal to 1 if the firm announces a merger or acquisition in the year following the management guidance, and 0 otherwise.

earnings forecast deviates from the preliminary earnings expectations: the management earnings forecast less the preexisting median consensus analyst forecast (the last consensus available in the 2–30 days prior to the guidance), scaled by price at the beginning of the quarter. The analyst revision (*REVISE*) is the revised consensus analyst forecast (the last revised consensus available in the 15 days following the management guidance), less the preexisting median consensus analyst forecast, scaled by price at the beginning of the quarter. In other words, *REVISE* is how much the consensus analyst forecast moves after management guidance is issued.[9] The magnitude of the mean analyst revision (*REVISE*; −0.0029) falls just below that of the "suggested" management

[9] We consider the consensus analyst forecast, rather than each individual analyst revision, to provide direct evidence that the consensus forecasts can be moved by the overweighting of guidance. We consider the median, rather than the mean, consensus analyst forecast because the mean consensus could be more easily moved by one analyst's overweighting of guidance to please management and, thus, examining the mean forecast could overstate the economic significance of our findings. Finally, we examine analyst revisions in the 15 days following management guidance to better capture revisions made by analysts in response to management guidance, rather than other news.

revision (*MGUIDE*; −0.0031), on average (see Table 3).

We measure equity offerings (*SEO*) as an indicator variable that equals 1 if the firm announces an equity offering in the year following the issuance of the management guidance, and equals 0 otherwise. We consider the announcement date instead of the actual offering date for two reasons. First, analysts cannot revise their forecasts following the announcement of equity offerings due to SEC-mandated quiet periods (e.g., see Lin and McNichols 1998).[10] Second, firms have usually selected their underwriters by the time of the announcement. Thus, it is before the announcement that analysts will be trying to gain the underwriting business. Approximately 4 percent of the sample issues equity through a secondary equity offering in the year following management guidance (Table 3).[11]

We compare guidance that is issued in the year prior to an equity offering announcement (SEO) to guidance issued during all other times (non-SEO) in Table 3. The frequency of guidance is higher among non-SEO observations relative to SEO observations, and the absolute value of analyst forecast errors is greater among SEO observations, though we explicitly link this error to the overweighting of guidance in the following section. Interestingly, we find no difference in the propensity of losses, the magnitude of special items, firm size, or analyst dispersion between SEO and non-SEO observations; thus, the results do not suggest that the larger forecast errors are a result of greater uncertainty prior to SEOs. Overall, there is no systematic evidence of one of these two groups clearly dominating the other with respect to the usefulness or credibility of guidance. Non-SEO observations tend to have more downward guidance (which is deemed more credible), while guidance among the SEO observations tends to be made by managers with slightly higher reputations.

IV. TEST DESIGN AND RESULTS

Do Analysts Overweight Management Guidance Prior to Equity Offerings?

To determine if analysts wishing to please management overweight management guidance when revising their short-term earnings forecasts, we estimate the following regression equation:

$$\begin{aligned} REVISE = {} & \alpha_0 + \alpha_1 MGUIDE + \alpha_2 MGUIDE \times SEO + \alpha_3 MGUIDE \times DOWN \\ & + \alpha_4 MGUIDE \times REPUTATION + \alpha_5 MGUIDE \times AGREE + \alpha_6 MGUIDE \\ & \times HORIZON + \alpha_7 MGUIDE \times RANGE + \alpha_8 MGUIDE \times ANALYSTS + \alpha_9 SEO \\ & + \alpha_{10} DOWN + \alpha_{11} REPUTATION + \alpha_{12} AGREE + \alpha_{13} HORIZON + \alpha_{14} RANGE \\ & + \alpha_{15} ANALYSTS + \varepsilon. \end{aligned} \tag{1}$$

The results are robust to several alternative specifications. First, our results do not change qualitatively when we use the mean consensus analyst forecasts instead of the median (not tabulated). Second, instead of analyst forecast revisions in 15 days, we examine the revisions in 30 days and up to the day before the earnings announcement. Our conclusions remain unchanged (not tabulated). Third, we include all analysts in the revised consensus figure; as an additional robustness check, we drop from this calculation analysts who did not revise their forecast; results are slightly stronger after the exclusion of these analysts (not tabulated). Finally, we also consider controlling for the age of the preexisting forecast, which is between two and 30 days. The age of the preexisting consensus is not a significant explanatory variable and does not change the results (not tabulated).

[10] Consistent with the interactions between managers and analysts preceding the announcement date, in our sample we find only 38 instances where management guidance is issued after the announcement of the equity offering but before 25 days following the actual offering (not tabulated).

[11] As a robustness check, we follow Bradshaw et al. (2006) and consider a second measure of equity financing that incorporates a broader set of equity financing (18 percent of the sample). Results are similar using this alternative financing measure (not tabulated).

TABLE 3

Descriptive Statistics

	Full Sample						SEO Observations (202 max. obs.)		Non-SEO Observations (4,783 max. obs.)	
Variable	**n**	**Mean**	**Std. Dev.**	**Q1**	**Median**	**Q3**	**Mean**	**Median**	**Mean**	**Median**
SEO	4,985	0.0405	0.1972	0.0000	0.0000	0.0000	1.0000	1.0000	0.0000***	0.0000***
MGUIDE	4,985	−0.0031	0.0072	−0.0044	−0.0006	0.0000	−0.0021	0.0000	−0.0031**	−0.0007***
REVISE	4,985	−0.0029	0.0066	−0.0042	−0.0003	0.0000	−0.0018	0.0000	−0.0029**	−0.0004***
EPS/PRICE	4,985	0.0093	0.0184	0.0041	0.0103	0.0168	0.0080	0.0098	0.0093	0.0103
FREQUENCY	4,985	1.6752	2.2472	0.0000	1.0000	2.0000	0.7228	0.0000	1.7155***	1.0000***
|*AFE*|	4,937	0.0012	0.0021	0.0000	0.0005	0.0013	0.0016	0.0008	0.0012	0.0005***
DOWN	4,985	0.5585	0.4966	0.0000	1.0000	1.0000	0.4505	0.0000	0.5630***	1.0000***
REPUTATION	3,026	0.5480	0.5431	0.0000	0.7500	1.0000	0.6261	1.0000	0.5456	0.7143**
AGREE	4,985	0.6088	0.4881	0.0000	1.0000	1.0000	0.5594	1.0000	0.6109	1.0000
HORIZON	4,985	32.5470	22.0381	15.0000	28.0000	43.0000	31.2822	27.0000	32.6005	28.0000
RANGE	4,985	0.0014	0.0023	0.0000	0.0008	0.0018	0.0015	0.0006	0.0014	0.0008**
ANALYSTS	4,937	9.3352	6.2863	5.0000	8.0000	13.0000	7.5931	7.0000	9.4103	8.0000***
|Δ*EPS*|	3,863	0.0100	0.0185	0.0018	0.0044	0.0111	0.0102	0.0054	0.0100	0.0044
LOSS	4,937	0.1485	0.3556	0.0000	0.0000	0.0000	0.1667	0.0000	0.1477	0.0000
SPECIAL ITEMS	4,937	−0.0084	0.0309	−0.0010	0.0000	0.0000	−0.0088	0.0000	−0.0084	0.0000
FIRM SIZE	4,937	6.9987	1.7280	5.7271	6.8597	8.1428	6.8927	6.7308	7.0033	6.8656
ANALYST DISP.	4,937	0.0011	0.0025	0.0002	0.0004	0.0010	0.0012	0.0006	0.0011	0.0004
DEBT	4,985	0.0628	0.2426	0.0000	0.0000	0.0000	0.1980	0.0000	0.0571***	0.0000
M&A	4,985	0.0401	0.1963	0.0000	0.0000	0.0000	0.0198	0.0000	0.0410	0.0000

*, **, *** Indicates that the mean and median are significantly different between Non-SEO and SEO observations at the 0.10, 0.05, and 0.01 levels, respectively, under a two-tailed test.

There are a maximum of 4,985 firm-quarter observations from 1994–2005; some variables have fewer observations due to missing data. The untransformed variables are presented for both *HORIZON* and *ANALYSTS* for ease of interpretation; the logged values are included in the following regression analyses.

Variables are defined in Table 2.

In general, analysts place weight on (or incorporate) management guidance when revising their forecasts; thus, without control variables, we expect α_1 to be positive and significant. To determine if analysts *overweight* guidance prior to equity offerings, we must first control for expected variation in the incorporation of guidance. We expect analysts to weight guidance more heavily if it is useful and credible (Hassell et al. 1988; Baginski and Hassell 1990; Williams 1996). We interact six measures of usefulness and credibility with *MGUIDE* to control for the expected incremental incorporation of guidance. The main effects of these variables are expected to be largely unassociated with analysts' revisions; thus, we include them for completeness but do not tabulate them. Because a firm can appear multiple times in the regression, we cluster the standard errors by firm following Petersen (2009) in this and all subsequent tests. All reported p-values are two-tailed.

We first control for two measures of credibility. *DOWN* is an indicator variable that equals 1 if the manager's suggested revision lowers expectations, which is generally viewed as more credible (Hassell et al. 1988; Cotter et al. 2006). *REPUTATION* is the average management guidance accuracy relative to analyst forecasts over the preceding three years (Williams 1996; Hutton and Stocken 2009). A higher value indicates that prior management guidance was more credible—i.e., had analysts incorporated the guidance, they would have reported a lower forecast error than if they had retained their original forecast.[12] We expect analysts to weight the guidance more heavily when it is more credible.

The next three controls proxy for the usefulness of the guidance. The first, *AGREE*, is an indicator variable that equals 1 if the three-day abnormal return around the management guidance has the same sign as the revision implied by the management guidance; this reflects the market's assessment of the usefulness of the guidance (e.g., Baginski and Hassell 1990). The second, *HORIZON*, is the log of the number of days prior to the earnings announcement that the guidance was issued. We expect guidance issued earlier in the quarter to be more useful to analysts. Finally, we include a measure of the precision of the guidance (*RANGE*), where we expect more precise guidance to be more useful (Baginski et al. 1993). We expect analysts to weight useful guidance more heavily when revising their short-term earnings forecasts. Because the measures in the analysis are based on the consensus analyst forecast, we also control for the log of the number of analysts (*ANALYSTS*) following the firm.[13]

We predict that, prior to equity offerings, analysts will overweight management guidance when revising their short-term earnings forecasts. Therefore, we expect α_2 to be positive and significant.

Table 4 presents the results from estimating Regression (1). Referring to the first column of results, which does not include control variables and thus includes all 202 firms with subsequent announcements of equity offerings, α_1 is positive and significant (0.83; $p < 0.01$), consistent with analysts incorporating a significant portion of management guidance into their short-term forecasts. This magnitude is significantly higher than that documented in the early work by Baginski

[12] Bhojraj et al. (2008) find that managers who are frequent forecasters also tend to be more accurate, and analysts tend to incorporate more of their guidance. Because our measure of reputation does not take forecasting frequency into account, as a sensitivity check we create the variable *#FORECASTS* that is equal to the number of forecasts issued by the firm over the three-year period that *REPUTATION* is measured. Consistent with Bhojraj et al. (2008), we find that the interaction term on *MGUIDE* × *REPUTATION* × *#FORECASTS* is positive and significant ($\alpha = 0.0422$; $p < 0.01$). Our inferences do not change; the coefficient on the interaction of *MGUIDE* and *SEO* is 0.2765 ($p < 0.01$), which is similar to the main results, presented in Table 4.

[13] We do not have a predicted sign on the interaction term of *ANALYSTS* and *MGUIDE*. On one hand, because more analysts would need to revise their forecasts to move the consensus when there are more analysts following the firm, it is possible that the guidance is incorporated less when there are more analysts. On the other hand, analyst following is not exogenous, and it is likely that more analysts follow larger and relatively more important firms, which might suggest a greater degree of incorporation of management guidance.

TABLE 4
Revision Magnitude on Equity Offerings

Independent Variables	Predicted Sign	Dependent Variable = *REVISE* Coefficient (t-statistic)	Coefficient (t-statistic)
Intercept		−0.0003***	−0.0012*
		(−6.77)	(−1.80)
MGUIDE	+	0.8303***	−0.1347
		(36.43)	(−0.31)
MGUIDE × *SEO*	+	0.1053***	0.2718***
		(3.14)	(3.68)
MGUIDE × *DOWN*	+		0.1473**
			(1.98)
MGUIDE × *REPUTATION*	+		0.1442***
			(2.92)
MGUIDE × *AGREE*	+		0.1585***
			(2.96)
MGUIDE × *HORIZON*	+		0.1005
			(0.99)
MGUIDE × *RANGE*	−		−7.7507**
			(−2.53)
MGUIDE × *ANALYSTS*	?		0.1151***
			(2.88)
Main Effects		Included	Included
Number of SEO Observations		202	87
Total Number of Observations		4,985	3,025
Adjusted R^2		0.8204	0.8803

*, **, *** Indicates statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, under a two-tailed test.
The regressions use all available observations. See Table 1 for sample selection and Table 2 for data definitions. All t-statistics are based on robust standard errors clustered at the firm level.

and Hassell (1990). Recently, however, management guidance has become more precise, more accurate, and is often supplemented with additional information, consistent with guidance issued during our time period being more credible and useful (Baginski et al. 2008). Consistent with our expectations, the coefficient on the interaction between management guidance and equity offerings, α_2, is positive and significant (0.11; $p < 0.01$), indicating that analysts place a greater weight on management guidance when the firm subsequently announces an equity offering.

In the next column we interact each of the six control variables with management guidance, as management guidance may be more useful or credible prior to equity offerings.[14] The main effect of *MGUIDE* becomes insignificant, consistent with the bulk of the analyst revision being explained by the credibility and usefulness of the management guidance. In initial support of our

[14] The sample is significantly reduced at 43 (61) percent of the original sample for SEO (all) firm-year observations. This reduction is almost entirely attributable to the requirement of *REPUTATION*, where firms offering equity tend to have issued less guidance in the past (see Table 3) and thus are missing this variable more often. Results are similar if we exclude this control variable from the analysis (not tabulated).

hypothesis, α_2 remains positive and significant (0.27; $p < 0.01$). In economic terms, analysts incorporate 27 percent more of the management guidance into their short-term earnings forecasts prior to equity offerings. This overweighting is economically significant, as, on average, analysts tend to incorporate approximately 80 percent of management guidance.

The coefficients on the control variables are consistent with our expectations. Analysts incorporate more of the management guidance when it is downward or issued by a more reputable manager (when it is more credible), as well as when the market reaction is in the same direction as the guidance and when the precision of the guidance is higher (when it is more useful). Finally, analysts tend to weight the guidance more heavily when more analysts follow the firm. In sum, while analysts weight guidance more heavily when it is credible and useful, they also place greater weight on guidance received prior to the announcement of an equity offering. Thus, results are consistent with our hypothesis that analysts with incentives to please management overweight management guidance when revising their short-term earnings forecasts.

Do Analysts Sacrifice Accuracy to Overweight Guidance Prior to Equity Offerings?

It is possible that management guidance prior to equity offerings is more informative in ways not captured by our measures of usefulness and credibility, leading to the appearance of an overweighting of guidance. To help distinguish between the expected incorporation of credible and useful guidance (Hassell et al. 1988; Baginski and Hassell 1990; Williams 1996; Cotter et al. 2006) and the overweighting of guidance associated with attempting to please managers prior to equity offerings (our hypothesis), we examine *ex post* analyst forecast errors.

If analysts weight guidance more heavily because it is more informative before equity offerings, or because analysts face more uncertainty regarding the growth or profitability of firms about to issue equity, then the greater reliance on management guidance should reduce analyst forecast errors. Alternatively, as suggested by Lim (2001) and Hong and Kubik (2003), when competing incentives are introduced, analysts are willing to sacrifice accuracy.[15] We predict that analysts overweight management guidance in order to increase their chances of gaining the underwriting business and, thus, this increased reliance on management guidance should reduce forecast accuracy.

In the following set of tests, we explicitly link the overweighting of guidance prior to equity offerings (*SEO REVISION* below) with larger analyst forecast errors in a multivariate estimation (Regression (2) below). First, we generate an estimate of the incremental weight placed on guidance prior to equity offerings from Regression (1) by decomposing the total analyst revision into three components:

(1) that associated with the upcoming equity offering:

$$SEO\ REVISION = \hat{\alpha}_2 MGUIDE \times SEO + \hat{\alpha}_9 SEO;$$

(2) that associated with other known factors affecting analyst responsiveness:

$$STANDARD\ REVISION = \hat{\alpha}_0 + \hat{\alpha}_1 MGUIDE + \hat{\alpha}_3 MGUIDE \times DOWN + \hat{\alpha}_4 MGUIDE \times REPUTATION + \hat{\alpha}_5 MGUIDE \times AGREE + \hat{\alpha}_6 MGUIDE \times HORIZON + \hat{\alpha}_7 MGUIDE \times RANGE + \hat{\alpha}_8 MGUIDE$$

[15] Ke and Yu (2006) examine the intertemporal characteristics of analysts' earnings forecasts, documenting that analysts switching from initially optimistic forecasts to *ex post* pessimistic forecasts just before the earnings announcement are more likely to receive inside information from managers (prior to Regulation Fair Disclosure) and more likely to be retained by their brokerage houses. Similarly, in an experimental setting, Libby et al. (2008) find that analysts are more likely to switch from initially optimistic forecasts to *ex post* pessimistic forecasts to gain favored conference call participation and information access. These analysts *ex post* have lower analyst forecast errors (as they gain inside information) and, thus, this setting differs from ours in that we examine incentives to overweight public guidance resulting in higher analyst forecast errors, *ex post*.

$$\times ANALYSTS + \hat{\alpha}_{10}DOWN + \hat{\alpha}_{11}REPUTATION + \hat{\alpha}_{12}AGREE + \hat{\alpha}_{13}HORIZON + \hat{\alpha}_{14}RANGE + \hat{\alpha}_{15}ANALYSTS; \text{ and}$$

(3) the residual from the estimation:

$$RESIDUAL\ REVISION = REVISION - SEO\ REVISION - STANDARD\ REVISION.$$

Second, we regress the absolute value of the *ex post* analyst forecast error on the absolute value of the decomposed revision components to test if analyst forecast errors are larger as a result of the increased reliance on management guidance prior to equity offerings:

$$\begin{aligned}|AFE| = {} & \alpha_0 + \alpha_1|SEO\ REVISION| + \alpha_2|STANDARD\ REVISION| + \alpha_3|RESIDUAL\ REVISION| \\ & + \alpha_4|\Delta EPS| + \alpha_5 LOSS + \alpha_6 SPECIAL\ ITEMS + \alpha_7 ANALYSTS + \alpha_8 HORIZON \\ & + \alpha_9 RANGE + \alpha_{10} ANALYST\ DISPERSION + \alpha_{11} FIRM\ SIZE + \alpha_i \sum_{i=1994}^{2005} \text{YEAR}_i + \varepsilon \end{aligned} \quad (2)$$

where $|AFE|$ is the absolute value of the revised consensus analyst forecast error (the difference between actual earnings and the revised analyst consensus forecast), scaled by the stock price at the beginning of the quarter.[16]

We consider eight variables to control for the innate difficulty in estimating earnings, which might vary systematically for firms issuing equity. We also include yearly indicator variables, since analyst forecast errors have changed over time (Brown 2001). To control for unexpected earnings shocks, we include $|\Delta EPS|$, the absolute change in earnings per share from First Call, scaled by the stock price at the beginning of the quarter. Abarbanell and Lehavy (2002) document that forecast errors are larger for firms with losses and special items. Thus, we include *LOSS*, an indicator variable that equals 1 if earnings per share from First Call is negative. and 0 otherwise, and *SPECIAL ITEMS* from Compustat (#32), scaled by the market value of common stock at the beginning of the quarter. We control for *ANALYSTS*, the log of the number of analyst forecasts used to form the revised consensus analyst forecast, as the number of analysts is expected to reduce the *ex post* analyst forecast error (Brown 1997). The next control is *HORIZON*, the log of the number of days between the issuance of management guidance and the earnings announcement. (Recall that the consensus is measured within 15 days of this event; thus, *HORIZON* based on management guidance is highly correlated with the age of the consensus forecast.) The earlier in the quarter the analyst forecast is issued, the greater is the expected error (as there is more time for innovations in earnings to occur). We include two proxies for uncertainty. First, *RANGE* is based on the precision of the management guidance; the greater the *RANGE*, the greater the inferred uncertainty on the part of management, and the larger the expected forecast error. Second, *ANALYST DISPERSION* represents the uncertainty among analysts about forecasted earnings. This variable is the standard deviation of the individual analyst forecasts used to generate the revised consensus analyst forecast, scaled by the stock price at the beginning of the quarter. Finally,

[16] By taking the absolute value of the revision, we focus on the degree of incorporation, the variable of interest, instead of the direction of incorporation. Consider two firms. The manager of Firm A issues guidance that is ten cents below the analyst consensus, and the analysts revise the consensus forecast downward by 0.08. The manager of Firm B issues guidance that is ten cents above the analyst consensus, and the analysts revise the consensus upward by 0.08. *REVISE* is −0.08 and 0.08 for Firm A and Firm B, respectively; however, in both instances the analysts incorporate 80 percent of the guidance.

because larger firms tend to have more disclosure in general, we control for *FIRM SIZE*, the log of market value of common stock at the beginning of the quarter.

A positive coefficient on *SEO REVISION* would indicate that the increased incorporation of guidance by analysts prior to equity offerings results in larger *ex post* forecast errors. We expect the coefficient on *STANDARD REVISION* to be negative, as, in general, management guidance has been shown to lower analyst forecast errors (e.g., Hassell and Jennings 1986). We do not predict the sign of the coefficient on the residual analyst revision.

Table 5 presents the results from estimating Regression (2). Consistent with the increased weighting of management guidance prior to equity offerings representing a tool to please management, it is associated with higher analyst forecast errors, as the coefficient on *SEO REVISION* is positive and significant with and without control variables. In terms of economic magnitude, the overweighting of management guidance prior to equity offerings increases *ex post* forecast errors by 40 percent, on average.[17] *STANDARD REVISION*, the revision associated with known factors, is positive and weakly significant when omitting control variables, but negative and significant when control variables are included.[18] The latter result is consistent with management guidance generally improving analyst forecast accuracy. Finally, *RESIDUAL REVISION* is positively associated with analyst forecast errors across both specifications. This finding suggests that other incentives, in addition to underwriting business, might lead analysts to vary their incorporation of management guidance at the cost of *ex post* accuracy; we examine additional incentives in Section V.

The coefficients on the control variables are largely consistent with expectations. Large shocks to earnings decrease forecast accuracy. Losses and special items are not significant, although special items are generally excluded from core earnings determined by forecast data providers (Philbrick and Ricks 1991). The more analysts following the firm, the greater the forecast accuracy, consistent with Brown (1997). When the management guidance is older or less precise, the *ex post* analyst forecast errors are larger, and the errors are also larger when there is less of a consensus among analysts (i.e., a higher standard deviation of the individual forecasts). Finally, firm size is not significant, which is reasonable given that the sample is restricted to firms that provide guidance, which tend to be larger firms.

Overall, we find that analysts' abnormally high weighting of management guidance preceding equity offerings is associated with an increase in analyst forecast errors. Analysts appear to be sacrificing their forecast accuracy by overweighting management guidance prior to equity offerings.

Cross-Sectional Tests of Analysts' Overweighting of Management Guidance

Thus far, we use consensus forecasts issued by all analysts. Not all analysts, however, are vying for investment bank business. In this section, we examine whether this behavior differs by analyst type. Specifically, we expect dependent analysts who *can* acquire the investment banking business to overweight management guidance when revising their short-term forecasts prior to an equity offering. We do not expect, however, to observe independent analysts overweighting guidance in a similar fashion. We also expect the overweighting of guidance to be associated with the

[17] To determine the economic magnitude of the increased forecast error associated with the overweighting of guidance prior to equity offerings, we multiply the average *SEO REVISION* for SEO firms (0.0004; not tabulated) with the coefficient on *SEO REVISION* (1.2065), which indicates an increase in the analyst forecast error of 0.00048 on average, or 40 percent of the mean analyst forecast error (0.0012; see Table 3).

[18] The coefficient on *SEO REVISION* (1.2065) appears to be much larger than the coefficient on *STANDARD REVISION* (0.0368). In terms of economic significance, however, the importance of *STANDARD REVISION* is about double that of *SEO REVISION*, where we measure economic significance as the change in |*AFE*| when the *REVISION* variable increases by one standard deviation.

TABLE 5

***Ex Post* Analyst Forecast Accuracy**

Independent Variables	Predicted Sign	Dependent Variable = |*AFE*| Coefficient (t-statistic)	Coefficient (t-statistic)
Intercept		0.0006***	−0.0038***
		(10.52)	(−4.89)
|*SEO REVISION*|	+	1.3837**	1.2065**
		(2.22)	(2.26)
|*STANDARD REVISION*|	−	0.0198	−0.0368**
		(1.57)	(−2.53)
|*RESIDUAL REVISION*|	?	0.6219***	0.4278***
		(8.86)	(5.60)
|Δ*EPS*|	+		0.0183***
			(4.56)
LOSS	+		0.0001
			(0.96)
SPECIAL ITEMS	+		−0.0003
			(−0.31)
ANALYSTS	−		−0.0002***
			(−3.05)
HORIZON	+		0.0012***
			(6.85)
RANGE	+		0.1018**
			(2.54)
ANALYST DISPERSION	+		0.2489***
			(4.10)
FIRM SIZE	−		−0.0000
			(−1.26)
Year Indicators		Not Included	Included
Number of SEO Observations		87	60
Total Number of Observations		2,997	2,342
Adjusted R^2		0.1500	0.2762

*, **, *** Indicates statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, under a two-tailed test.

|*AFE*| is the absolute value of the revised analyst forecast error. We decompose the total analyst revision, from the estimation of Regression (1), into three components: that associated with the upcoming equity offering ($SEO\ REVISION = \hat{\alpha}_2 SEO + \hat{\alpha}_9 MGUIDE \times SEO$), that associated with other known factors affecting analyst revisions ($STANDARD\ REVISION = \hat{\alpha}_0 + \hat{\alpha}_1 MGUIDE + \hat{\alpha}_3 MGUIDE \times DOWN + \hat{\alpha}_4 MGUIDE \times REPUTATION + \hat{\alpha}_5 MGUIDE \times AGREE + \hat{\alpha}_6 MGUIDE \times HORIZON + \hat{\alpha}_7 MGUIDE \times RANGE + \hat{\alpha}_8 MGUIDE \times ANALYSTS + \hat{\alpha}_{10} DOWN + \hat{\alpha}_{11} REPUTATION + \hat{\alpha}_{12} AGREE + \hat{\alpha}_{13} HORIZON + \hat{\alpha}_{14} RANGE + \hat{\alpha}_{15} ANALYSTS$), and the residual from the estimation ($RESIDUAL\ REVISION = REVISE - SEO\ REVISION - STANDARD\ REVISION$). All t-statistics are based on robust standard errors clustered at the firm level.

Additional variables are defined in Table 2.

ex post selection of the underwriter and, thus, we expect those analysts whose employers are *ex post* selected to underwrite the deal to have incorporated the greatest proportion of guidance into their short-term earnings forecasts, after controlling for the credibility and usefulness of the guidance. For these analyses, we limit the sample to guidance issued in the year prior to the announce-

ment of an equity offering (SEO observations). As a result, these cross-sectional tests also help to allay concerns that some underlying difference between SEO and non-SEO observations drives the higher weighting of guidance among SEO observations.

For each analyst following the 202 firms that issue management guidance and announce an equity offering in the subsequent year, we identify (1) whether they are employed by an investment bank, and (2) whether their employer is on the subsequently formed team of underwriters; in these instances, we set *DEPENDENT* and *AFFILIATED*, respectively, equal to 1.[19] Approximately 90 (25) percent of the analysts in the sample are dependent (affiliated). To be included in the sample, the firm must be followed by both dependent and independent (affiliated and unaffiliated) analysts. This design choice rules out the possibility that different types of analysts tend to follow different types of firms (and therefore different-quality management guidance). This requirement results in 35 (172) usable management guidance observations for the dependent (affiliated) analyst-type tests.[20]

For each instance of management guidance, we have two observations, one for each analyst group (i.e., dependent and independent), resulting in a total of 70 (344) observations for the dependent (affiliated) test. For each of these subgroups, we generate *MGUIDE* and *REVISE* using the corresponding median consensus forecast that includes only the relevant analysts (dependent/independent and affiliated/unaffiliated). The reason for this approach is that when we examine affiliated/unaffiliated or dependent/independent analysts, each of these four sub-groups will have a potentially different pre-existing and revised consensus, as each analyst group's consensus should be made up of only that particular analyst type (e.g., there will be an affiliated analyst consensus, which might differ from the unaffiliated analyst consensus). Partitioning in this manner allows us to determine whether the main movement in the consensus (documented in Table 4) is by self-interested (dependent or affiliated) analysts, supporting our hypothesis, or by all analysts, supporting the existence of a correlated omitted variable or self-selection concerns.

We replicate the estimation of Regression (1), but instead of investigating variation based on *SEO*, we hypothesize that there will be variation based on analyst type (recall that the test is limited to the SEO firms). Table 6 presents the results from this estimation, with dependent/independent analysts in the first column and affiliated/unaffiliated in the second column.

Turning first to the dependent/independent partition, we find that, conditional on an upcoming announcement of an equity offering, those analysts who can gain the underwriting business incorporate significantly more of the management guidance into their short-term earnings forecasts than do independent research analysts. Specifically, the coefficient on *MGUIDE* × *DEPENDENT* is positive and significant, while the coefficient on *MGUIDE* is not significantly different from zero. Unlike dependent analysts, who have an incentive to gain the subsequent underwriting business, independent analysts do not appear to incorporate any management guidance beyond that dictated by the credibility and usefulness of the guidance.[21] Thus, the overweighting of management guidance preceding equity offerings that we document in Table 4 is, on average, present only among analysts with greater incentives to please management—those who can actually obtain the

[19] To determine if the analysts' employers could feasibly gain the underwriting business, we use the data from Gu and Xue (2008), who separate full service investment banks and brokerage firms from independent research firms; we thank Zhaoyang Gu for providing us with these data. Ideally, we would like to focus solely on those analysts employed by banks that offer underwriting services (as some brokerage firms do not). We are limited, however, to this broader partition, which biases against finding results consistent with our hypothesis. We use SDC Platinum to identify the subsequent underwriting team. Analysts are affiliated if they are employed by any investment bank involved in the deal, rather than solely by the lead underwriter.

[20] To maximize the number of usable observations, we set *REPUTATION* equal to 0 if it is missing.

[21] If we exclude the control variables, the coefficient on the main effect of *MGUIDE* is positive and significant, consistent with independent research analysts incorporating management guidance into their earnings forecasts, on average.

TABLE 6

Revision Magnitude by Analyst Type

		Dependent Variable = *REVISE*	
		Analyst Type	
		Dependent Analysts	Affiliated Analysts
Independent Variables	Predicted Sign	Coefficient (t-statistic)	Coefficient (t-statistic)
Intercept		−0.0006	−0.0029*
		(−0.44)	(−1.85)
MGUIDE	+	1.4482	0.7540
		(1.32)	(0.61)
MGUIDE × *ANALYST TYPE*	+	0.2387*	0.3355*
		(1.70)	(1.74)
MGUIDE × *DOWN*	+	−0.3762*	−0.2403
		(−1.88)	(−1.28)
MGUIDE × REPUTATION	+	−0.0846	−0.0446
		(−0.81)	(−0.39)
MGUIDE × *AGREE*	+	0.5982***	−0.0235
		(2.90)	(−0.11)
MGUIDE × *HORIZON*	+	−0.2661	−0.1785
		(−1.23)	(−0.58)
MGUIDE × *RANGE*	−	24.2946	−5.5979
		(1.10)	(−0.32)
MGUIDE × *ANALYSTS*	?	−0.1454	0.4167***
		(−1.17)	(3.60)
Main Effects		Included	Included
Analyst Type Equal to 1		35	172
Total Number of Observations		70	344
Adjusted R^2		0.7945	0.7487

*, **, *** Indicates statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, under a two-tailed test.

Only firms issuing equity in the next year are included in these estimations. We define *DEPENDENT* (*AFFILIATED)* as an indicator variable that is set equal to 1 if the analyst is employed by a full-service investment bank or a brokerage house (the subsequent underwriter), and 0 otherwise. We recalculate *MGUIDE* and *REVISE*, defined in Table 2, for both the dependent/affiliated and independent/unaffiliated analysts' initial forecasts and subsequent revisions (based on the median consensus analyst forecast for that specific type of analyst; we examine only firm-quarters that have both types of analyst forecasts). All t-statistics are based on robust standard errors clustered at the firm level.

Additional variables are defined in Table 2.

underwriting business for their investment bank. This finding is consistent with analysts trying to please management by overweighting their guidance.

Turning next to the affiliated/unaffiliated partition, we again find that the coefficient on *MGUIDE* is insignificant, while the coefficient on *MGUIDE* × *AFFILIATED* is positive and significant. These results suggest that the analysts who incorporate the greatest amount of the management guidance are affiliated analysts—those who work for the investment banks housing the subsequent underwriters of the equity offering. These results are consistent with analysts benefiting from overweighting management guidance. Specifically, although the overweighting of

guidance is associated with lower analyst forecast accuracy (Table 5), it is also associated with future underwriting business.[22]

Overall, the results are consistent with our central hypothesis: analysts appear to overweight management guidance when revising their short-term earnings forecasts in order to please management. This behavior precedes the announcements of equity offerings, leads to larger *ex post* analyst forecast errors, is present only among those analysts who can gain the investment banking business, and is associated with the *ex post* receipt of the underwriting services. The following section presents additional analyses to corroborate our conclusions.

V. ADDITIONAL ANALYSES

Self-Selection of an Equity Offering

Although we attempt to control for the underlying economics of each firm in each of the tests, and the cross-sectional tests help alleviate the endogeneity concerns, in this section we explore the issue of endogeneity further. First, we employ the "omitted variables" variant of the Hausman (1978, 1983) test to determine if the main treatment variable, *MGUIDE* × *SEO*, exhibits evidence of endogeneity after we control for the variables presented in Table 4. The test is unable to reject the null condition of no endogeneity ($p = 0.31$; not tabulated).

Second, we control for self-selection bias using a two-stage approach in which the first stage is a probit regression of *SEO* on the hypothesized determinants of equity offerings (presented in the Appendix). This first-stage regression uses the following expected determinants (with annual data): profitability, R&D and capital expenditure investments, the book-to-market ratio, leverage, firm size, cash reserves, tangible assets, annual stock returns, financial stress, and equity offering history (Rajan and Zingales 1995; Jung et al. 1996; Loughran and Ritter 1997; Frank and Goyal 2003; Dittmar and Thakor 2007; Kadan et al. 2009). From this first-stage regression, which identifies the likelihood of a firm choosing to issue equity, we calculate the inverse Mills ratio (see Heckman 1979; Leuz and Verrecchia 2000) and include it in Regression (1). Including this ratio helps control for the likelihood of self-selecting into the equity issuer group. The results are similar to those in Table 4 when we include the inverse Mills ratio (not tabulated).

Finally, following Frank (2000) and Larcker and Rusticus (2010), we describe the characteristics an omitted variable must have in order to overturn the OLS results. The unidentified omitted variable must be correlated with both *REVISE* (the dependent variable) and *MGUIDE* × *SEO* (the treatment variable) in order to cause spurious positive correlations between *REVISE* and *MGUIDE* × *SEO*. Specifically, the product of two partial correlations, the correlation between the omitted variable and *REVISE*, and the correlation between the omitted variable and *MGUIDE* × *SEO*, needs to be at least 0.0415 to overturn the positive association between *REVISE* and *MGUIDE* × *SEO*. To put this number in perspective, the highest product of the partial correlations with *REVISE* and *MGUIDE* × *SEO* based on the identified control variables is 0.0299 (for *MGUIDE* × *REPUTATION*). Thus, we would need an omitted variable with an impact 39 percent greater than that of any of the control variables to change the results, suggesting that it is unlikely that a confounding omitted variable would overturn the positive association between *REVISE* and *MGUIDE* × *SEO*.

[22] It is possible that affiliated analysts are simply more diligent at following the firm and incorporating new information about the firm (along the lines of Jacob et al. 2008). This diligent incorporation, however, should not be associated with larger *ex post* analyst forecast errors. Alternatively, some analysts might always wish to please management. We also, therefore, examine the incorporation of guidance by affiliated versus unaffiliated analysts in all years that do not precede an equity offering. Unlike in the year prior to the equity offering, we do not find a difference in the incorporation of guidance between these two types of analysts when guidance is issued at other times (not tabulated), suggesting that analysts appear to change their behavior when equity offerings are imminent.

To summarize, we are unable to reject the null of no endogeneity based on the omitted variables variant of the Hausman test, results are similar after including the inverse Mills ratio, and the likelihood that our OLS results are driven by an omitted variable is low. Regardless, we cannot completely rule out the possibility that the endogenous nature of equity offerings drives our results.

Alternative Mechanisms to Please Management

We document a tool that analysts appear to use to please management: the overweighting of management guidance by analysts revising their short-term earnings forecasts. Prior research has found evidence that analysts issue overly optimistic stock recommendations (e.g., Dugar and Nathan 1995; Lin and McNichols 1998; Michaely and Womack 1999) for firms they wish to please.[23] It is likely that analysts use a portfolio of tools to curry favor with management. To investigate the interplay of these tools, we identify the analysts in the sample who issue a stock recommendation, and partition those issuing a strong buy recommendation from those issuing any other recommendation (buy, hold, or sell). To be included in the test, each guidance observation must have at least one strong buy recommendation and one other recommendation. As with the analyst-type tests, we re-estimate *REVISE* and *MGUIDE* for both groups of analysts. We estimate Regression (1) separately for the two groups (strong buy and other), presented in Table 7. We find that only analysts who issue a strong buy recommendation overweight management guidance prior to an equity offering ($\alpha_2 = 0.18$, $p = 0.08$). In contrast, among analysts not issuing a strong buy recommendation, there is no evidence of analysts overweighting guidance prior to an equity offering for the same management guidance observations ($\alpha_2 = -0.04$, $p > 0.50$). These findings suggest that analysts please managers by jointly using both optimistic stock recommendations and the overweighting of guidance.[24] These findings also further establish that analysts with different incentives respond differently to the same guidance, which is more consistent with the overweighting of guidance representing a mechanism used to curry favor with management and less consistent with alternative explanations such as the endogeneity of equity offerings.

Knowledge of the Equity Offering

An assumption underlying our study is that analysts know which firms will be issuing equity in the upcoming year and thus actively vie for the underwriting business. We conduct two tests to determine the robustness of the results to this assumption. First, we replace actual equity announcements from SDC with an expected probability that the firm will issue equity in the year to come (see the Appendix). We find that analysts incorporate more guidance for firms that are *expected* to have an equity offering, suggesting that analysts make overtures to all management teams that *could* be undertaking an equity offering in the near future (not tabulated).

Second, we examine the sensitivity of the results to the length of the horizon period. Specifically, we examine announcements that occur in the six-month period following the management guidance relative to those that occur in the 7–12-month period following the management guidance. If the incentive to gain underwriting business is driving the results, then we expect stronger results when the horizon is shorter—i.e., when equity offerings are both more certain and have more timely payoffs. Alternatively, if firms that tend to issue equity also tend to provide more useful guidance, we would not expect to find stronger results in the shorter time horizon.

[23] Research has also documented overly optimistic long-term growth forecasts as a mechanism to please management (e.g., Lin and McNichols 1998; Dechow et al. 2000); however, this variable is more difficult to identify, *ex ante*. Thus, we focus the cross-sectional test on stock recommendations.

[24] Results are similar if we partition only those firms announcing equity offerings in the subsequent year by stock recommendation. *MGUIDE* is positive and significant only among the strong buy partition (not tabulated).

TABLE 7

Revision Magnitude on Equity Offerings Based on Stock Recommendation and Horizon

		Dependent Variable = *REVISE*			
		Analyst Recommendation		Management Guidance Issued	
		Buy, Hold, or Sell	Strong Buy	In the Six Months before the SEO Announcement	In the 7–12 Months before the SEO Announcement
Independent Variables	**Predicted Sign**	**Coefficient (t-statistic)**	**Coefficient (t-statistic)**	**Coefficient (t-statistic)**	**Coefficient (t-statistic)**
Intercept		0.0001	0.0011	−0.0012*	−0.0014**
		(0.16)	(1.05)	(−1.75)	(−1.97)
MGUIDE	+	−0.3200	−0.2230	−0.1627	−0.2287
		(−0.68)	(−0.53)	(−0.37)	(−0.50)
MGUIDE × SEO	+	−0.0365	0.1790*	0.3287***	0.0431
		(−0.29)	(1.75)	(4.29)	(0.72)
MGUIDE × DOWN	+	0.1082	0.0512	0.1413*	0.1430*
		(1.27)	(0.72)	(1.88)	(1.87)
MGUIDE × REPUTATION	+	0.1239***	0.0835*	0.1498***	0.1494***
		(2.83)	(1.80)	(3.04)	(3.08)
MGUIDE × AGREE	+	0.1866***	−0.0169	0.1571***	0.1711***
		(2.73)	(−0.27)	(2.98)	(3.15)
MGUIDE × HORIZON	+	0.0365	0.0062	0.1077	0.1183
		(0.27)	(0.06)	(1.05)	(1.12)
MGUIDE × RANGE	−	16.5235**	19.5753*	−8.3088***	−7.4736**
		(2.21)	(1.80)	(−2.61)	(−2.38)
MGUIDE × ANALYSTS	?	0.2210***	0.1485***	0.1155***	0.1172***
		(4.22)	(3.01)	(2.88)	(2.92)
Main Effects		Included	Included	Included	Included
Number of SEO Observations		59	59	45	42
Total Number of Observations		2,133	2,133	2,983	2,978
Adjusted R^2		0.7374	0.3548	0.8806	0.8733

*, **, *** Indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, under a two-tailed test.
All t-statistics are based on robust standard errors clustered at the firm level.
Additional variables are defined in Table 2

Table 7 presents the results in the final two columns, with the shorter time horizon announcements in the first column and the 7–12-month time horizon announcements in the second column. Consistent with our expectations, analysts weight management guidance more heavily when the equity offerings are nearer term in nature ($\alpha_2 = 0.33$; $p < 0.01$). When the equity offering is not imminent, there is no evidence, on average, of analysts overweighting management guidance ($\alpha_2 = 0.04$; $p = 0.47$), consistent with analysts having less certainty about the possibility of an offering or placing a lower weight on the less timely benefits.

Upward versus Downward Guidance

Chan et al. (2003b), Ke and Yu (2006), Baik and Yi (2007), and Malmendier and Shanthikumar (2007) generally find that affiliated analysts tend to issue more pessimistic short-term forecasts, thereby allowing managers to meet the analyst forecast, and Richardson et al. (2004) document a "walk down" of analyst forecasts that is more pervasive prior to equity offerings. It is likely that the overweighting of guidance we document is one way that managers walk down analysts to *ex post* pessimistic analyst forecasts (e.g., Cotter et al. 2006). However, we posit that managers will also, at times, wish analysts to increase their forecasts.[25] Generally, we expect analysts to take their cue from management, regardless of the direction of the management guidance.

We investigate this directly by examining the direction of the guidance in Table 8. Of the 87 instances of management guidance issued in the year before the announcement of the equity offering with all necessary control variables, 31 are upward, 42 are downward, and 14 are confirmations. We re-estimate Regression (1) separately for upward and downward guidance and find that analysts overweight management guidance prior to equity offerings in both groups. Moreover, the magnitude of the overweighting appears similar for upward and downward forecasts (0.31 versus 0.33), suggesting that analysts are willing to overweight management guidance by an economically significant amount in either direction to please management. Thus, our findings go beyond those documenting a "walk down" of analysts, as we find analysts are also "walked up."

Additional Settings

Though we examine the specific setting of equity offerings, the overweighting of management guidance is also a viable tool for analysts wishing to curry favor with management in the face of other incentives. As a final robustness check, we examine two additional incentives, the desire to gain debt underwriting fees and M&A advisory fees. These incentives are present in the year following management guidance for 6.3 and 4.0 percent of the sample firms, respectively. We examine all three incentives (*SEO*, *DEBT*, and *M&A*) in the first column of Table 9, and we create a joint indicator variable (*INCENTIVES*) that equals 1 if any of these three incentives are present in the second column of Table 9. Turning first to the disaggregated estimation, we see that the coefficient on *MGUIDE* $\times$ *SEO* is 0.23 ($p < 0.01$), similar to the results in Table 4. Analysts also overweight management guidance prior to debt offerings; the coefficient on *MGUIDE* $\times$ *DEBT* is 0.13 ($p = 0.02$). Finally, there is some evidence that analysts overweight guidance when there are prospective M&A advisory services; the coefficient on *MGUIDE* $\times$ *M&A* is 0.11 ($p = 0.12$). Thus, the results are not limited to the incentives of equity offerings, but rather extend to additional settings where analysts might gain fees for their banks. When we aggregate all of the incentives, 342 firm-year observations (11.3 percent of the sample) have at least one of these three incentives in the following year. The coefficient on *MGUIDE* $\times$ *INCENTIVES* is 0.16 ($p = 0.02$), consistent with the premise that analysts with incentives to please management overweight management guidance when revising their short-term earnings forecasts.

In summary, we consider the endogeneity of equity offerings, the interaction of different mechanisms to curry management favor (e.g., stock recommendations), the knowledge of the offering, the direction of the management guidance, and alternative measures of analysts' incentives (e.g., debt offerings).[26] Each of these results supports our conclusion that analysts wishing to please management overweight management guidance when revising their short-term earnings forecasts.

[25] Evidence of downward management guidance is not direct evidence of *ex post* pessimism; however, finding that managers provide upward guidance suggests that they do not desire pessimistic forecasts alone (or they would simply allow the analysts to underestimate earnings).

[26] Results are also similar if we limit the sample to firms that announce an equity offering at least once during the sample period (not tabulated). We also split the sample on whether the management guidance occurred before or after Regu-

TABLE 8

Revision Magnitude on Upward and Downward Management Guidance

		Dependent Variable = *REVISE*	
		Coefficient (t-statistic)	Coefficient (t-statistic)
Independent Variables	**Predicted Sign**	**Upward Management Guidance**	**Downward Management Guidance**
Intercept		−0.0001	−0.0037
		(−0.08)	(−1.45)
MGUIDE	+	0.0020	−0.0853
		(0.00)	(−0.14)
MGUIDE × *SEO*	+	0.3059**	0.3269***
		(2.14)	(3.50)
MGUIDE × *REPUTATION*	+	0.0621	0.1792***
		(0.45)	(2.93)
MGUIDE × *AGREE*	+	0.3882**	0.1138*
		(2.37)	(1.67)
MGUIDE × *HORIZON*	+	0.0769	0.1134
		(0.32)	(0.84)
MGUIDE × *RANGE*	−	−24.8156**	−6.4814*
		(−2.29)	(−1.76)
MGUIDE × *ANALYSTS*	?	0.0487	0.1397***
		(0.51)	(2.59)
Main Effects		Included	Included
Number of SEO Observations		31	42
Total Number of Observations		865	1,514
Adjusted R^2		0.6202	0.8503

*, **, *** Indicates statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, under a two-tailed test.

Management guidance is upward if the guidance is greater than the preexisting consensus analyst forecast and downward if the guidance is less than the preexisting consensus analyst forecast. All t-statistics are based on robust standard errors clustered at the firm level.

Additional variables are defined in Table 2.

VI. CONCLUSION

We predict and find that analysts who wish to please the firms they follow overweight management earnings guidance when revising their short-term earnings forecasts, even at the expense of *ex post* accuracy. We also document evidence of the benefit to analysts—subsequent underwriting business for their firms. Specifically, we show that analysts who are affiliated with the *ex post* underwriters of the subsequent equity offerings weight guidance more heavily than other analysts.

lation Fair Disclosure in October 2000, and the Global Research Analyst Settlement in April 2003. In results not tabulated, we find a significantly stronger association between management guidance and analysts' incorporation of that guidance preceding equity offerings in the post-Regulation Fair Disclosure era, when other mechanisms of guidance were restricted, and we find an economically weaker relation between upcoming equity offerings and analysts' revisions following the settlement, a period when analysts faced increased scrutiny by regulators.

TABLE 9

Analyst Revision Magnitude on Multiple Incentives: Equity Offerings, Debt Offerings, and M&A Activity

		Dependent Variable = *REVISE*	
Independent Variables	**Predicted Sign**	**Coefficient (t-statistic)**	**Coefficient (t-statistic)**
Intercept		−0.0012*	−0.0011*
		(−1.78)	(−1.68)
MGUIDE		−0.1722	−0.0746
		(−0.39)	(−0.14)
MGUIDE × SEO	+	0.2293***	
		(3.96)	
MGUIDE × DEBT	+	0.1327**	
		(2.30)	
MGUIDE × M&A	+	0.1062	
		(1.57)	
MGUIDE × INCENTIVES	+		0.1609**
			(2.40)
MGUIDE × DOWN	+	0.1439*	0.1516**
		(1.93)	(2.04)
MGUIDE × REPUTATION	+	0.1418***	0.1380***
		(2.89)	(2.71)
MGUIDE × AGREE	+	0.1685***	0.1576***
		(3.12)	(2.82)
MGUIDE × HORIZON	+	0.1076	0.0871
		(1.05)	(0.86)
MGUIDE × RANGE	−	−7.3614**	−6.6200**
		(−2.48)	(−2.22)
MGUIDE × ANALYSTS	?	0.1155***	0.1130***
		(2.88)	(2.80)
Main Effects		Included	Included
Number of SEO Observations		87	87
Number of DEBT Observations		175	175
Number of M&A Observations		115	115
Number of Incentives Observations		342	342
Total Number of Observations		3,025	3,025
Adjusted R^2		0.8810	0.8789

*, **, *** Indicates statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, under a two-tailed test.

INCENTIVES is an indicator variable that is set equal to 1 if there is an equity offering, debt offering, or M&A activity in the year following the management guidance, and 0 if none of these events occur in the subsequent year. Standard errors are clustered by firm. All t-statistics are based on robust standard errors clustered at the firm level.

Additional variables are defined in Table 2.

Our study has limitations. First, equity offerings are endogenous, and characteristics of firms issuing equity might lead analysts to incorporate more guidance prior to equity offerings for reasons other than gaining underwriting business. To minimize this limitation, we explicitly link the overweighting of guidance prior to equity offerings to larger *ex post* forecast errors, mitigating the possibility that the overweighting is in response to more informative guidance prior to offer-

ings. We also examine different analysts' responses to the same guidance and find that only analysts with an incentive to please management weight the management guidance more than predicted based on the credibility and usefulness of the guidance. In addition, we conduct a Hausman test that does not reject the null of no endogeneity. Finally, we estimate a Heckman two-stage regression to further control for the endogenous choice to provide equity and continue to find similar results. A second limitation is that we do not model the manager's selection of an underwriting team. Clearly, managers will consider deal terms, underwriter quality, and other criteria when determining whom to select as underwriters. This analysis is beyond our scope. These additional criteria, however, would likely add noise to the analysis. A third limitation is that all of the main tests and inferences surround a single incentive: upcoming equity offerings. We therefore conduct a preliminary analysis on both debt issues and M&A activity, where analysts might wish to vie for the debt underwriting business or the M&A advisory fees. We find evidence of analysts overweighting guidance prior to these events as well.

Overall, our findings suggest that analysts weight management guidance more heavily than expected when faced with incentives to please management. Future research might examine other settings where analysts might overweight management guidance, such as pre-Regulation Fair Disclosure selective disclosure (Chen and Matsumoto 2006; Ke and Yu 2006) or favored conference call participation (Mayew 2008). Future research might also investigate whether investors anticipate that analysts overweight guidance in certain settings, whether analysts' reputations are hurt by this behavior, or whether analysts appear to understand individual managers' incentives and incorporate guidance differentially based on these perceived incentives.

APPENDIX

We form an SEO prediction model to test two of our robustness checks: the choice to issue equity and the knowledge of the upcoming equity offering versus the expectation of such an event (both presented in Section V). Our model is as follows:

$$\begin{aligned} SEO_{t+1} = {} & \alpha_0 + \alpha_1 PROFITABILITY_t + \alpha_2 \Delta SALES_t + \alpha_3 INVESTMENT_t + \alpha_4 B/M\ RATIO_t \\ & + \alpha_5 LEVERAGE_t + \alpha_6 SIZE_t + \alpha_7 CASH_t + \alpha_8 TANGIBLE\ ASSETS_t \\ & + \alpha_9 ANNUAL\ RETURN_t + \alpha_{10} FINANCIAL\ STRESS_t + \alpha_{11} SEO\ HISTORY \\ & + \text{Industry Indicators} + \text{Year Indicators} + \varepsilon_t. \end{aligned} \tag{A1}$$

Each of the variables is defined in Table 10. We are predicting actual equity offerings in year $t+1$ and include the following expected determinants from year t, based on prior research (e.g., Rajan and Zingales 1995; Jung et al. 1996; Loughran and Ritter 1997; Frank and Goyal 2003; Dittmar and Thakor 2007; Kadan et al. 2009).

First, we include firm profitability. Generally, the more profitable the firm, the more likely it is to issue equity, relative to debt. However, we are predicting an equity offering relative to no equity offering (instead of the use of debt). Thus, it could be that more profitable firms have a lower requirement for additional funds and, thus, we have no prediction on the sign of profitability. Our next variable, change in sales ($\Delta SALES$), is a proxy for growth, and we expect growth firms to be more likely to issue equity. *INVESTMENT* is the amount of expenditures on R&D and capital investments in year t; generally, the higher these expenditures, the higher the expected probability of an equity offering. We expect the book-to-market ratio (*B/M RATIO*) to be negatively related to equity offerings; again, higher growth firms are expected to have a higher probability of issuing equity. Leverage is expected to increase a firm's likelihood of issuing equity over debt, but as noted above, we are predicting the likelihood of issuing equity versus not issuing equity and, thus, we have no prediction for the associated variable. We include *SIZE* (the log of sales), as larger

TABLE 10
SEO Prediction Model

		Dependent Variable = *SEO*
Independent Variables	**Predicted Sign**	**Coefficient (χ^2-statistic)**
Intercept		−1.5554***
		(22.45)
PROFITABILITY	?	−0.2069**
		(4.21)
Δ*SALES*	+	0.2309***
		(38.67)
INVESTMENTS	+	0.4918***
		(11.90)
B/M RATIO	−	−0.3305***
		(37.20)
LEVERAGE	?	0.9946***
		(81.33)
SIZE	−	−0.0696***
		(39.18)
CASH	−	−0.1662***
		(13.76)
TANGIBLE ASSETS	−	0.1453**
		(3.85)
ANNUAL RETURN	+	0.2831***
		(170.08)
FINANCIAL STRESS	+	0.1490**
		(5.06)
SEO HISTORY	+	0.2878***
		(48.76)
Industry Indicators		Included
Year Indicators		Included
Number of SEO Observations		1,104
Total Number of Observations		14,407
Pseudo R^2		0.1435

*, **, *** Indicates statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, under a two-tailed test.

Variable Definitions:

SEO_{t+1} = indicator variable that is set equal to 1 if the firm issued equity in year t+1, and 0 otherwise;
$PROFITABILITY_t$ = profitability ((Annual Compustat #13 + #62)/lagged #6);
$\Delta SALES_t$ = change in sales ((#12 – lagged #12)/lagged #12);
$INVESTMENT_t$ = investments in research and development and capital expenditures in year t (#128 + #46)/lagged #6;
$B/M\ RATIO_t$ = book-to-market ratio (#60/(#54 × #199));
$LEVERAGE_t$ = debt leverage (#9/#6);
$SIZE_t$ = firm size, measured using the log of sales (#12);
$CASH_t$ = cash reserves (#1/#6);
$TANGIBLE\ ASSETS_t$ = measure of collateral or tangible assets (#8/lagged #6);
$ANNUAL\ RETURN_t$ = market-adjusted fiscal year return for year t;
FINANCIAL STRESS = sum of cash dividends, net investments, and change in working capital less cash inflows from operations in year t (see Frank and Goyal 2003); and
SEO HISTORY = 1 if a firm issued equity in previous three years, and 0 otherwise.

firms are expected to have lower costs of debt and thus may be more likely to issue debt. Firms with more cash are expected to be less likely to issue equity, while firms with greater tangible assets are expected to be more likely to issue debt than equity. We expect firms with higher returns over the past year to be more likely to issue equity; *ANNUAL RETURN* is the market-adjusted fiscal year return for year *t*. We include a variable for financial stress, following Frank and Goyal (2003), who argue that demand for capital is closely tied to the firm's financing deficit. *FINANCIAL STRESS* is a measure of excess cash. Finally, we include *SEO HISTORY*, which is an indicator variable showing whether the firm issued equity in the prior three years.[27]

Table 10 reports results. Generally, the predicted signs are consistent with existing theory, although, as noted above, our setting differs, in that we are predicting the difference between equity offering firms and all other firms; we are not conditioning on the need for additional financing. Overall, the estimated pseudo-R^2 is approximately 14 percent.

We form the inverse Mills ratio following Heckman (1979). To form the predicted probability of an upcoming equity offering, we estimate Regression (A1) in a pooled regression (as presented in Table 10) and retain the predicated value for each firm-year. We then merge the annual prediction of an equity offering with guidance quarters in that year to avoid look-ahead bias, as analysts would need year *t* values to predict year *t*+1 equity offerings and, thus, would not be able to form their predictions until year *t*+1.

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