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Does analyst forecast informativeness affect managers' financial reporting incentives?

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ABSTRACT

This study investigates how the informativeness of analyst forecasts affects managers' financial reporting incentives. Using a novel Match Index to estimate the earnings management induced by analyst forecasts, we find that when analyst forecasts are less informative, managers place less value on using them as a benchmark and thus, engage in less earnings management to meet that benchmark.

1. Introduction

Prior research suggests that analyst forecasts are important for the market and that managers are incentivized to manage earnings to meet these forecasts (Robb, 1998; Degeorge et al., 1999; Matsumoto, 2002; Dhaliwal et al., 2004; Burgstahler and Eames, 2006; Roychowdhury, 2006). However, there has been mixed evidence on whether managers actually manage earnings to meet analyst forecasts. For example, some argue that there are other benchmarks firms strive to meet in addition to analyst forecasts (e.g., Degeorge et al., 1999), while Roychowdhury (2006) finds little evidence that managers use real activities to meet analyst forecasts. We argue that given the vast amount of information available in their environments, managers must allocate their limited attention wisely, facing tradeoffs between productive efforts and financial reporting efforts (Liang and Nan, 2014). Thus, managers may choose not to exert efforts toward meeting analyst forecasts if they deem that the return from meeting these forecasts is low.

In this study, rather than exploring the various determinants of analyst forecast quality in extant research (Givoly and Lakonishok, 1979; Lys and Sohn, 1990; Francis and Soffer, 1997; Clement and Tse, 2003; Asquith, Mikhail, and Au, 2005; Yu, 2008; Hilary and Hsu, 2013), we investigate how the informativeness of analyst forecasts, defined as market responses to previous analyst forecasts, affects managers' financial reporting incentives.[1] We posit that due to limited attention, rather than evaluating the quality of analyst forecasts, which requires high levels of capabilities and distracts managers from productive efforts, managers rely on the informativeness of analyst forecasts to decide whether they want to exert effort towards meeting these forecasts. Specifically, when analyst forecasts are less informative to the market (i.e., there is little to no market response to the issuances of the forecasts),

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[1] Our study differs from Yu (2018) in that we examine the market response when analyst forecasts were issued, but do not evaluate the quality or accuracy of the forecasts. For example, if the analyst forecasts are accurate and in line with market expectations, then the issuances of these forecasts could induce little to no market reaction. In our study, these forecasts would be considered less informative because they provide little information, while Yu (2018) would consider the forecasts to be of high quality because they are accurate. Therefore, while both studies are investigating similar research questions, the constructs we are capturing is different. Yu (2018) evaluates a determinant of a good analyst forecast, while we measure the market response to the issuance of the forecasts regardless of its quality. Whether there is any association between the informativeness and quality of analyst forecasts is beyond the scope of our study.

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Table 1
Descriptive statistics of the treat (match) group and T-test of the means.

	Mean	SD	P50	T-stat
Variable:				
LogAT	6.115 (5883)	2.178 (2.351)	5.903 (5.836)	4.37
EPS	0.192 (0.244)	0.758 (0.864)	0.130 (0.130)	−17.70
EPSGrowth	−0.187 (−0.171)	3.255 (3.405)	−0.070 (−0.059)	0.33
SalesGrowth	0.331 (0.346)	1.184 (1.263)	0.087 (0.072)	−0.22

Obs. 27,212 (43,873).

managers may decide against managing earnings to meet analyst forecasts and instead choose to allocate their limited attention towards productive efforts. Therefore, we predict a positive association between the informativeness of analyst forecasts and analyst forecast-induced earnings management activities.

To isolate analyst forecast-induced earnings management (EM) from earnings management induced by other incentives (Degeorge et al., 1999; Core et al., 2003), we create a novel Match Index to pair our treatment firms with analyst following to matched firms with similar characteristics but without analyst following. By matching on similar characteristics, the matched firms and their managers are likely subject to the same underlying economics and incentives as our treatment firms, other than the incentive to manage earnings to meet analyst forecasts. Consistent with our prediction, we find that analyst forecast informativeness is positively associated with analyst forecast-induced EM when unmanaged earnings deviate from analyst forecasts.

Our paper contributes to the literature by investigating the association between analyst forecasts and earnings management. Despite survey findings that executives believe every company manages earnings and that there are benefits to managing earnings (Graham, Harvey, and Rajgopal, 2005), prior research suggests other benchmarks, such as avoiding losses, maybe more important (Degeorge et al., 1999). Furthermore, studies have found weak evidence that managers use real activities to meet analyst forecasts (Roychowdhury, 2006), but do find that managers are more likely to use expectations management to walk down forecasts (Filzen and Peterson, 2015). Thus, while there may be benefits to managing earnings to meet analysts' forecasts, overall, prior literature does not find strong evidence that this is consistently happening. Our results suggest that the incentive to manage earnings to meet analyst forecasts is moderated by analyst forecast informativeness. Managers place less value on uninformative analyst forecasts and thus, exert less effort to meet these forecasts. In sum, firms with varying levels of analyst forecast informativeness may contribute to this prior mixed evidence on whether managers engage in earnings management to meet analyst expectations.

2. Research design and sample

2.1. The match index

We calculate the score of our novel Match Index for each possible pair of firms with analyst following (treatment group) and without analyst following (match group) within the same fiscal quarter and industry (the same 2-digit SIC codes) using four observable attributes, as shown in the following equation :[2]

$$Match\,Index = \left[\left(LogAT_t^{dec} - LogAT_c^{dec}\right)/10\right]^2 + \left[\left(EPS_t^{dec} - EPS_c^{dec}\right)/10\right]^2 + \left[\left(EPSGrowth_t^{dec} - EPSGrowth_c^{dec}\right)/10\right]^2 + \left[\left(SalesGrowth_t^{dec} - SalesGrowth_c^{dec}\right)/10\right]^2 \quad (1)$$

We restrict the actual EPS growth of the two groups to be within the same decile and the Match Index to be equal to or less than 0.05.[3] We then calculate the match group's quarterly EPS growth rates and apply the arithmetic average of these rates to the treatment group to predict the treatment group's unmanaged EPS:

$$Unmanaged\_EPS_{i,q} = EPS_{i,q-4} * \left(1 + Matched\_Growth\_Rate_{i,q}\right) \quad (2)$$

The amount of the treatment group's analyst forecast-induced EM is the difference between the actual EPS and the unmanaged EPS at quarter q :[4]

$$EM_{i,q} = EPS_{i,q} - Unmanaged\_EPS_{i,q} \quad (3)$$

2.2. The informativeness of analyst forecasts

We use the market response to both the initial and revisions of an-

[2] Superscript "*dec*" indicates the decile value of that variable, "*t*" indicates treatment observation, and the subscript "*c*" indicates the match sample.

[3] Consistent with existing literature, we argue that firms that are close to meeting certain targets are more likely to engage in earnings management activities (Dhaliwal et al., 2004; Gleason and Mills, 2008).The restriction on the Match Index allows only three scenarios that will result in a match: (1) the match firm shares the same decile values for all four attributes; (2) the match firm deviates by one rank for one to four attributes; or (3) the match firm deviates by two ranks on one dimension and at most one on another.

[4] In sum, our new method of calculating analyst forecast-induced earning management includes both accrual earnings management and real earnings management and alleviates some of the concerns with estimating unmanaged earnings from prior literature. We are aware of two ways to measure unmanaged earnings in extant research. First, DeFond and Park (1997) use the first consensus analyst forecast as a proxy for unmanaged earnings. Since managers can use their communications with analysts to guide or influence analyst forecasts, and the informativeness of analyst forecasts is our independent variable of interest, we cannot use this method to measure analyst forecast-induced earnings management, which is the dependent variable in our study. Second, Dhaliwal et al. (2004) measure earnings without tax expense management as annual pretax income multiplied by one minus the average tax rate in the first three quarters. However, this measure can only capture tax expense management and cannot capture other accruals management or real earnings management. Thus, rather than using an existing method to measure earnings management, we create a novel Match Index to estimate unmanaged earnings and thus, the analyst forecast-induced earnings management in question.

Table 2
Descriptive statistics of the main regression variables.

	Mean	SD	P50
EM	−0.006	0.300	0.000
Forecast_Distance	0.055	0.399	0.010
Infor_Abret	0.005	0.012	0.002
Infor_Vol	0.222	0.357	0.182
Infor_Spread	0.006	0.012	0.003
Zero_EPS	0.012	0.110	0.000
Zero_EPSGrowth	0.021	0.143	0.000
COMP	0.131	0.314	0.000
DISP	0.306	43.373	0.020
ExpMgmt	0.274	57.521	−0.020

Obs. 27,212. The *DISP* and *COMP* variables are coded as 0 when missing. *EM* and *Forecast_Distance* are winsorized at the top and bottom one percent by fiscal quarter.

alyst forecasts as our proxy for the informativeness of analyst forecasts (*Infor*), measured using the absolute value of abnormal stock returns. For each firm quarter, we estimate OLS regressions for the past one year prior to the start of that quarter, as follows:

$$Abs(Abret_{it}) = \alpha_0 + \alpha_1 Issue_{it} + error_{it} \quad (4)$$

where *Issue* is the issuance indicator variable and *Abret* is the daily stock return of the firm benchmarked against the equal-weighted market return. We then create a pair of proxies for informativeness: the $\widehat{\alpha_1}$ and the adjusted r-squares of the regression.[5,6]

2.3. Sample selection

We use all quarterly observations in COMPUSTAT from 1984 to 2018 matched with the analyst forecast data from IBES, daily stock return data from CRSP, and compensation data from EXECUCOMP. We eliminate all observations missing information necessary to construct our key variables and restrict our sample to observations with a Match Index equal to or less than 0.05. Our final sample is comprised of 27,212 firm-quarters.

2.4. Descriptive statistics

Table 1 presents the descriptive statistics for our treatment and match groups. On average, the treatment group is larger and has a relatively lower EPS, consistent with larger firms being more likely to attract the analysts' attention. The means of the EPS growth rates of the two groups are not significantly different, providing assurance that using the EPS growth rates of the match group to predict unmanaged earnings of the treatment group in the absence of analyst forecasts is a reasonable approach.

[5] We replace any negative estimated coefficients with zero, which indicates that the issuance of analyst forecasts has no meaningful impact on the stock's abnormal return.

[6] We also estimate the market responses to previous analyst forecasts using trading volume and trading spread, and find comparable results. For the sake of succinctness, we choose not to discuss the results of these analyses in the main text. Specifically, we find that for a fixed distance between the analyst consensus and the unmanaged earnings of one cent, a one standard deviation change in forecast informativeness measured by trading volume increases earnings management in response to analyst forecasts by about 1.3 percent when using the r-squares and about 1.7 percent when using the estimated coefficients. Conversely, we find weak evidence that managers' earnings management activities are positively associated with the security's trading spread. However, this result is not surprising, considering that increased trading spread could indicate enlarged information asymmetry between firms and investors, as well as among different investors. These differing opinions could potentially restrict managers' ability or willingness to meet analyst consensus.

Table 3
Regressions using the informativeness measure estimated by abnormal return.

Variables	*EM*			
	(1) R^2	(2) R^2	(3) *Coef.*	(4) *Coef.*
Infor_Abret	−0.109	−0.111	−0.435**	−0.444**
	(−1.27)	(−1.28)	(−2.44)	(−2.52)
Forecast_Distance	0.250***	0.251***	0.265***	0.266***
	(8.27)	(8.36)	(9.22)	(9.33)
Infor_Abret x Forecast_Distance	**1.669*****	**1.665*****	**2.472***	**2.479***
	(4.06)	**(4.06)**	**(1.72)**	**(1.72)**
Zero_EPS	−0.000	−0.000	0.000	0.000
	(−0.05)	(−0.03)	(0.02)	(0.04)
Zero_EPSGrowth	−0.006	−0.006	−0.007	−0.007
	(−1.16)	(−1.16)	(−1.24)	(−1.24)
ExpMgmt	−0.000	0.003	0.000	0.003
	(−0.28)	(0.99)	(0.39)	(0.99)
DISP		0.011		0.012
		(0.62)		(0.64)
DISP x Forecast_Distance		−0.009		−0.010
		(−0.82)		(−0.83)
COMP		0.000		0.000
		(0.07)		(0.01)
_Cons	0.030	0.028	0.027	0.025
	(0.77)	(0.74)	(0.63)	(0.59)
No. of obs.	27,212	27,212	27,212	27,212
Adj. R-squared	0.1422	0.1426	0.1388	0.1393
Firm FEs?	Yes	Yes	Yes	Yes
Quarter FEs?	Yes	Yes	Yes	Yes

*, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 2 includes descriptive statistics for the variables in our main analysis. The mean of *EM* is −0.006, representing that on average, firms manage earnings downwards by 0.6 cents. Meanwhile, the median firm does not appear to manage earnings. *Forecast_Distance* has a mean of 0.055 (a median of 0.010), exhibiting a skewness to the right. This indicates that the unmanaged EPS is about 5.5 cents (1 cent) lower than analyst consensus. If a firm's unmanaged earnings are significantly below the analyst consensus, the firm will likely be less incentivized to manage earnings. Thus, this skewness may work against finding significant results in the multivariate tests.

3. Methodology and empirical results

3.1. Model

Using quarterly data, we estimate the following model to examine our research question:

$$EM_{it} = b_0 + b_1 Infor_{it} + b_2 Forecast\_Distance_{it} + b_3 Infor_{it} * Forecast\_Distance_{it} + CONTROLS + error_{it} \quad (5)$$

where *Forecast_Distance* captures the distance between the unmanaged earnings and the consensus forecast, which will affect the magnitude of analyst forecast-induced EM needed to meet the consensus forecast. The interaction between *Forecast_Distance* and *Infor* is our main variable of interest. We predict b_3 to be positive.[7]

[7] We control for incentives to achieve positive earnings, incentives to achieve a positive earnings growth rate, incentives to increase the executives' compensation, incentives to beat analyst forecasts when the dispersion in forecasts is low, and the effect of management guidance. We include firm and quarter fixed effects in all regressions. See Appendix A for all variable definitions.

3.2. Main results

Table 3 presents our main results. We find that b_3 is both positive and significant, supporting the notion that whether managers manage earnings to meet analyst expectations depends on the informativeness of the forecasts and the extent to which the firm's unmanaged earnings depart from the analyst consensus. The economic significance of this result is modest but plausible. For a fixed distance between the analyst consensus and the unmanaged earnings of one cent, a one standard deviation change in forecast informativeness increases EM by about 1.7 percent using the r-squares and about 2.5 percent using the estimated coefficients. We find no evidence that managers manage earnings to achieve positive profits or positive annual growth rate, or that the dispersion of analyst forecasts affects managers' financial reporting incentives.

4. Conclusions

This study examines whether analyst forecast informativeness affects managers' incentives to meet these forecasts. While prior literature finds that managers have incentives to manage earnings to meet analyst forecasts, we posit that due to limited attention, managers rely on analyst forecast informativeness to adjust their financial reporting incentives. We find a positive association between analyst forecast informativeness and firms' earnings management to meet these forecasts. In other words, when the market responds less to the issuances of analyst forecasts, managers place less value on the analyst forecast benchmark and thus, engage in less earnings management to meet that benchmark. Firms with varying levels of analyst forecast informativeness could be contributing to the overall mixed evidence for earnings management to meet analyst expectations in prior literature. Our analysis has limitations. First, the method used to estimate EM focuses only on finding EM induced by analyst forecasts. Second, our matching process may limit the generalizability of our analyses to other firms without close matches. Despite these possible limitations, our paper makes a unique contribution to the existing EM and analyst forecast literature and has important implications for regulators, investors, and researchers.

Data availability

Data will be made available on request.

Appendix A: Variable definitions

Variables	Definitions
Abret	Daily stock return of firm i at time t benchmarked against the equal-weighted market return at the same time
Issue	An indicator variable, one if within two days of the issuance of analyst forecasts, zero otherwise
Infor_Abret	The adjusted r-squares or the coefficient, α_1, from estimating the following equation: $Abs(Abret_{it}) = \alpha_0 + \alpha_1 Issue + error_{it}$
LogAT	Logarithm of total assets
SalesGrowth	The firm's y-o-y growth rates in sales
EPS	The firm's earnings per share before extraordinary items
EPSGrowth	The firm's y-o-y growth rates in diluted EPS
EM	The difference between *Actual_EPS* and *Unmanaged_EPS*
Actual_EPS	Actual EPS
Unmanaged_EPS	Predicted EPS without EM
Forecast_Distance	The difference between the mean analyst forecast and *Unmanaged_EPS*
CONTROL VARIABLES:	
Zero_EPS	An indicator variable, one if the *Actual_EPS* is positive but smaller than two cents, zero otherwise
Zero_EPSGrowth	An indicator variable, one if the actual y-o-y EPS growth rate is positive but less than two percent, zero otherwise
DISP	The standard deviation of analyst forecasts, zero for only one analyst forecast within a specific quarter
COMP	The sum of executives' bonus, option granted and restricted stock grant, divided by the executives' total compensation, zero when missing
ExpMgmt	The difference between the last and first mean analyst forecast

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