FEATURE ARTICLE

The effect of the SEC's regulation fair disclosure on analyst forecast attributes

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Abstract

Purpose – This study aims to examine the effect of the Securities and Exchange Commission's regulation fair disclosure (Reg. FD) on analyst forecast performance for pre-Reg. FD closed-call (CLC) and open-call (OPC) firms compared with the non-conference-call (NCC) firms in the post-Reg. FD period.

Design/methodology/approach – Specifically, it examines whether Reg. FD influenced the earnings forecast accuracy and forecast dispersion of financial analysts for the previous-CLC firms in the post-Reg. FD period compared with the previous-OPC firms, and both sets of conference call firms relative to the NCC firms in the same period.

Findings – The main findings indicate that forecast accuracy improved for both OPC and CLC firms compared with the NCC firms in the post-Reg. FD period. More importantly, the differences in earnings forecast performance between the pre-Reg. FD OPC and CLC firms had disappeared in the post-Reg. FD period.

Originality/value – These results offer further confirmation of previous findings that Reg. FD has contributed to leveling the playing field for financial analysts and investors.

Keywords Financial institutions, Earnings, Forecasting, Disclosure, Conferencing

Paper type Viewpoint

1. Introduction

On October 23, 2000, the US Securities and Exchange Commission (SEC) issued regulation fair disclosure (hereafter Reg. FD) which prohibits selective disclosure of material nonpublic information to certain financial analysts, institutional investors and others prior to making it available to the general public. Information is considered material if it is important enough to persuade an investor to buy or sell a stock. Before the implementation of Reg. FD, most conference calls were accessible only to certain analysts and institutional investors. It has been argued that conference calls, because they were predominantly closed, may have contributed to an information gap between analysts privy to the call and analysts and other investors excluded from the call. The intent of Reg. FD was to prevent this selective disclosure of information.

A number of published studies have already examined the impact of Reg. FD on various aspects of the capital markets and investment climate, including the effect on

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analyst forecast accuracy and dispersion, although the findings have been contradictory. Using data from the first three quarters after the release of Reg. FD, Agarwal and Chadha (2003) report that sell-side analysts' forecasts were less accurate and more dispersed than before its adoption, where Heflin *et al.* (2003) report no change in analysts' earnings forecast bias, accuracy or dispersion compared to the pre-Reg. FD period. Furthermore, Shane *et al.* (2001), also using data from the same period, find that analysts gathered more information between earnings announcements so that their forecasts are ultimately as accurate as those made in the period before Reg. FD was adopted.

This study has two main objectives. The first is to examine if there were changes in analyst earnings forecast errors (FE) and forecast dispersion (FD) in the pre- and post-Reg. FD period between the "closed-call" (henceforth referred to as CLC) firms and "open-call" (OPC) firms. The second objective is to determine if there were any changes in analyst earnings forecast attributes between the CLC and OPC firms as a group (labeled CC – conference call firms), and the non-conference-call (NCC) firms in the post-Reg. FD environment.

Thus, this study contributes to the existing literature by differentiating between firms in the pre-Reg. FD period that held closed conference calls, firms that held open conference calls, and other firms which held NCCs. By limiting the study only to OPC and NCC firms in the post-Reg. FD period, we are able to control for extraneous factors such as changing group membership in our analyses. Second, because the study covers the period from October 1998 to September 2002, more quarterly observations are available to conduct the tests than in previous research.

The remainder of this study is organized as follows. Section 2 presents a brief summary of previous studies focused on only the main sources, and an outline of the hypotheses examined in the paper. Section 3 describes the sample selection and a brief outline of our research methodology. Section 4 presents the major results of the study. Section 5 presents the conclusions and suggestions for future research. In the Appendix, we provide details on the research methodology and the regression equations used to analyze the data.

2. Literature review and hypothesis development

2.1 Brief review

Economic theory suggests that expanded disclosures can reduce information asymmetry arising between the firm and its shareholders or among potential buyers and sellers of firm shares and benefit firms by correcting any firm mis-valuation and increasing institutional interest and liquidity for the firm's stock. For example, Diamond and Verrecchia (1991) find that credible commitments by managers to improve disclosure increasing the precision of public information about firm value results in higher current stock prices due to reduced information asymmetry and increased liquidity. Frankel *et al.* (1999) provide evidence that firms holding conference calls as a voluntary disclosure medium tend to be relatively larger, more profitable, more heavily followed by analysts, and access the capital markets more often than other firms.

In other related findings, Bowen *et al.* (2002) provide evidence that regular use of earnings-related conference calls could present a selective disclosure problem if the public is not privy to these calls, even if conference calls tend to reduce both FE and FD. Bushee and Noe (2000) find that firms with greater analyst following and greater

institutional ownership are less likely to have conference calls that provide open access to all investors. Core (2001) presents evidence consistent with the intuition that informed investors prefer less disclosure, and that analysts and institutions produce information that reduces information asymmetry and the need for conference calls.

As cited previously, some of the research focused on the effect of Reg. FD on financial analyst behavior have yielded mixed results. In general, however, the majority of these studies conclude that Reg. FD has had the intended benefit of diminishing the information advantage of analysts with previously exclusive access to management, although some anecdotal stories in the press still hint at the continued exclusive disclosure of material non-public information (*Wall Street Journal*, 2004). Interested readers can contact the lead author for a more detailed reference list.

2.2 Expected effects of Reg. FD on analysts forecast performance and related stock market

The arguments surrounding Reg. FD revolve around two major themes:

(1) its potential to level the playing field for all investors; and

(2) its potential to increase the cost of capital by restricting the availability of information to investors.

The first of these themes relies on the rationale that, by providing equal access to firm information, Reg. FD can reduce the level of information asymmetry, leading stock prices to be less dependent on private information. This logic implies that any loss of accuracy in earnings forecasts by analysts would be offset by the wider dissemination of information and hence, a more informed general investor population. In addition, Reg. FD may enhance the accuracy and precision of analysts' earnings forecasts, if it succeeded in opening up new sources of information to analysts, or if analysts could substitute the information obtained directly from companies with the information gathered from customers, suppliers, competitor's industry observers, and other sources of information. That is consistent with Mohanram and Sunder's (2006) finding, analysts may substitute privately acquired information for public-disclosed information for firms after the enactment of Reg. FD.

The counter-argument relies on the possibility that Reg. FD could have an adverse effect on certain analysts' forecast accuracy through denying them the sometimes-exclusive access to management that they previously enjoyed. Given the important role of financial analysts as intermediaries who provide professional investment to the capital markets, the decreased accuracy may have deleterious capital market consequences. In addition, it has been argued that Reg. FD induce firms to reduce the level of information and guidance that they may have provided originally in the closed conference calls, but which they may be unwilling to impart in open conference calls.

Recently, Bushee *et al.* (2004) find that Reg. FD had a significantly negative impact on managers' decisions to continue hosting conference calls even though this impact was not large. Hence, the level of specialty guidance may have decreased in the post-Reg. FD period. At the same time, Gintschel and Markov (2004) report that the informativeness of analysts output has dropped in the post-FD environment.

Specifically, they found that the absolute price impact of information disseminated by financial analysts dropped by 28 percent in this period. Eleswarapu *et al.* (2004) also report that the return volatility around mandatory announcements had decreased, and the impact was more pronounced for smaller and less liquid stocks. Taken together, these results suggest a strong impact of Reg. FD on the functioning of capital markets.

2.3 Hypothesis development

Extant studies assume that public information is common across all analysts and private information is idiosyncratic and uncorrelated across analysts. They have used FE and FD as proxies for analyst forecast attributes. Both FE and FD capture the extent to which private information differs across analysts, which also represents the level of actual past selective disclosure. For instance, Barron *et al.* (1998) present a model that expresses two properties of their forecasts, proxied by both dispersion in individual forecasts and the squared error in the mean forecast, as functions of the amount or "precision" of analysts' public and private information in forecasting firms' earnings. Sunder (2001) further find that "restricted-call" firms faced higher information asymmetry compared to "open-call" firms in the pre-Reg. FD period, while in the post-Reg. FD period, the differences in information asymmetry between two groups do not persist.

In summary, analysts should make more FE for OPC firms than for CLC firms if open conference calls do not provide as much information as closed conference calls. The first objective of Reg. FD was to level the playing field among all investors and analysts with respect to access to corporate information. If this objective were achieved with the implementation of Reg. FD, then one observable effect should be no difference in analysts' earnings forecast attributes between the previous-OPC and previous-CLC firms. This line of reasoning leads to the following set of hypotheses (stated in null form):

$H_0$1.1. Analysts' quarterly earnings FE for the previous-CLC firms are not significantly different from those for the previous-OPC firms in the post-Reg. FD period (i.e. $FE^{CLC}_{POST} \approx FE^{OPC}_{POST}$).

$H_0$1.2. Analysts' quarterly earnings FD for the previous-CLC firms is not significantly different from that for the previous-OPC firms in the post-Reg. FD period (i.e. $FD^{CLC}_{POST} \approx FD^{OPC}_{POST}$).

Using the same line of reasoning, it can be argued that the earnings FE and FD of NCC firms should be greater than those of both CLC and OPC firms (if they remained conference call firms) in the post-Reg. FD period. In other words, Reg. FD's exclusive effect should be on closing the information gap between the OPC and CLC firms, but should have no effect on the greater informativeness of conference calls as a means of communicating more information to investors (as demonstrated by prior research). This leads to the following set of hypotheses (in alternative form):

H_a1.3. Analysts' quarterly earnings FE for NCC firms are significantly greater than those for both previous-CLC and OPC firms in the post-Reg. FD period (i.e. $FE^{NCC}_{POST} > (FE^{CLC}_{POST}, FE^{OPC}_{POST})$).

H_a 1.4. Analysts' quarterly earnings FD for NCC firms is significantly greater than that for both previous-CLC and OPC firms in the post-Reg. FD period (i.e. $FD^{NCC}_{POST} > (FD^{CLC}_{POST}, FD^{OPC}_{POST})$).

In addition to the effects hypothesized above, the effectiveness of Reg. FD can be further evaluated by its effect on changes in the forecast attributes. That is, if the equality of the earnings forecast attributes between the CLC and OPC firms in the post-Reg. FD period is to be attributed to the adoption of Reg. FD, then the change in the forecast attributes from the pre- to the post-FD period should reflect this. So the absolute change in both FE and FD for the previous-CLC firms should be bigger than those for the OPC firms. These hypotheses can be stated in alternative form as follows:

H_a2.1. The absolute change in analysts' quarterly earnings FE for the previous-CLC firms is significantly higher than that for the previous-OPC firms in the post-Reg. FD period (i.e. $|\Delta FE^{CLC}| > |\Delta FE^{OPC}|$).

H_a 2.2. The absolute change in analysts' quarterly earnings FD for the previous-CLC firms is significantly higher than that for the previous-OPC firms in the post-Reg. FD period (i.e. $|\Delta FD^{CLC}| > |\Delta FD^{OPC}|$).

3. Brief description of research methodology

3.1 Sample selection

Following the Bushee *et al.* (2003) approach, firms on the Bestcalls.com list are considered to be "open-call" firms (i.e. calls that allow unlimited real time access), while the firms provided by First Call Corporation but not included on the Bestcalls.com list are considered to be "closed-call" firms (i.e. calls that restrict access to invited professionals) in the pre-Reg. FD period. According to Bowen *et al.* (2002, p. 286, footnote 1), Bestcalls.com launched a web site in March 1999 publicizing the dates and times of conference calls open to individual investors. However, some firms did not allow individuals access to their calls. Meanwhile, other firms began live broadcasts of their conference calls using internet web casts. So it is reasonable to assume that after March 1999, all firms on the Bestcalls.com list had OPCs. Therefore, we divide the samples into three groups, OPC, CLC and NCC (where no disclosures are made via conference calls) firms in the pre-Reg. FD period. More specifically, the firms listed by the Bestcalls.com are regarded as OPC firms, while the firms listed by First Call Corporation but not included in the Bestcalls.com list are regarded as CLC firms. Firms listed in CRSP and the I/B/E/S databases but not included in either Bestcalls.com or First Call Corporation lists are regarded as pre-NCC firms.

To obtain better control of extraneous factors, the sample is restricted to firms which retained their status in both pre- and post-Reg. FD environments. We exclude firms that Bestcalls.com lists as NCC firms, as well as NCC firms now listed as CC firms. The analyst forecast data used are obtained from I/B/E/S database, and earnings announcement dates and other control variables from quarterly Compustat data sets. To ensure the meaningful computation of dispersion, the minimum number of analysts following a firm is set to four. All firms are required to have non-missing quarterly I/B/E/S forecast data during the period of October 1998 through September 2002 and non-missing quarterly Compustat data. After applying this screening process, the surviving sample consists of 1,697 firms (521 OPC, 990 CLC, and 186 NCC firms).

The total final sample consists of 12,806 firm-quarter observations in the pre-Reg. FD period, and 13,104 firm-quarter observations in the post-Reg. FD period.

3.2 Research methodology

Empirical accounting research frequently utilizes the properties of analyst forecasts, such as accuracy, dispersion, bias, etc. to construct proxies for variables of interest. For instance, FD and errors in the mean forecast are used to proxy for the uncertainty or the degree of consensus among analysts or market expectations. Based on prior research, we estimated the effect of Reg. FD on analysts' forecast attributes by running a series of regression equations. Technical details on the regressions estimated are provided in Appendix. The description below is a brief summary of the approach used in the paper.

To control for factors that have been shown in prior research to be highly related to the levels of analyst FE and FD, we include in our regressions proxies measures for firm size, industry effect, earnings predictability, earnings surprise, and age of the forecast. Firm size and the level of FE or the level of FD are proxies for the richness of the firm's information environment. The ability of analysts to forecast the current quarter's earnings depends on both earnings surprise in the prior quarter and any information disclosed during the conference call. Forecast age is also an important determinant of forecast accuracy.

We estimate two regression equations, with the dependent variable in the first equation the absolute FE, and in the second equation, the FD. The independent variables in both equations include the dummy variables to represent the CLC and OPC firms, interaction terms to control for the presence of high-technology firms in the sample, forecast age (AGE), the number of analysts which follow a given firm (ANA), the size of earnings surprise in the previously released quarterly earnings (SURP), and firm size (SIZE).

The interaction terms for high-technology firms are designed to evaluate whether forecast attributes are consistently different for firms in the high technology sector. Barron *et al.* (2002) find that lower levels of analyst consensus are associated with high-tech firms because of their relatively high R&D expenditures. Therefore, a significantly positive coefficient on HighTech is consistent with the belief that analysts make more FE and dispersion for high-technology firms due to a higher information asymmetry as compared to non-high-technology firms.

4. Empirical results

4.1 Descriptive statistics

Tables I-III present some descriptive statistics on the post-Reg. FD period variables. Panel A reveals that both the mean and the median of analyst FE for NCC firms are greater than those for CLC and OPC firms in the post-Reg. FD period. Also the median of FD for NCC firms is greater than the median for both OPC and CLC firms in the post-Reg. FD period. Panel B presents the significant difference in means of FE and FD using statistical tests for the differences (specifically, Scheffe's tests and *t*-tests) in the post-Reg. FD period.

The first part of panel B shows that the means of OPC and CLC firms are not statistically different (at the 0.05 probability level), whereas the means for the other two groups, NCC and OPC, NCC and CLC are significantly different in the post-Reg. FD period. On the other hand, the second part of panel B shows the means between

	CLC firms	OPC firms	NCC firms
Descriptive statistics [a]			
FE			
Mean	0.0109	0.0202	0.0254
Median	0.0019	0.0021	0.0024
Std. deviation	0.0561	0.3335	0.1513
FD			
Mean	0.0032	0.0085	0.0065
Median	0.0008	0.0008	0.0009
Std. deviation	0.0183	0.2166	0.0412
AGE			
Mean	60.8104	61.9091	59.6318
Median	61.0000	63.0000	59.0000
Std. deviation	32.2772	31.7771	32.3843
ANA			
Mean	8.1587	9.7380	8.2127
Median	7.0000	8.0000	7.0000
Std. deviation	4.7847	6.1128	4.3793
SURP			
Mean	−0.0029	−0.0055	−0.0041
Median	−0.0007	−0.0016	−0.0009
Std. deviation	0.0396	0.0454	0.1156
SIZE			
Mean	7.3864	7.6700	7.2287
Median	7.2105	7.5224	7.3333
Std. deviation	1.6543	1.6927	1.5248

Notes: [a]Variables definitions: FE_{it} = absolute difference between actual earnings per share for quarter t less the mean forecast as provided by IBES summary file at the end of the quarter t deflated by the stock price at the beginning of quarter t. FD_{it} = standard deviation of all analyst forecasts made at the end of the quarter t from the "consensus" (mean) of analysts' forecasts deflated by the stock price at the beginning of quarter t. $AGE_{i,t}$ = the number of calendar days between the analyst's forecast date and the date of the actual earnings announcement at quarter t. $ANA_{i,t}$ = the total number of analysts releasing an earnings forecast for the firm i at quarter t. $SURP_{it} = \{EPS_t - EPS_{t-4}\}/P_{t-4}$, where EPS_t is the primary earnings share (excluding extraordinary items) for quarter t and P_{t-4} is the ending price per share at quarter $t - 4$. $SIZE_{it}$ = the log of market value of equity at the beginning of quarter t.

[b]All correlations are significant at the 0.001 level or better except for the correlation between SURP and ANA, and ANA and AGE, which are not significant at conventional levels.

[c]Above of the table is the Pearson correlation coefficients and the below is the Spearman correlation coefficients.

[1]NCC – non-conference call firms; [2] CLC – closed-call firms; [3] OPC – open-call firms.

& = Statistically significant at a probability of less than 0.10;

* = Statistically significant at a probability of less than 0.05;

** = Statistically significant at a probability of less than 0.01;

*** = Statistically significant at a probability of less than 0.001

Table I.
Univariate tests on analysts forecast attributes and other variables after Reg. FD: Panel A

NCC and CC, and between CLC and OPC in the post-Reg. FD period are statistically different. All the *t*-values are significant for each comparison except for the comparison of FD between NCC and CC in the post-Reg. FD period. These preliminary results are generally consistent with *H1.1-H1.4*.

Panel C presents correlation coefficients (both the Pearson product-moment and Spearman rank-order correlations) between analyst forecast attributes and their determinants in the post-Reg. FD period. All the correlation coefficients have signs consistent with those expected for the regression coefficients and all are significant except for the correlation coefficient between the number of analysts following (ANA) and forecast age (AGE), and between ANA and earnings surprise (SURP). The correlation coefficients between the number of analysts following (ANA) and the firm size (SIZE) is the highest among all coefficients, which is consistent with the previous research findings that large firms usually have a large group of analysts following regardless of the implementation of Reg. FD.

4.2 Regression results

Table IV presents the results of regressing analyst FE and FD in the pre- and post-Reg. FD periods by using equations (1) and (2). As expected, the coefficients of two dummy variables, CLC and OPC, are significantly negative. Moreover, the coefficients of CLC are greater than the coefficients of OPC for both regressions of FE and FD in both pre- and post-Reg. FD periods. Also as expected, forecast age (AGE), the number of forecasts (ANA) and high-tech firms (HighTech) are positively associated with FE and FD, while earnings surprise (SURP) and firm size (SIZE) are negatively associated with FE and FD.

Focusing on the tests of *H1-H4*, the results in Table IV (PRE period) indicate that conference calls did provide additional information to financial analysts, with both OPC and CLC firms having fewer earnings FE than NCC firms prior to the

Tests	Group/Variables[a]	FE	FD
Scheffe's tests and Satterthwaite unequal variance t-tests for OPC[3], CLC[2] and NCC[1] firms			
Scheffe's test – Difference in means	$NCC^1 - CLC^2$	0.0224*	0.0057*
	$NCC^1 - OPC^3$	0.0224*	0.0062*
	$CLC^2 - OPC^3$	−0.0001	0.0005
T-test among 3 groups: *t* value	$NCC^1 - (CLC^2 + OPC^3)$	4.43***	1.47
	$CLC^2 - OPC^3$	4.18***	3.71***

Note: See Table I for key

Table II. Univariate tests on analysts forecast attributes and other variables after Reg. FD: Panel B

Variables[a]	FE	FD	AGE	ANA	SURP	SIZE
Correlations between forecast attributes and other variables[bc]						
FE	1	0.7646	0.0620	−0.0329	−0.1510	−0.1749
FD	0.6123	1	0.0253	−0.0405	0.0415	−0.1706
Age	0.1422	0.0151	1	0.0108	−0.0191	0.0228
ANA	−0.1604	−0.1827	0.0526	1	−0.0196	0.5160
SURP	−0.3063	−0.1450	−0.0170	−0.0012	1	−0.0020
Size	−0.3806	−0.4391	0.0233	0.5003	0.0381	1

Note: See Table I for key

Table III. Univariate tests on analysts forecast attributes and other variables after Reg. FD: Panel C

Table IV. Regression of analyst FE and dispersion on both pre- and post-Reg. FD variables

Regression of FE and FD		Among NCC, CLC and OPC firms							
		Before Reg. FD (PRE)				After Reg. FD (POST)			
		FE		FD		FE		FD	
Variables[a]	Expected sign	Coefficient	*t*-value	Coefficient	*t*-value	Coefficient	*t*-value	Coefficient	*t*-value
Intercept		0.0169	56.49***	0.0049	59.16***	0.0877	31.26***	0.0203	30.08***
CLC	−	*−0.0006*	*−2.34**	*−0.0004*	−6.05***	−0.0225	−12.09***	−0.0045	−10.09***
OPC	−	*−0.0011*	*−4.09****	*−0.0005*	*−7.02****	*−0.0232*	*−11.72****	*−0.0046*	*−9.67****
HighTech × CLC	+	−0.0004	−2.71**	−0.0004	−9.1***	0.0121	6.43***	0.0025	5.54***
HighTech × OPC	+	0.0016	11.9***	0.0002	5.32***	0.0127	7***	0.0016	3.66***
HighTech × NCC	+	0.0019	3.31***	−0.0003	−1.72&	−0.0077	−2.39*	0.0029	3.81***
AGE	+	0.0001	29.38***	0.0001	6.56***	0.0001	9.89***	0.0000	4.37***
ANA	+	0.0001	5.82***	0.0001	7.34***	0.0010	8.95***	0.0002	7.82***
SURP	−	−0.0366	−35.5***	−0.0022	−7.71***	−0.2127	−24.14***	0.0145	6.83***
SIZE	−	−0.0018	−74.74***	−0.0005	−66.51***	−0.0097	−28.82***	−0.0022	−26.81***
Adjusted R^2		0.1294		0.0847		0.0697		0.0434	
F-statistic		1,038.41***		647.11***		213.36***		129.65***	
F-test ($\alpha_1 = \alpha_2, \beta_1 = \beta_2$)		*31.73****		*11.28****		*0.37*		*0.11*	

Notes: [a]Variables definitions: FE_{it}, absolute difference between actual earnings per share for quarter t less the mean forecast as provided by IBES summary file at the end of the quarter t deflated by the stock price at the beginning of quarter t; FD_{it}, standard deviation of all analyst forecasts made at the end of the quarter t from the "consensus" (mean) of analysts' forecasts deflated by the stock price at the beginning of quarter t; $AGE_{i,t}$, the number of calendar days between the analyst's forecast date and the date of the actual earnings announcement at quarter t; $ANA_{i,t}$, the total number of analysts releasing an earnings forecast for the firm i at quarter t; $SURP_{it} = \{EPS_t - EPS_{t-4}\}/P_{t-4}$, where EPS_t is the primary earnings share (excluding extraordinary items) for quarter t and P_{t-4} is the ending price per share at quarter $t-4$; $SIZE_{it}$, the log of market value of equity at the beginning of quarter t; [b]all correlations are significant at the 0.001 level or better except for the correlation between SURP and ANA which is not significant at conventional levels; [c]above of the table is the Pearson correlation coefficients and the below is the Spearman correlation coefficients; [1]NCC – non-conference call firms; [2]CLC – closed-call firms; [3]OPC – open-call firms; [&]statistically significant at a probability of <0.10; [*]statistically significant at a probability of <0.05; [**]statistically significant at a probability of <0.01; [***]statistically significant at a probability of <0.001

implementation of Reg. FD. This conclusion can be drawn from the differences in the values of the intercepts terms for the NCC and CLC dummy variables. The intercept of the regression of FE in the pre-Reg. FD period is 0.0169 for NCC firms, 0.0163 (i.e. 0.0169 − 0.0006) for CLC firms, and 0.0158 (i.e. 0.0169 − 0.0011) for OPC firms. The intercept of the regression of FD in the pre-Reg. FD period is 0.0049 for NCC firms, 0.0045 (i.e. 0.0049 − 0.0004) for CLC firms, and 0.0044 (i.e. 0.0049 − 0.0005) for OPC firms.

Further examination of the regressions results in Table IV (POST period) supports the inference that analysts still made more FE and had higher FD for the NCC firms as compared to the OPC and CLC firms after the release of Reg. FD. In the post-Reg. FD period, the intercept of the regression of FE is 0.0877 for NCC firms, 0.0652 (i.e. 0.0877 − 0.0225) for CLC firms, and 0.0645 (i.e. 0.0877 − 0.0232) for OPC firms. The intercept of the regression of FD in the post-Reg. FD period is 0.0203 for NCC firms, 0.0158 (i.e. 0.0203 − 0.0045) for CLC firms, and 0.0157 (i.e. 0.0203 − 0.0046) for OPC firms.

To determine if Reg. FD has any impact on analysts FE, it is necessary to compare the coefficients across CLC and OPC firms within each period which can be done using the standard *F*-test. The *F*-tests performed show that the observed differences between the coefficients of interest (α_1 and α_2 in equation (1) and β_1 and β_2 in equation (2) in the Appendix) support the hypotheses presented earlier. In the pre-Reg. FD period, the *F*-value for FE (FD) is 31.73 (11.28), and the *p*-value is significant at the 0.001 level. Thus, these two null hypotheses that $\alpha_1 = \alpha_2$, and $\beta_1 = \beta_2$ can both be rejected. However, in the post-Reg. FD period, the *F*-value for FE (FD) is 0.37 (0.11) with an insignificant probability level. Thus, the null hypotheses that $\alpha_1 = \alpha_2$ in equation (1) and $\beta_1 = \beta_2$ in equation (2) cannot be rejected.

In summary, there are observable differences in the regression coefficients between CLC and OPC firms in the PRE period, and these statistically significant differences in coefficients disappear in the POST period. These results thus support both *H1.1* and *H1.2*, and provide evidence that differences in analyst forecast performance between the previous-CLC and previous-OPC firms do not persist after Reg. FD went into effect[1].

4.3 Univariate analyses of change in analyst forecast attributes

Tables V-VII present some descriptive statistics on the absolute change in analyst FE (|ΔFE|) and FD (|ΔFD|). From panel A, it can be observed that the means of |ΔFE| and |ΔFD| for CLC firms are smaller than those for OPC firms. Panel B presents the significant difference in means of the absolute change in FE and FD using both Scheffe's tests and the pairwise *t*-tests.

The results from Scheffe's tests show the comparisons in means are significantly different at the 0.05 level among three groups except for one comparison, |ΔFE| between CLC and OPC firms. At the same time, the results from the *t*-tests show that there is no significant difference in mean levels of |ΔFE| or |ΔFD| for the comparison between NCC and CC (including CLC and OPC firms) firms and the comparison between CLC and OPC firms. Panel C presents the Pearson and Spearman correlation coefficients between the absolute change in analyst forecast attributes and their determinants.

Statistics	CLC firms	OPC firms	NCC firms
Descriptive statistics[a]			
|ΔFE|			
Mean	0.0113	0.0199	0.0318
Median	0.0021	0.0023	0.0024
Std. deviation	0.0477	0.4281	0.2186
|ΔFD|			
Mean	0.0027	0.0069	0.0087
Median	0.0005	0.0005	0.0007
Std. deviation	0.0129	0.2061	0.0744
ΔAGE			
Mean	1.1795	1.3668	8.0495
Median	−1.0000	−1.0000	−1.0000
Std. deviation	46.5676	45.8835	53.9615
ΔANA			
Mean	1.5168	2.0406	1.1011
Median	1.0000	1.0000	0.0000
Std. deviation	4.8651	5.4807	4.6420
ΔSURP			
Mean	−0.0062	−0.0134	−0.0048
Median	−0.0031	−0.0029	−0.0018
Std. deviation	0.0596	0.0909	0.1276
lagSIZE			
Mean	7.3170	7.6682	7.1224
Median	7.1327	7.5000	7.1416
Std. deviation	1.6198	1.7113	1.4797
lagFE			
Mean	0.0086	0.0083	0.0132
Median	0.0016	0.0017	0.0020
Std. deviation	0.0451	0.0349	0.0474
lagFD			
Mean	0.0021	0.0020	0.0035
Median	0.0007	0.0006	0.0009
Std. deviation	0.0093	0.0098	0.0167

Notes: [a]Variable definition: CLC = a dummy variable equal to 1 if the firm is a CLC firm and 0 if the firm is a NCC or OPC firm. $|\Delta FE_t|$=the absolute value of the difference between forecast errors in the post- and the pre-Reg. FD period deflated by the price at the beginning of the pre-Reg. FD period. $|\Delta FD_t|$ = the absolute value of the difference between forecast dispersion in the post- and the pre-Reg. FD period deflated by the price at the beginning of the pre-Reg. FD period. ΔAGE_t = the difference in forecast age between the post- and pre-Reg. FD period. ΔANA_t = the difference in the number of followed analysts between the post- and pre-Reg. FD period. $\Delta SURP_t$ = the difference in earnings surprise between the post- and pre-Reg. FD period. lagSIZE = the log of market value of equity in the pre-Reg. FD period. lagFE, lagFD = the level of forecast error or forecast dispersion in the pre-Reg. FD period.

[b]Above the table is the Pearson correlation coefficients and the below is the Spearman correlation coefficients. All correlations are significant at the 0.001 level or better except for the correlations between ΔSURP and ΔANA, ΔSURP and ΔAGE, ΔAGE and lagFE, and ΔSURP and lagSIZE, which are not significant at conventional levels.

[1]NCC – non-conference call firms;

[2]CLC – closed-call firms;

[3] OPC – open-call firms.

& = Statistically significant at a probability of less than 0.10;

* = Statistically significant at a probability of less than 0.05;

** = Statistically significant at a probability of less than 0.01;

*** = Statistically significant at a probability of less than 0.001

Table V.
Univariate tests on the change in analysts forecast attributes: Panel A

4.4 Regression results for change in analyst forecast attributes

Table VIII presents the regression results obtained when the absolute changes in analyst quarterly FE (|ΔFE|) and FD (|ΔFD|) are regressed on the hypothesized independent variables (as presented in equations (3) and (4) in Appendix). The sign of coefficients on the dummy variable, OPC, for both regressions of |ΔFE| and |ΔFD| is not significant, a result which contradicts *H2.1* and *H2.2*. In addition, the sign of coefficients on the dummy variable, NCC, is significantly positive for both regressions of |ΔFE| and |ΔFD|.

Because we adopt October 23, 2000 as the boundary between the pre-Reg. FD period and the post-period, it is possible that the failure to support *H2.1* and *H2.2* may be due to the choice of the cut-off date. Previous research by Mac (2003) finds that firms had already changed their voluntary disclosure policy in the pre-enactment period (December 20, 1999-October 22, 2000), before Reg. FD became effective on October 23, 2000. Thus, if some firms in the sample have already changed their voluntary disclosure policy prior to the release of Reg. FD because they anticipate the passage of Reg. FD, the tests may not be sufficiently powerful.

Figures 1 and 2 show the graph of the means of FE and FD among three groups, CLC, OPC and NCC firms, from the third quarter of 1998 to the third quarter of 2002. Both Figures 1 and 2 show that FE and FD for NCC firms are higher than those for both OPC and CLC firms in both pre- and post-Reg. FD periods. However, the means of FE (FD) for CLC firms are greater than those for OPC firms in the pre-Reg. FD period

Tests[a]	Group/Variables[a]	|ΔFE[a]|	|ΔFD[b]|
Test of difference in means of ΔFE and ΔFD – Scheffe's tests and Satterthwaite unequal variance T-tests			
1. Scheffe's Tests – Difference between Means	NCC[1] – CLC[2]	0.158*	0.0046*
	NCC[1] – OPC[3]	0.0163*	0.005*
	CLC[2] – OPC[3]	0.0005	0.0004
2. *T* tests – *t* value	NCC[1] – (CLC[2] + OPC[3])	1.62	1.18
	CLC[2] – OPC[3]	1.02	1.03

Note: See Table V for key

Table VI. Univariate tests on the change in analysts forecast attributes: Panel B

	|ΔFE|	|ΔFD|	ΔAge	ΔANA	ΔSURP	lagSIZE	lagFE	lagFD
Correlations[ab]								
|ΔFE|	1	0.5810	0.1128	−0.0467	−0.1486	−0.1476	0.6277	0.5205
|ΔFD|	0.5004	1	0.0806	−0.0322	0.0634	−0.1171	0.4934	0.5922
ΔAge	0.0741	0.0556	1	−0.0493	−0.0375	−0.1274	0.0402	0.0073
ΔANA	−0.0649	−0.0663	−0.0121	1	−0.0090	0.1034	−0.0306	−0.0211
ΔSURP	−0.1501	−0.0723	0.0035	0.0023	1	0.0060	0.0006	−0.0746
lagSIZE	−0.2966	−0.3287	−0.0728	0.1086	−0.0038	1	−0.1846	−0.1692
lagFE	0.5398	0.4751	0.0465	−0.0540	0.0159	−0.3826	1	0.7908
lagFD	0.4242	0.5425	0.0352	−0.0858	−0.0189	−0.3673	0.5494	1

Note: See Table V for key

Table VII. Univariate tests on the change in analysts forecast attributes: Panel C

Variables[a]	Expected sign	|ΔFE| Coefficient	|ΔFE| *t*-value	|ΔFD| Coefficient	|ΔFD| *t*-value
Intercept		0.0075	2.61**	0.0005	0.68
OPC	−	−0.0013	−0.88	−0.0003	−0.87
NCC	−	0.0188	7.26***	0.0029	4.11***
HighTech × CLC	+	0.0018	0.71	0.0014	2.05*
HighTech × OPC	+	0.0069	2.98**	0.0012	1.93&
HighTech × NCC	+	−0.0175	−3.27**	−0.0021	−1.42
ΔAGE	+	0.0001	4.13***	0.0000	3.57***
ΔANA	+	−0.0004	−1.7&	−0.0001	−1.29
ΔSURP	−	−0.0900	−11.69***	0.0039	1.84&
lagSIZE	−	−0.0005	−1.25	0.0000	−0.11
lagFE	−	0.8006	42.55***		
lagFD	−			0.8514	40.01***
Adjusted R^2		0.4435		0.3831	
F-statistic		222.35***		173.53***	

Notes: [a]Variable definition: CLC, a dummy variable equal to 1 if the firm is a CLC firm and 0 if the firm is a NCC or OPC firm; OPC, a dummy variable equal to 1 if the firm is a OPC firm and 0 if the firm is a NCC or CLC firm; HighTech, a dummy variable equal to 1 if the firm is a high-technology firm and 0 if the firm is not a high-technology firm; $|\Delta FE_t|$, the absolute value of the difference between FE in the post- and the pre-Reg. FD period deflated by the price at the beginning of the pre-Reg. FD period; $|\Delta FD_t|$, the absolute value of the difference between FD in the post- and the pre-Reg. FD period deflated by the price at the beginning of the pre-Reg. FD period; ΔAGE_t, the difference in forecast age between the post- and pre-Reg. FD period; ΔANA_t, the difference in the number of followed analysts between the post- and pre-Reg. FD period; $\Delta SURP_t$, the difference in earnings surprise between the post- and pre-Reg. FD period; lagSIZE, the log of market value of equity in the pre-Reg. FD period; lagFE, lagFD, the level of FE or FD in the pre-Reg. FD period; [1]NCC – non-conference call firms; [2]CLC – closed-call firms; [3]OPC – open-call firms; [&]statistically significant at a probability of less than 0.10; *statistically significant at a probability of < 0.05; **statistically significant at a probability of < 0.01; ***statistically significant at a probability of < 0.001

Table VIII.
Regression of the change in analyst forecast attributes

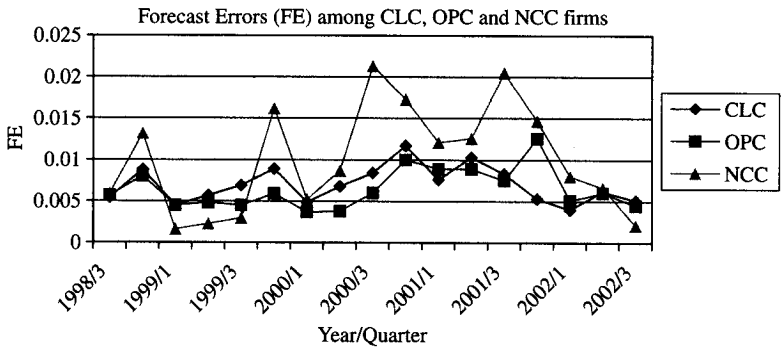

Figure 1.

(before the third quarter of 2000), but generally indistinguishable in the post-Reg. FD period.

The statistical tests performed earlier show that the difference in OPC and CLC means for FE and FD are not statistically significant (when the control variables are

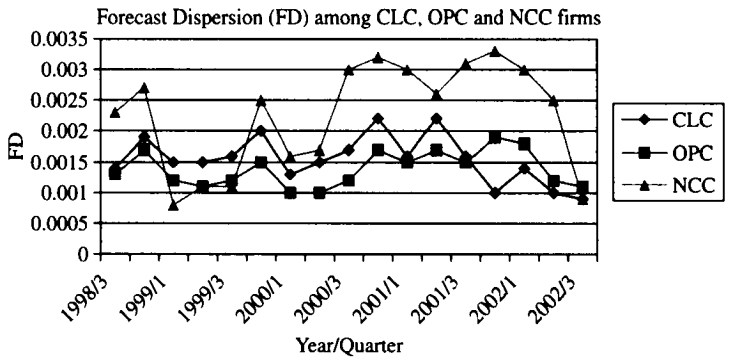

Figure 2.

accounted for) in the post-Reg. FD period. However, CLC firms have statistically significant (and positive) intercepts compared to NCC firms in both pre- and post-Reg. FD periods. This finding indicates that both FE and FD for NCC firms increase relative to those of OPC and CLC firms (both of which held conference calls). Thus, the overall view conveyed is that conference calls continue to be useful in helping analysts to produce accurate forecasts during a period when NCC firms experience a huge jump in earnings FE and FD.

4.5 Additional analysis and robustness tests

It can be argued that FE is another factor which affects FD. To evaluate this possibility, we use a recursive two-stage regression approach by allowing FE to be included as an explanatory variable for the FD equation. The regression results of FE and FD are qualitatively consistent with the previous results without adding FE in the regression of FD.

To evaluate the robustness of these results to possible outliers, we apply four diagnostic tests recommended by Belsley *et al.* (1980):

(1) the diagonal of the projection matrix (Hat matrix);

(2) the studentized residuals (RSYUDENT);

(3) the change in the determinants of the covariance matrix of the estimates (CovRatio); and

(4) the change in the predicted value (DFFITS).

The filters are applied by setting observations exceeding the cutoffs recommended by Belsley *et al.* (1980) to missing values. Qualitatively, the results are the same regardless of whether the outliers are eliminated or not.

5. Conclusion

Prior to the release of Reg. FD, CLC firms were accustomed to disclosing material nonpublic information to certain analysts and institutional investors while not concurrently releasing the information to the general public. There is considerable anecdotal evidence indicating that managers penalize analysts based on the content of their forecasts by limiting or cutting off analysts' future contact with management. Since, voluntary disclosures (e.g. conference calls) put individual investors at a larger

informational disadvantage, it has been of concern to the SEC that the effect of selective disclosure is similar to insider trading. The primary purpose of Reg. FD is to curtail analysts' private channels to companies that they had previously enjoyed.

The results of this study are somewhat mixed. On one hand, there is support for the inference that, at least with respect to closing the information gap between analysts privy to the closed conference calls and those not privy to these calls, Reg. FD succeeded in that no statistical difference in earnings FE and FD between the previous-CLC and previous-OPC firms remained in the post-Reg. FD period. Moreover, in the post-Reg. FD period, conference calls continue to lead to lower FE and FD for both previous-OPC and previous-CLC firms, despite a huge jump in the earnings forecast attributes for firms which do not hold conference calls.

Against these favorable findings may be offset the contrary finding that no change in the earnings forecast attributes centered on the actual date of adoption of Reg. FD could be detected. Moreover, the findings reported by Gintschel and Markov (2004) that the informativeness of analysts' information output have declined in the post-Reg. FD period suggests that analysts' forecast attributes may no longer play as vital a role in the capital markets as in the pre-Reg. FD period. To the extent that this was the intent of the SEC in adopting Reg. FD, then the policy may be deemed to be a success[2].

Notes

1. These results are consistent with the findings reported by Shane *et al.* (2001). They provide evidence that analysts gather relatively more uncertainty-relieving information between earnings announcements and by the end of the quarter, their forecasts are as accurate as they were in the prior year. That is to say, the previous-CLC firms may have changed their selective disclosure policy, and Reg. FD may have contributed to the leveling of such information asymmetry.
2. It is not clear what the implication of the findings of Clement and Tse (2003) that investors respond more strongly to the earlier forecasts than to the later forecasts (despite the greater accuracy of the later forecasts) are to the findings reported by Gintschel and Markov (2004). Presumably, analysts forecasts may be more useful when released early that later. The effect of Reg. FD on analyst behavior in terms of earlier or later revisions of forecasts have yet to be examined.

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Appendix. Description of regression equations estimated

Test of first set of hypotheses (H1.1-H1.4)

We use the following two regression models in the cross-sectional tests to test *H1.1-H1.4*, using data for the pre- and the post-Reg. FD period, respectively:

$$FE_{it} = \alpha_0 + \alpha_1 CLC_{it} + \alpha_2 OPC_{it} + \alpha_3(HighTech \times CLC) + \alpha_4(HighTech \times OPC) + \alpha_5(HighTech \times NCC) + \alpha_6 AGE_{i,t} + \alpha_7 ANA_{i,t} + \alpha_8 SURP_{i,t} + \alpha_9 SIZE_{it} + \varepsilon_{it} \quad (1)$$

$$FD_{it} = \beta_0 + \beta_1 CLC_{it} + \beta_2 OPC_{it} + \beta_3(HighTech \times CLC) + \beta_4(HighTech \times OPC) + \beta_5(HighTech \times NCC) + \beta_6 AGE_{i,t} + \beta_7 ANA_{i,t} + \beta_8 SURP_{i,t} + \beta_9 SIZE_{it} + \varepsilon_{it} \quad (2)$$

where, CLC, a dummy variable equal to 1 if the firm is a CLC firm and 0 if the firm is a NCC or OPC firm; OPC, a dummy variable equal to 1 if the firm is an OPC firm and 0 if the firm is a NCC

or CLC firm; NCC, a dummy variable equal to 1 if the firm is a NCC firm and 0 if the firm is an OPC or CLC firm; HighTech, a dummy variable equal to 1 if the firm is a high-technology firm and 0 if the firm is not a high-technology firm; FE_{it}, the absolute difference between actual earnings per share for quarter t less the mean forecast as provided by IBES summary file at the end of the quarter t deflated by the stock price at the beginning of quarter t; FD_{it}, the standard deviation of all analyst forecasts made at the end of the quarter t from the "consensus" (mean) of analysts' forecasts deflated by the stock price at the beginning of quarter t. The consensus forecast used is the last one on the IBES summary tape prior to earnings being reported; AGE_{it}, the number of calendar days between the analyst's forecast date and the date of the actual earnings announcement at quarter t; ANA_{it}, total number of analysts releasing an earnings forecast for the firm i at quarter t; $SURP_{it} = \{EPS_t - EPS_{t-4}\}/P_{t-4}$, a proxy for the difficulty in forecasting earnings, where EPS_t is the primary earnings share (excluding extraordinary items) for quarter t and P_{t-4} is the ending price per share at quarter $t - 4$.; $SIZE_{it}$, the log of market value of equity at the beginning of quarter t.

To evaluate *H1.1*, an F-test of whether $\alpha_1 = \alpha_2$ in equation (1) is performed. Similarly, to evaluate *H1.2*, an F-test of whether $\beta_1 = \beta_2$ in equation (2) is performed. Rejection of the equalities and the relative magnitude of the two parameters would permit us to infer that analyst earnings forecast attributes are different for the previous-CLC firms versus the previous-OPC firms in the post-Reg. FD period. The test of *H1.3* is an F-test of whether $\alpha_1 + \alpha_2 = 0$. Rejection of that equality would provide support for *H1.3*. Similarly, a test of *H1.4* is whether $\beta_1 + \beta_2 = 0$, with its rejection an indication that *H1.4* is supported by the data.

Test of second set of hypotheses (H2.1-H2.4)

To test *H2.1* and *H2.4*, the dependent variables for testing the attributes of analyst earnings forecast are the change in FE and the change in FD. Using changes rather than levels of FE and dispersion mitigates the effect of cross-sectional differences in information environments. The general form of each dependent variable is:

$$\frac{\text{Post–Reg. FD event measure} - \text{Pre–Reg. FD event measure}}{\text{Stock price at Pre–Reg. FD event date}}$$

The pre-Reg. FD event measure component of the dependent variable is the quarterly FE or quarterly FD measured at quarter t before Reg. FD, and the post-Reg. FD event measure component of the dependent variable is the quarterly FE or quarterly FD measured at quarter t after Reg. FD:

$$|\Delta FE| = \left| \frac{FE_{post,it} - FE_{pre,it}}{P_{pre,it}} \right|$$

$$|\Delta FD| = \left| \frac{FD_{post,it} - FD_{pre,it}}{P_{pre,it}} \right|$$

The regressions estimated to evaluate *H2.1* and *H2.4* can be written as follows:

$$\begin{aligned} |\Delta FE_{it}| = {} & \lambda_0 + \lambda_1 OPC_{it} + \lambda_2 NCC_{it} + \lambda_3 (HighTech \times CLC) \\ & + \lambda_4 (HighTech \times OPC) + \lambda_5 (HighTech \times NCC) + \lambda_6 \Delta AGE_{it} + \lambda_7 \Delta ANA_{it} \\ & + \lambda_8 \Delta SURP_{it} + \lambda_9 lagSIZE_{i,pre} + \lambda_{10} lagFE_{i,pre} + \delta_{it} \end{aligned} \quad (3)$$

$$\begin{aligned} |\Delta FD_{it}| = {} & \gamma_0 + \gamma_1 OPC_{it} + \gamma_2 NCC_{it} + \gamma_3 (HighTech \times CLC) \\ & + \gamma_4 (HighTech \times OPC) + \gamma_5 (HighTech \times NCC) + \gamma_6 \Delta AGE_{it} + \gamma_7 \Delta ANA_{it} \\ & + \gamma_8 \Delta SURP_{it} + \gamma_9 lagSIZE_{i,pre} + \gamma_{10} lagFD_{i,pre} + \delta_{it} \end{aligned} \quad (4)$$

where $lagSIZE_{i,pe}$, the log of market value of equity in the pre-Reg. FD period; $lagFE_{i,pre}$, the level of FE in the pre-Reg. FD period; $lagFD_{i,pre}$, the level of FD in the pre-Reg. FD period, and all terms are as defined earlier.

As presented in equations (3) and (4), the CLC effect is captured in the intercept. Thus, to evaluate *H2.1*, the test is whether $\lambda_1 < 0$ in equation (3). This essentially examines whether the change in FE is higher for the firms classified as CLC in the pre-Reg. FD period than that for the OPC firms. If so, then Reg. FD had a more pronounced effect on the firms which previously held closed conference calls. This is exactly the effect that should be expected if Reg. FD had the desired effect.

Similarly, to evaluate *H2.2*, the test is whether $\gamma_1 < 0$ in equation (4). Rejection of the equality with positive coefficients would permit an inference that the absolute change in analyst earnings forecast attributes for the previous-CLC firms was greater than the absolute change for the previous-OPC firms.

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