

Anup Agrawal

University of Alabama

Sahiba Chadha

Dupont Capital Management, Wilmington, Delaware

Mark A. Chen

University of Maryland

Who Is Afraid of Reg FD? The Behavior and Performance of Sell-Side Analysts Following the SEC's Fair Disclosure Rules*

I. Introduction

On August 10, 2000, the U.S. Securities and Exchange Commission (SEC) approved a set of "fair disclosure" rules, generally referred to as "Reg FD." Effective October 23, 2000, these rules require a company to reveal any "material" information to all investors and to analysts simultaneously in case of intentional disclosures or within 24 hours in case of unintentional

* We thank Richard Boylan, Larry Brown, Augustine Duru, Paul Irvine, Jeff Jaffe, Prem Jain, Chuck Knoeber, Junsoo Lee, David Reeb, Cliff Smith, Tom Smith, Jon Sokobin, Anjali Tagare, Richard Willis, participants of the 2002 European Financial Association Berlin meetings, the 2002 Financial Economics and Accounting conference at the University of Maryland, the 2003 American Financial Association meetings, seminar participants at American University, Australian Graduate School of Management, Georgetown University, Georgia State University, Melbourne Business School, University of Oklahoma, and the U.S. Securities and Exchange Commission for comments. Special thanks are due to Albert Madansky and to a referee for very helpful comments and suggestions. Jaclyn Whitehorn provided research assistance. We are grateful to Thomson Financial for providing the I/B/E/S database. Agrawal acknowledges financial support from the William A. Powell Jr. Chair in Finance and Banking. Contact the corresponding author, Anup Agrawal, at aagrwal@cba.ua.edu.

(Journal of Business, 2006, vol. 79, no. 6)
© 2006 by The University of Chicago. All rights reserved.
0021-9398/2006/7906-0003\$10.00

We examine Regulation FD's impact on the accuracy and dispersion of sell-side analysts' earnings forecasts. Using a large sample of quarterly forecasts made over a nearly 10-year period surrounding FD's adoption, we uncover two main sets of findings. First, individual and consensus forecasts become less accurate post-FD, particularly for early forecasts and for smaller companies. Second, forecast dispersion increases post-FD. This effect is stronger for early forecasts and has increased with the passage of time. These results, which are quite robust to alternative empirical methodologies, suggest that there has been a reduction in both selective guidance and forecast quality post-FD.

disclosures. These rules are intended to put an end to the practice of selective disclosure, whereby companies give Wall Street analysts and large shareholders crucial earnings and business information prior to making it public. The rules prohibit companies from tipping off some favored analysts, investors, and media outlets before others. Like existing insider trading rules, these new rules are aimed at leveling the playing field for all investors.

This article empirically assesses the impact of Reg FD on the accuracy and dispersion of analysts' earnings forecasts. We use univariate tests and fixed-effects panel regressions to examine a large sample of forecasts over a nearly 10-year period surrounding FD's adoption. We investigate whether FD's effects vary by forecast age, firm size, and industry. Finally, we examine the evolution of FD's effects over time.

Our study builds on valuable early work on Reg FD by Bailey et al. (2003) and Heflin, Subramanyam, and Zhang (2003). Both papers examine a range of issues affected by FD, including changes in the accuracy of consensus analyst forecasts, and changes in forecast dispersion. Both studies perform univariate tests to analyze forecast accuracy and dispersion; Heflin et al. also conduct cross-sectional regressions using matched-pairs samples.¹ Our article contributes to this literature in several ways. First, unlike the broad scope adopted by prior studies, we focus specifically on changes in forecast accuracy and dispersion. We perform a detailed empirical analysis of these two consequences of Reg FD using fixed-effects panel regressions that allow us to abstract from forecast seasonality and from analyst and company characteristics. Second, while prior studies analyze only the latest forecasts issued just before earnings release, we analyze both early and late forecasts. If managers enjoy a greater information advantage over analysts when an earnings release is far in the future, there is more room for selective disclosure early on. By the time earnings are publicly released, managers usually have little information advantage left over the market,² so there may be little room for selective disclosure. Third, while prior studies analyze the short-run effects of Reg FD based on 3 quarters of post-FD data, we analyze its medium-term effects based on 15 quarters of post-FD data. This allows us to examine how FD's effects change over time as analysts and companies adjust to the new regulatory environment. Fourth, we investigate differences across several interesting subsamples (such as small firms and firms in certain industries) where earnings guidance was more likely pre-FD. Finally, we examine the accuracy of individual analyst forecasts as well as consensus forecasts.

We have two main sets of findings. First, analyst forecasts become less

1. Related research examines FD's effects on analyst following and forecast dispersion (e.g., Irani and Karamanou 2003), trading costs around earnings announcements (e.g., Eleswarapu, Thompson, and Venkataraman 2004), the price impact of analyst forecasts and recommendations (e.g., Gintchel and Markov 2004), and the information content of bond rating changes (Jorion, Liu, and Shi 2005).

2. Indeed, Heflin et al. (2003, table 3) find that the average magnitude of the surprise in earnings per share relative to the latest consensus forecast just before earnings release was only about 3 cents on a \$10 stock pre-FD.

accurate following the adoption of fair disclosure rules. This effect is found both at the individual analyst level and at the level of the consensus (i.e., the median across all analysts). We find that this effect is significantly larger for early forecasts than for late forecasts and for smaller companies than for larger companies. Second, analyst forecasts become more dispersed following Reg FD. This effect is also larger for early forecasts than for late forecasts. The effect is relatively small in the first year following FD's adoption, but it increases significantly over the following 3 years. These results are robust to alternative empirical methodologies. Our findings suggest that there has been a reduction in both selective guidance and the quality of analyst forecasts post-FD.

The article proceeds as follows. Section II describes the sample and data. Section III presents our tests and results on forecast accuracy, and Section IV deals with forecast dispersion. Section V concludes.

II. Data and Sample

Subsections A–C discuss, respectively, the origins of Reg FD, our data sources, and the sample.

A. *Origins of the Rules*

The first public hint of the SEC's concern with selective guidance came in a speech by its then chairman Arthur Levitt on February 27, 1998 (SEC 1998b). He reiterated his concern with the practice at a speech on September 28, 1998 (SEC 1998a).³ A year later, the SEC formally proposed the fair disclosure rules on December 15, 1999. The rules were open for public comment until March 29, 2000. Despite intense opposition by analysts, brokerage firms, and companies, the rules were approved by the SEC on August 10, 2000, and became effective on October 23, 2000.⁴

B. *Data*

We analyze earnings forecasts for quarters ending between March 1995 and June 2004, a nearly 10-year period surrounding the adoption of the rules. Almost all of the data for this study come from the Institutional Brokers Estimate System (I/B/E/S) detail and summary history databases, except for data on special items of earnings (described in n. 13 below), which are obtained

3. Levitt (SEC 1998a, 1) described the practice as follows: "Through conference calls or embargoed press releases, analysts and institutional investors often hear about material news before it is made public. In the interval, there is a great deal of unusual trading." And (SEC 1998b, 4), "Well, it doesn't take Oliver Stone to imagine how that might come about."

4. Could the rules have had an effect prior to their formal adoption? While this is a possibility, it seems unlikely. From all accounts, before the rules were adopted, there was considerable uncertainty about their passage. Nonetheless, we repeated all our subsequent tests using the pre-1998 period as our pre-FD benchmark. These results are generally quite similar to those presented here.

from Compustat. To simplify presentation of the results, we limit the sample to firms with fiscal years ending in March, June, September, or December.

For each quarter, we examine the latest forecast issued by an analyst within an early forecast period and a late forecast period. The early period is the 2-month period ending the day before a quarter begins. The late period consists of the 2-month period ending the day before earnings release. Figure 1 depicts the timing of these forecast periods for the quarter ending June 30 for a firm that releases earnings on July 15. In our sample of individual analyst forecasts, the median age of the early and late forecasts at the time of earnings release is 150 days and 28 days, respectively (see table 4, panel A).

Companies usually start announcing the results for a quarter beginning about 2 weeks after the quarter ends. Analysts following a company issue forecasts for a given quarter starting about a year before earnings release; as the release date approaches, more analysts issue forecasts, and some analysts revise their forecasts. Obviously, with the passage of time, forecasts become more accurate as more information becomes available. We choose forecast periods of 2 months each in order to have a meaningful number of analysts issuing forecasts during each interval and to ensure that those analysts are on a roughly equal footing as to the quantity and quality of information available to them.

C. *Sample*

We conduct multiple tests of each of the two issues discussed in the introduction. For each test, we analyze individual analyst and consensus (median) forecasts made during each of the two forecast periods discussed in Section II.B. Each test is based on the maximum data available for the test. Therefore, sample sizes sometimes vary across the tables.

Table 1 gives a flavor for how sample sizes are determined for the tests presented below in Section III.B for the early forecast period (i.e., for the regressions shown in cols. 1 and 3 of table 4). As column 1 of table 1 shows, individual analysts made a total of 760,087 forecasts of quarterly earnings over our sample period. Out of these, we focus on the latest forecast made by each analyst during our early forecast period. There are a total of 275,140 such forecasts, out of which stock price data are available for 252,823 forecasts. Out of these, the stock price is \$1 or more in 252,270 cases. Of these cases, the normalized forecast error (NFE, defined in Sec. III.A.1) is 2 or less in 246,728 cases, out of which data are available for all the variables in table 4 regressions for 179,729 cases. This is the sample size shown in column 1 of table 4. Column 2 of table 1 similarly shows how we arrive at the sample size for the consensus (median) of analyst forecasts in the regression in column 3 of table 4.

Table 2 shows descriptive statistics of our sample of early forecasts made by individual analysts. The median actual quarterly earnings per share (EPS) is 23 cents. The median ratio of quarterly EPS to the stock price at the beginning of our early forecast period is about 1.1%, and the median absolute

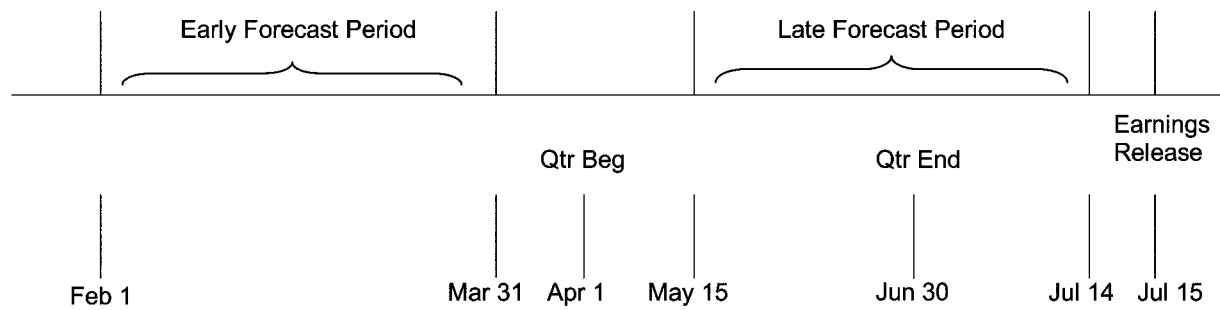


FIG. 1.—Timing of forecast periods for the quarter ending June 30 for a firm that releases earnings on July 15

TABLE 1 Sample Selection Criteria

	Number of Forecasts	
	Individual Forecasts	Consensus Forecasts
1. All quarterly forecasts over the sample period	760,087	570,774
2. Latest forecasts made during the early forecast period	275,140	129,539
3. Item 2 with stock price available before early period	252,823	124,114
4. Item 3 with stock price not less than \$1	252,270	123,106
5. Item 4 with NFE \leq 2	246,728	117,470
6. Item 5 with data available on all variables in table 4 regressions	179,729	80,512

NOTE.—The table shows the number of individual and consensus forecasts in the I/B/E/S database that satisfy various data requirements. The early forecast period is the 2-month period ending the day before a quarter begins. Normalized forecast error (NFE) is as defined in table 2. The sample sizes in item 6 of the table correspond to the regressions shown in cols. 1 and 3 of table 4.

forecast error is about 0.23% of the stock price. About 43% of the observations of forecasts occur post-FD. The median age of the forecasts in the sample is 150 days, corresponding to the natural log of one plus the age (LAGE) of 5.0173. About 19% of the EPS observations are negative (LOSS = 1). EPS declines relative to the same quarter of the previous year (DECLINE = 1) in about 40% of the cases. The median absolute change in EPS relative to the same quarter of the previous year (SHOCK) is about 0.45%.

The typical (median) sample company has a market capitalization of about \$536 million, sales of about \$104 million, total assets of about \$624 million, and is followed by five analysts. The median standard deviation of analyst EPS forecasts is about 0.1% of the stock price at the beginning of the forecast period and about 5.6% of the mean forecast.

III. Forecast Accuracy

The first issue we investigate is whether analyst forecast errors (absolute differences between actual and forecasted EPS) change following Reg FD. With the adoption of Reg FD, the job of predicting earnings may become harder for analysts because the rules prohibit companies from making pre-announcement disclosures to analysts. This implies that analysts' forecast errors should increase post-FD, unless (1) SEC enforcement of the rules is ineffective, (2) companies increase disclosure via public channels (e.g., conference calls and news releases), or (3) analysts develop alternate information sources (such as customers, suppliers, employees, or industry groups). We examine this issue both at the level of the individual analyst and at the level of the consensus forecast.

Sections III.A and III.B present, respectively, the results of univariate tests and fixed-effects regressions. Section III.C examines three interesting partitions of our sample, and Section III.D compares our results with prior FD research.

TABLE 2 Descriptive Statistics of Individual Forecasts for the Early Forecast Period

Variable	Mean	Median	Q ₁	Q ₃	SD	N	Unit of Observation
Actual EPS (\$)	.2603	.2300	.0500	.4500	6.7061	246,728	Forecast
Actual EPS/stock price at beginning of period	.0055	.0111	.0031	.0186	.0507	246,728	Forecast
NFE	.0084	.0023	.0007	.0068	.0339	246,728	Forecast
REGFD	.4329	0	0	1	.4955	246,728	Forecast
LAGE	5.0087	5.0173	4.8828	5.1299	.1699	246,713	Forecast
LOSS	.1901	0	0	0	.3924	246,728	Forecast
DECLINE	.3954	0	0	1	.4889	179,918	Forecast
SHOCK	.0114	.0045	.0020	.0110	.0418	179,738	Forecast
Market capitalization (\$ millions)	3,915.92	535.80	166.16	1,872.10	16,725.45	83,629	Company-quarter
Sales (\$ millions)	691.76	103.79	28.37	400.10	2,452.78	76,830	Company-quarter
Assets (\$ millions)	6,993.74	624.32	158.64	2,547.90	37,134.05	76,651	Company-quarter
Analyst following	6.7108	5	4	8	4.4626	53,448	Company-quarter
Normalized standard deviation	.0024	.0009	.0004	.0022	.0098	65,064	Company-quarter
Coefficient of variation	.1026	.0556	.0294	.1111	.1705	54,982	Company-quarter

NOTE.—The table shows summary statistics of earnings per share (EPS), normalized EPS, normalized forecast errors (NFE), measures of forecast dispersion, firm size, analyst following, and explanatory variables in the regressions of NFE and forecast dispersion. $NFE_{jt} = |e_{jt} - \hat{e}_{jt}|/p_{jt}$, where e_{jt} is the EPS for company j for quarter t , \hat{e}_{jt} is analyst i 's latest forecast of e_{jt} during the early forecast period (defined in table 1), and p_{jt} is the latest available stock price preceding the forecast period. REGFD, equals one if the forecast period for a quarter occurs during the post-FD period, and zero otherwise; LAGE_{jt} is the natural logarithm of one plus the number of days between a forecast and the earnings report; LOSS_{jt} equals one if $e_{jt} < 0$ and zero otherwise; DECLINE_{jt} equals one if $e_{jt} < e_{j,t-4}$ and zero otherwise; and SHOCK_{jt} = $|e_{jt} - e_{j,t-4}|/p_{jt}$. Normalized standard deviation is defined as $NSD_{jt} = \sigma_{jt}/p_{jt}$, where σ_{jt} is the standard deviation of analysts' forecasts. The coefficient of variation is defined as $cov_{jt} = \sigma_{jt}/|\bar{X}_{jt}|$, where \bar{X}_{jt} is the mean of analysts' forecasts. The sample excludes observations where $p_{jt} < 1$ or $NFE_{jt} \geq 2$. The sample period consists of quarters ending between March 1995 and June 2004.

A. Univariate Tests

Before we control for other factors that may affect forecast accuracy, it is useful to perform a simple “before versus after” comparison. Sections III.A.1 and III.A.2 below present the results of univariate tests for individual analyst and consensus forecasts, respectively.

1. Individual Analysts

We define the normalized forecast error for analyst i following company j for forecast period t as follows:

$$\text{NFE}_{ijt} = |e_{jt} - \hat{e}_{ijt}|/p_{jt}, \quad (1)$$

where e_{jt} equals the EPS for company j for quarter t , \hat{e}_{ijt} equals the latest estimate of e_{jt} by analyst i during a given forecast period, and p_{jt} equals the latest available stock price preceding the forecast period.

We choose the stock price rather than EPS to normalize forecast errors to avoid the inference problems caused by division by zero or by a negative EPS number. Given that our sample period consists of a nearly 10-year period over which both EPS and stock prices fluctuate widely, we normalize forecast errors by the stock price at the beginning of the forecast period rather than a constant stock price measured at a single point in time. To avoid the problem of inflated forecast errors caused by division by very small numbers, we omit NFE observations associated with stock prices less than \$1. We also omit observations where $\text{NFE} \geq 2$.

Table 3 reports the average values of normalized forecast errors for matched pairs (pre- vs. post-FD) of individual analyst forecasts. We present these values separately for each of the two forecast periods for the March, June, September, and December quarters.⁵ For each forecast period, the column labeled “Post” shows the mean (median) value of NFE across all analyst-company pairs during the post-FD quarters. The column labeled “Pre” shows the corresponding pre-FD period values for the same analyst-company pairs. The sample includes all analyst-company pairs in the I/B/E/S database that have at least one NFE observation pre-FD and one observation post-FD. For early forecasts, the pre-FD period consists of quarters ending between March 1995 and December 2000, and the post-FD period consists of quarters ending between March 2001 and June 2004. For late forecasts, the pre-FD period consists of quarters ending between March 1995 and June 2000, and the post-FD period consists of quarters ending between December 2000 and June 2004.⁶

5. We compute these values as follows. For a given forecast period for a given quarter (such as the late forecast period for quarters ending in December), we first compute the mean NFE pre-FD and the mean NFE post-FD for each analyst-company pair in our sample. We then use these mean values across all analyst-company pairs to compute the mean and median values shown in table 3. This approach gives equal weight to each analyst-company pair in the sample.

6. We omit the late forecast period for the quarter ending September 2000. That period includes periods both before and after October 23, 2000, for the majority of our sample firms, making it difficult to classify as either pre- or post-FD.

TABLE 3 Average Normalized Forecast Errors for Matched Pairs (Pre-FD vs. Post-FD) of Analyst Forecasts

	Means			Medians			Number of Pairs
	Pre*	Post*	<i>p</i> -Value†	Pre*	Post*	<i>p</i> -Value†	
A. Individual Analyst Forecasts							
December quarters:							
Early forecasts	.0059	.0104	<.0001	.0019	.0030	<.0001	4,381
Late forecasts	.0028	.0057	<.0001	.0010	.0012	<.0001	4,108
March quarters:							
Early forecasts	.0055	.0103	<.0001	.0020	.0032	<.0001	2,201
Late forecasts	.0023	.0045	<.0001	.0009	.0011	<.0001	5,853
June quarters:							
Early forecasts	.0044	.0084	<.0001	.0018	.0025	<.0001	4,914
Late forecasts	.0022	.0043	<.0001	.0009	.0011	<.0001	4,888
September quarters:							
Early forecasts	.0060	.0141	<.0001	.0022	.0035	<.0001	4,162
Late forecasts	.0022	.0059	<.0001	.0009	.0012	<.0001	3,568
B. Consensus Forecasts							
December quarters:							
Early forecasts	.0119	.0162	<.0001	.0038	.0047	<.0001	3,382
Late forecasts	.0087	.0161	<.0001	.0023	.0028	<.0001	3,699
March quarters:							
Early forecasts	.0075	.0162	<.0001	.0035	.0050	<.0001	2,684
Late forecasts	.0046	.0121	<.0001	.0020	.0025	<.0001	3,175
June quarters:							
Early forecasts	.0068	.0163	<.0001	.0033	.0043	<.0001	2,982
Late forecasts	.0046	.0131	<.0001	.0019	.0025	<.0001	3,306
September quarters:							
Early forecasts	.0078	.0202	<.0001	.0037	.0049	<.0001	2,977
Late forecasts	.0048	.0131	<.0001	.0018	.0023	<.0001	2,797

NOTE.—Normalized forecast error is defined in panel A as $NFE_{ijt} = |e_{jt} - \hat{e}_{ijt}|/p_{jt}$, where e_{jt} is the EPS for company j for quarter t , \hat{e}_{ijt} is analyst i 's latest forecast of EPS for company j for quarter t during a forecast period, and p_{jt} is the latest available stock price preceding the forecast period. For each quarter, forecasts are included if they occur within an early period and a late period. The early forecast period is the 2-month period ending the day before a quarter begins. The late forecast period consists of the 2-month period ending the day before earnings release. The sample includes all analyst-company pairs in the I/B/E/S database that have at least one NFE observation pre-FD and at least one observation post-FD; it excludes observations where $p_{jt} < \$1$ or $NFE_{ijt} \geq 2$. NFA is defined similarly in panel B, based on the latest median (consensus) of analyst estimates issued during a given forecast period instead of analyst i 's forecast.

* For early forecasts, the pre-FD period consists of quarters ending between March 1995 and December 2000, and the post-FD period consists of quarters ending between March 2001 and June 2004. For late forecasts, the pre-FD period consists of quarters ending between March 1995 and June 2000, and the post-FD period consists of quarters ending between December 2000 and June 2004.

† *p*-values are based on two-tailed matched-pairs tests (*t*-tests for means, Wilcoxon signed ranks test for medians).

The first two columns of panel A show that the mean value of the normalized forecast error increases following Reg FD in both forecast periods for each of the four quarters. The *p*-value for the matched-pairs *t*-test, shown in column 3, is less than .0001 in all eight cases. The magnitude of the increase in mean NFE ranges from 76% to 168%, and has a mean of 106% across the eight cases. Not surprisingly, late forecasts are substantially more accurate than early forecasts. The average NFE for the former is about one-half as large as the average NFE of the latter.

In columns 4 and 5, the median NFE following Reg FD also increases in all eight cases. All the differences are statistically significant at the .0001 level using a matched-pairs Wilcoxon signed-ranks test. The magnitude of the increase in median values is considerably lower, ranging from 20% to 60%, with a mean of 39%.

2. Consensus Forecast

We next define the normalized consensus forecast error for company j for forecast period t as

$$\text{NFE}_{jt} = |e_{jt} - \hat{e}_{jt}|/p_{jt}, \quad (2)$$

where \hat{e}_{jt} equals the latest consensus (median) of all analyst forecasts of e_{jt} made within a given forecast window, and other variables are as defined in Section III.A.1 above. Once again, forecasts with stock price under \$1 or NFE of 2 or greater are excluded.

Panel B of table 3 presents the mean and median values of normalized consensus forecast errors for matched pairs (pre- and post-FD) of companies. Columns 1 and 2 show that the mean NFE increases following Reg FD in both forecast periods for all four quarters; the p -value is less than .0001 in all cases. The increase ranges from 36% to 185%, with a mean of 132%.

Columns 4 and 5 show that the median forecast error also increases in all eight cases. The increase is statistically significant in all cases with a Wilcoxon test p -value of less than .0001. The increase ranges from 22% to 43% and has a mean value of 30%.

B. Fixed-Effects Regressions

The evidence in table 3 suggests that forecast errors for a firm increase post-FD, both at the level of individual analysts and the consensus. However, table 3 does not control for other factors that can affect the accuracy of analyst forecasts, such as characteristics of analysts and companies. In order to control for these influences, we next estimate the following cross-sectional time-series regression of normalized forecast errors:

$$\begin{aligned} \text{NFE}_{ijt} = & b_1 \text{REGFD}_t + b_2 \text{LAGE}_{ijt} + b_3 \text{LOSS}_{jt} \\ & + b_4 \text{DECLINE}_{jt} + b_5 \text{SHOCK}_{jt} + u_{ijt}, \end{aligned} \quad (3)$$

where NFE is defined as in Section III.A.1 above. The indicator variable REGFD_t equals one if the forecast period for a quarter occurs during the post-FD period and zero otherwise. The variable LAGE_{ijt} equals $\ln(\text{AGE}_{ijt} + 1)$, where AGE_{ijt} is the number of days between the forecast date and earnings release. The indicator variable LOSS_{jt} equals one if $e_{jt} < 0$ and zero otherwise. The indicator variable DECLINE_{jt} equals one if $e_{jt} < e_{j,t-4}$ and 0 otherwise.

The variable $SHOCK_{jt}$ equals $|e_{jt} - e_{j,t-4}|/p_{jt}$. We omit observations where $p_{jt} < \$1$ or $NFE_{ijt} \geq 2$. The sample period is from January 1995 to June 2004.⁷

Since we are interested in examining the effect of Reg FD on forecast errors, rather than in assessing the usual determinants of forecast errors, we use a model with analyst-company-quarter fixed effects.⁸ This involves subtracting from each variable in equation (3) its mean value for an analyst i following a company j for the relevant quarter during the sample period.⁹ By treating analyst-company-quarter effects as fixed, we do not try to explain what determines the accuracy of analyst forecasts in general (such as characteristics of analysts and companies).¹⁰ Instead, our panel data and the fixed-effects model allow us to largely abstract from that question. In other words, given our panel data, treating analyst-company-quarter effects as fixed allows us to control for differences in characteristics across individual analysts (such as age, experience, education, and intrinsic ability) and companies (such as age, location, state of incorporation, industry, and New York Stock Exchange size decile) that remain relatively stable over time. It also controls for seasonal differences in forecast accuracy. In these and all subsequent regressions in the article, we report robust t -statistics from a heteroskedasticity-autocorrelation consistent estimator.

Including analyst-company-quarter fixed effects, however, does not control for characteristics of earnings shocks experienced by a company, nor does it control for forecast age. These variables can be important determinants of forecast accuracy. For example, prior research (e.g., Brown 2001) finds striking differences in analysts' forecast accuracy for profits versus losses. Hence we control for that effect by including LOSS as an explanatory variable in equation (3). Similarly, earnings may be harder to forecast when they decline, or when they change substantially, relative to the same quarter of the prior year. We control for these possibilities by including the DECLINE and SHOCK variables in equation (3). Finally, forecasts are more likely to be accurate the closer they are to earnings release. The LAGE variable in equation (3) is intended to control for this effect.

This regression allows us to focus on the consequences of Reg FD. A positive coefficient on REGFD would imply that post-FD, forecast errors tend to increase above their normal levels for a given analyst tracking a given company for a given quarter (such as the December-ending quarter). As with the univariate tests reported above, we estimate equation (3) separately for forecasts made during each of the two forecast periods.

Panel A of table 4 shows the results of this estimation at the level of

7. As discussed in n. 6 above, we omit the late forecast period for the quarter ending September 2000.

8. Prior studies (e.g., Clement 1999) have also used the fixed-effects model to examine analyst forecasts. See Wooldridge (2002) for a detailed exposition of the fixed-effects model.

9. This is mathematically equivalent to adding a dummy variable for each analyst following a given company for a given quarter to the right-hand side of eq. (3) (see Wooldridge 2002).

10. See Mikhail, Walther, and Willis (1997), Clement (1999), and Jacob, Lys, and Neale (1999) for some excellent work on that topic.

TABLE 4 Fixed-Effects Panel Regressions of Normalized Forecast Errors (NFEs) from Early and Late Forecasts

Explanatory Variable	A. Individual Analyst Forecasts		B. Consensus Forecasts	
	Early Forecasts	Late Forecasts	Early Forecasts	Late Forecasts
REGFD	.0023 (4.85) ^a	.0013 (4.20) ^a	.0023 (6.29) ^a	.0022 (6.70) ^a
LAGE	.0092 (5.91) ^a	.0006 (4.11) ^a	.0350 (8.25) ^a	.0011 (4.70) ^a
LOSS	.0164 (14.31) ^a	.0084 (9.55) ^a	.0282 (27.88) ^a	.0223 (22.60) ^a
DECLINE	.0014 (3.57) ^a	.0002 (.79)	.0031 (10.30) ^a	.0022 (7.29) ^a
SHOCK	.0962 (1.34)	.0906 (2.58) ^a	.0745 (2.36) ^b	.1581 (3.90) ^a
Overall R^2	.1377	.0903	.1406	.1190
Sample size	179,729	203,808	80,512	86,568
Median age of forecasts (days)	150	28	131	14
p -value for the difference*	.0000		.1161	

NOTE.—Panel A shows coefficient estimates from the following cross-sectional time-series regression of individual analyst forecasts:

$$NFE_{ijt} = b_1 \text{REGFD}_{ijt} + b_2 \text{LAGE}_{ijt} + b_3 \text{LOSS}_{ijt} + b_4 \text{DECLINE}_{ijt} + b_5 \text{SHOCK}_{ijt} + u_{ijt}$$

where the variables are as defined in table 2 and analyst-company-quarter effects are treated as fixed. Early and late forecast periods are as defined in table 3. The sample period is from January 1995 to June 2004; the quarter ending September 2000 is excluded for the late forecast period. The sample also excludes observations where $p_{jt} < \$1$ or $NFE_{ijt} \geq 2$. Reported t -statistics (shown in parentheses) are from a robust variance estimator, and R^2 values are based on overall variation within and across analyst-company pairs. Panel B shows results from corresponding regressions for the consensus (median) of analyst forecasts, where company-quarter effects are treated as fixed.

^a Denotes statistical significance at the 1% level in two-tailed tests.

^b Denotes statistical significance at the 5% level in two-tailed tests.

* Test for difference in the coefficient of REGFD between early and late forecasts.

individual analyst forecasts for both forecast periods.¹¹ The estimated coefficient (\hat{b}_1) of the REGFD dummy is positive and highly statistically significant for both periods. Thus, forecasts of individual analysts become less accurate following the adoption of fair disclosure rules. The magnitude of this effect is nontrivial. For early forecasts, \hat{b}_1 equals .0023. For a \$10 stock, this implies an average increase in absolute earnings forecast error of 2.3 cents per share post-FD. The corresponding increase for late forecasts works out to only 1.3 cents per share. This difference is statistically significant, with a p -value less than .001. These results indicate that analysts are less informed post-FD, particularly early on in a quarter.

Panel B shows the corresponding regressions for consensus forecasts. Here, there is only one NFE observation per company for each time period. Hence, we use a model with company-quarter fixed effects. These results largely

11. In all fixed-effects regressions reported in the article, tests of the null hypothesis that all unobserved effects are jointly zero yield p -values less than .0001.

mirror those of panel A.¹² The coefficient of REGFD is positive and highly statistically significant for both early and late forecasts, with the difference being insignificant. The results indicate that the consensus of analyst forecasts also becomes less accurate following Reg FD.

As expected, forecast errors increase with the age of the forecast. Consistent with earlier studies (e.g., Brown 2001), we find that forecast errors are substantially larger for loss-making firms than for profitable firms, and errors increase with the magnitude of the earnings shock. Forecast errors are also larger for firms with earnings declines versus other firms. Estimated coefficients of the LAGE, LOSS, SHOCK, and DECLINE variables are positive and generally statistically significant.¹³

C. Subsample Results

We next examine, in subsections 1–3, whether post-FD changes in forecast accuracy differ across three interesting partitions of our sample based on firm size, industry, and post-FD time period. In each case, we estimate variants of equation (3) and treat analyst-company quarter effects (or, in the case of consensus forecasts, company-quarter effects) as fixed.

1. Firm Size

We first examine whether small companies may have engaged more in selective disclosure pre-FD in order to attract and retain analyst coverage. If so, we would expect post-FD declines in forecast accuracy to be especially pronounced for these firms. To examine this effect, we estimate the following panel regression:

$$\begin{aligned} \text{NFE}_{ijt} = & b_{1S} \text{REGFD}_t \times \text{SMALL}_j + b_{1L} \text{REGFD}_t \times \text{LARGE}_j \\ & + b_2 \text{LAGE}_{ijt} + b_3 \text{LOSS}_{jt} + b_4 \text{DECLINE}_{jt} \\ & + b_5 \text{SHOCK}_{jt} + u_{ijt}, \end{aligned} \quad (4)$$

where SMALL_j equals one if the market value of equity of company j is below the sample median for the relevant forecast period in the middle year of the sample period; it equals zero otherwise. LARGE_j equals $1 - \text{SMALL}_j$. The remaining variables are as defined in Section III.B above. Estimating equation (4) allows us to test for the equality of the effect of Reg FD on small versus large firms.

12. The results are also similar when we winsorize all continuous variables in the regression at the first and 99th percentiles of the sample.

13. We also examine the effect of negative special items of earnings as in Heflin et al. (2003). We define a variable NEGSPEC as the absolute value of special items (from Compustat) divided by total assets, if special items are negative, and zero otherwise. In the process of merging our I/B/E/S dataset with Compustat, sample sizes decrease significantly. Nevertheless, when we add NEGSPEC as an explanatory variable, its coefficient estimate turns out to be insignificant in all four regressions. Importantly, its addition does not change the sign or significance of the other variables. To save space, we do not report these results in a table.

Panel A in part 1 of table 5 shows that individual analyst forecast errors increase significantly following Reg FD for both small and large firms for both forecast periods, with no significant difference between small and large firms. The results for consensus forecasts shown in panel B of part 1 generally mirror those in panel A. But here, the post-FD increase in forecast errors is significantly bigger for small firms than for large firms, for both early and late forecasts.

2. Industry Effect

If earnings guidance provided by managers is generally informative, then post-FD forecast accuracy should be expected to decline more in industries where guidance was more likely pre-FD. Hutton (2003) argues that before FD, managers were more likely to provide detailed guidance to analysts when earnings were more important to valuation but harder to forecast and when intangible assets composed a large part of total assets. This description appears to fit two of the 11 I/B/E/S two-digit sector/industry/group (SIG) industry sectors: technology (SIG = 08) and consumer services (04).¹⁴ On that basis, we would expect the effect of Reg FD to be more pronounced for companies in these two sectors. We define a variable for industries where guidance was more likely, GMLIND, to equal one if a firm's two-digit SIG code is 04 or 08, and zero otherwise. Similarly, we define a variable for industries where guidance was less likely, GLLIND, to equal $1 - \text{GMLIND}$. We then estimate a panel regression that is similar to equation (4) above, except that we replace the SMALL and LARGE variables by GMLIND and GLLIND, respectively.

Part 2 of table 5 shows the coefficient estimates from this regression. The increase in forecast errors is not significantly different across the two groups of industries for late forecasts. For early forecasts, contrary to our expectation, the increase in forecast errors is significantly larger for firms in industries where guidance was less likely pre-FD ($\text{GLLIND} = 1$) than in other industries.

3. Post-FD Time Period

We next examine how FD's effects change over time as analysts and companies adjust to the new regulatory environment. This is ultimately an empirical issue. We can distinguish between two contrasting views. One possibility is that FD's effects on forecast errors may be greater in the immediate aftermath of its adoption as the flow of private information from companies to analysts gets cut off. With the passage of time, as companies find newer ways to communicate with analysts (either via public channels, or privately, if SEC enforcement slacks off) and as analysts develop alternative sources of information (e.g., industry groups, customers, suppliers, or employees), the effects of FD might dampen. Alternatively, private communication between

14. The other industry sectors are: finance (01), healthcare (02), consumer nondurables (03), consumer durables (05), energy (06), transportation (07), basic industries (09), capital goods (10), and public utilities (11).

TABLE 5 Fixed-Effects Panel Regressions of Normalized Forecast Errors: Differential Effects Based on Firm Size, Industry, and Post-FD Time Period

	A. Individual Analyst Forecasts				B. Consensus Forecasts			
	$\hat{b}_{1,k}$	$t(\hat{b}_{1,k})$	R^2	N	$\hat{b}_{1,k}$	$t(\hat{b}_{1,k})$	R^2	N
1. Company size:								
Early forecasts:								
Small firms	.0029	2.51 ^b			.0032	4.06 ^a		
Large firms	.0018	3.69 ^a	.1780	161,527	.0004	1.01	.2257	69,854
<i>p</i> -value for difference	.4182				.0007			
Late forecasts:								
Small firms	.0013	2.08 ^b			.0045	6.54 ^a		
Large firms	.0014	4.10 ^a	.0871	185,253	.0007	2.45 ^b	.1578	74,131
<i>p</i> -value for difference	.8228				.0000			
2. Industry:								
Early forecasts:								
“Guidance more likely” industries	.0005	.65			.0009	1.51		
“Guidance less likely” industries	.0045	4.99 ^a	.1374	178,943	.0029	6.63 ^a	.1408	80,511
<i>p</i> -value for difference	.0184				.0113			
Late forecasts:								
“Guidance more likely” industries	.0008	1.65			.0022	3.50 ^a		
“Guidance less likely” industries	.0015	3.67 ^a	.0897	202,446	.0023	5.81 ^a	.1179	86,564
<i>p</i> -value for difference	.2972				.8771			
3. Post-FD time period:								
Early forecasts:								
First post-FD year	.0013	2.25 ^b			.0025	4.53 ^a		
Subsequent post-FD years	.0031	6.01 ^a	.1362	179,729	.0022	5.59 ^a	.1407	80,512
<i>p</i> -value for difference	.0015				.6316			
Late forecasts:								
First post-FD year	.0005	1.47			.0040	6.70 ^a		
Subsequent post-FD years	.0020	5.09 ^a	.0903	203,808	.0016	4.53 ^a	.1190	86,568
<i>p</i> -value for difference	.0000				.0001			

NOTE.—Part 1 of panel A of the table shows estimated coefficients $\hat{b}_{1,k}$ ($k = S, L$) from the following cross-sectional time-series regression:

$$NFE_{jt} = b_{1,S}REGFD_t \times SMALL_j + b_{1,L}REGFD_t \times LARGE_j + b_2LAGE_{jt} + b_3LOSS_{jt} + b_4DECLINE_{jt} + b_5SHOCK_{jt} + u_{jt}$$

where $SMALL_j$ equals one if the market capitalization of company j is below the sample median for the relevant forecast period in the middle year of the sample period; it equals zero otherwise. $LARGE_j = 1 - SMALL_j$. The remaining variables are as defined in table 3, and analyst-company-quarter effects are treated as fixed. Early and late forecast periods are as defined in table 3. The sample period is from January 1995 through June 2004; the September 2000 quarter is excluded for the late forecast period. The sample also excludes observations where $p_{jt} < \$1$ or $NFE_{jt} \geq 2$. Reported t -statistics are from a robust variance estimator, and R^2 values are based on overall variation within and across analyst-company pairs. N denotes sample size. Part 1 of panel B shows results from corresponding regressions for the consensus (median) of analyst forecasts, where company-quarter effects are treated as fixed. Part 2 shows estimates from regressions similar to those in part 1 with $SMALL$ and $LARGE$ replaced, respectively, by $GMLIND$ and $GLLIND$. $GMLIND$ is an indicator variable equal to one for industries where guidance was more likely pre-FD (I/B/E/S SIG codes 04 and 08). $GLLIND = 1 - GMLIND$. Part 3 shows estimates from regressions similar to those in pt. 1 with $SMALL$ and $LARGE$ replaced, respectively, by $FIRST$ and $LATER$. $FIRST$ equals one for quarters in the first post-FD year (i.e., the first 4 post-FD quarters for a given forecast period); it equals zero otherwise. $LATER$ equals one for the subsequent post-FD quarters; it equals zero otherwise. p -values are for tests of differences in the coefficient of $REGFD$ between the two groups.

^a Denotes statistical significance at the 1% level, in two-tailed tests.
^b Denotes statistical significance at the 5% level, in two-tailed tests.

companies and analysts may fall to some extent immediately upon FD's adoption and then decline further as SEC enforcement increases.

We divide our roughly 4-year post-FD period into the first post-FD year and subsequent years and replace the SMALL and LARGE variables in equation (4) by two variables: FIRST and LATER. FIRST equals one for the first post-FD year (i.e., the first 4 post-FD quarters for each forecast period) and zero otherwise. LATER equals one for the subsequent years, and zero otherwise. The results are shown in part 3 of table 5.

We find that the post-FD increase in forecast errors is not confined to the period immediately following FD's adoption. Indeed, the coefficient of REGFD is positive and generally statistically significant not only for the first post-FD year but also for subsequent years. For late consensus forecasts, the magnitude of the increase is quite large in the first year but declines significantly after that. For individual analysts' forecasts, the opposite pattern holds.

D. Comparison with Prior FD Research

Heflin et al. (2003) examine changes in consensus forecast errors using a sample of 3 quarters of post-FD data and 3 quarters of pre-FD data. Their table 4 reports the results of cross-sectional regressions for a sample of pre- and post-FD observations for a group of companies. The regressions reported in panel B of our table 4 use a panel data set with 6 years of pre-FD data and nearly 4 years of post-FD data and treat company effects as fixed. The company-quarter fixed-effects model and our panel data set allow us to abstract from cross-sectional differences in fixed company characteristics and seasonality that might affect forecast accuracy. Our approach focuses on differences in forecast errors for a firm over time relative to its time-series mean. Like Heflin et al. (2003), we control for forecast age and several characteristics of a firm's earnings shocks that can be expected to vary from period to period.

But while Heflin et al. examine the latest consensus forecast for a firm made just before earnings release, we examine the latest forecast made over 2 periods of 2 months each. As discussed in Section II.B, our early forecast period ends the day before the quarter begins; the late forecast period ends the day before earnings release.¹⁵ In addition, Heflin et al. (2003, 5) point out that their sample is biased toward larger firms. To compare results using our fixed-effects panel regression methodology with those of Heflin et al. we next examine errors for the latest consensus forecasts and subdivide the sample into small and large firms. For the purpose of this comparison, we restrict our post-FD sample to the first 3 post-FD quarters, as in Heflin et al. (2003).

Despite differences in methodology, our results both confirm and extend those of Heflin et al. (2003). We find no increase in forecast errors for the type of forecast they examine, namely, the latest consensus forecast made

15. The median ages of our early and late consensus forecasts, shown in cols. 3 and 4 of table 4, are 131 days and 14 days, respectively. The latter is comparable to the median age of 22 ($= e^{3.091}$) days reported in Heflin et al.'s (2003) table 4, panel A.

before earnings release by large firms. However, we find a significant increase for consensus forecasts that are made earlier or that are made for small firms. For the overall sample of both small and large firms, consensus forecast errors increase significantly for both our early and late forecasts. The pattern is similar for individual analyst forecasts. To save space, these results are not shown in a table. Furthermore, while Heflin et al. provide early evidence on FD's effects from 3 post-FD quarters, we examine its medium-term effects over several years post-FD. We find that with the passage of time, the effect of FD on individual analysts' forecast errors increases, but the effect on consensus forecast errors decreases (see pt. 3 of table 5). FD also has had a greater effect on consensus forecast errors for small firms than for large firms over this 4-year period (see pt. 1 of table 5).

IV. Forecast Dispersion

We next examine changes in the dispersion of analyst forecasts post-FD. Since a company can no longer guide analysts to a precise earnings number, analysts now have to rely on their individual analyses. This is likely to result in more dispersed forecasts unless the rules are not effectively enforced or unless companies substitute more public disclosure for private analyst guidance. We present the results of univariate tests in Section IV.A and fixed-effects regressions in Section IV.B. Section IV.C presents the results for three interesting partitions of our sample.

A. Univariate Tests

We compute the coefficient of variation of analysts' forecasts of EPS for company j for forecast period t as

$$\text{cov}_j = \sigma_j / |\bar{X}_j|, \quad (5)$$

where σ_j and \bar{X}_j equal, respectively, the standard deviation and the mean of the forecasts of all analysts following the company. Observations are excluded if there are fewer than three analysts following a company or if $\bar{X}_j > \$0.10$.

Table 6 shows the mean and median COV values pre- and post-FD for matched pairs of firms. These values are shown for both forecast periods separately for each quarter.¹⁶ The pre- and post-FD periods for the two forecast windows are as defined in Section III.A.1 above. The sample includes all companies in the I/B/E/S database that have at least one COV observation pre-FD and one observation post-FD.

Columns 1 and 2 of table 6 show that the mean COV increases post-FD

16. We compute these values as follows. Within a given forecast period for a given quarter, we first compute the mean COV pre-FD and the mean COV post-FD for each company over all the years that the company exists in our sample. We then use these mean values across all companies to compute the mean and median values shown in table 6. This approach gives equal weight to each company in the sample.

TABLE 6 Average Dispersion of Analyst Forecasts for Matched Pairs of Companies (Pre-FD vs. Post-FD)

	Mean			Median			Sample Size
	Pre*	Post*	<i>p</i> -Value†	Pre*	Post*	<i>p</i> -Value†	
December:							
Early forecasts	.0993	.1297	.0000	.0609	.0769	.0000	1,715
Late forecasts	.0962	.0966	.9179	.0540	.0588	.3079	1,919
March:							
Early forecasts	.0934	.1164	.0000	.0594	.0725	.0000	1,113
Late forecasts	.0892	.0948	.0931	.0556	.0591	.0101	1,661
June:							
Early forecasts	.0883	.1220	.0000	.0541	.0714	.0000	1,530
Late forecasts	.0832	.0945	.0016	.0527	.0566	.0199	1,780
September:							
Early forecasts	.0845	.1200	.0000	.0540	.0708	.0000	1,528
Late forecasts	.0822	.1021	.0000	.0482	.0556	.0000	1,479

NOTE.—The table shows mean and median values for the coefficient of variation (COV) in analyst forecasts. Statistics are reported for early and late forecast periods (defined in table 3) for quarters ending in March, June, September, and December. For company *j* during forecast period *t*, $cov_{jt} = \sigma_{jt} / |\bar{X}_{jt}|$, where σ_{jt} is the standard deviation of analysts' forecasts and \bar{X}_{jt} is the mean of forecasts. Within each forecast period, only analysts' latest EPS estimates are included. The sample includes all companies in the I/B/E/S database that have at least one COV observation each pre- and post-FD. Observations are excluded if there are fewer than three analysts following a company or if $\bar{X}_{jt} < \$0.10$.

* For early forecasts, the pre-FD period consists of quarters ending between March 1995 to December 2000, and the post-FD period consists of quarters ending between March 2001 and June 2004. For late forecasts, the pre-FD period consists of quarters ending between March 1995 and June 2000, and the post-FD period consists of quarters ending between December 2000 and June 2004.

† *p*-values are based on two-tailed matched-pairs tests (*t*-tests for means, and Wilcoxon signed ranks tests for medians).

for both forecast periods in each of the 4 quarters; the difference is statistically significant at the 5% level or better in all periods except for late forecasts for the December and March quarters. Columns 4 and 5 show a similar pattern. The median COV increases in all periods; the difference is always statistically significant except for late forecasts in the December quarter.

B. Fixed-Effects Regressions

The results in table 6 suggest that the dispersion of analyst forecasts for a firm increases post-FD. However, table 6 does not account for systematic differences in firm characteristics that can affect the dispersion of analyst forecasts. To control for these characteristics, we next estimate the following cross-sectional time-series regression of the dispersion of analyst forecasts:

$$\begin{aligned} \text{DISPERSION}_{jt} = & b_1 \text{REGFD}_t + b_2 \text{LAGE}_{jt} + b_3 \text{LOSS}_{jt} \\ & + b_4 \text{DECLINE}_{jt} + b_5 \text{SHOCK}_{jt} + u_{jt}, \end{aligned} \quad (6)$$

where DISPERSION equals the normalized standard deviation (NSD) or the coefficient of variation (COV). Specifically, $\text{NSD}_{jt} = \sigma_{jt} / p_{jt}$, where σ_{jt} is the standard deviation corresponding to the latest consensus forecast of EPS for company *j* during a given forecast period of a given quarter *t* from the I/B/E/S Summary History file, and p_{jt} is the latest available stock price preceding

the forecast period. $LAGE_{jt}$ is the natural log of one plus the age of the latest consensus forecast (i.e., the number of days between earnings release and the date that the standard deviation is computed), and the remaining variables are defined as in Sections III.B and IV.A above. The sample period is January 1995–June 2004; the quarter ending September 2000 is excluded for the late forecast period. The early and late forecast periods are defined as in Section II.B above. Observations are excluded if there are fewer than three analysts following a company or if $p_{jt} < 1$ (for NSD) or $\bar{X}_{jt} < \$0.10$ (for COV).

In estimating equation (6), we treat company-quarter effects as fixed. As in our analysis of forecast accuracy, we are not interested in explaining variation across firms in the normal level of forecast dispersion. Instead, we focus on whether forecast dispersion changes in response to Reg FD after controlling for the normal level of dispersion for each company over the sample period. The company-quarter fixed-effects estimate of equation (6) allows us to abstract from the effects of fixed firm characteristics that affect forecast dispersion. As in equation (3), we control for forecast age and for potential differences in characteristics of earnings shocks for a firm (LOSS, DECLINE, and SHOCK).

We estimate equation (6) separately for both forecast periods for each of our two measures of dispersion. Table 7 shows that the normalized standard deviation of analyst forecasts increases following Reg FD for both forecast periods; the coefficient of variation increases for early forecasts only. The coefficient of the REGFD variable is positive and statistically significant in these three estimations.¹⁷ For early forecasts, the magnitude of the post-FD increase in forecast standard deviation is about 1.7% of the mean absolute forecast error.

Consistent with our expectations, dispersion is positively related to forecast age. Forecast dispersion is also related to the characteristics of earnings shocks experienced by a company. For both the NSD and COV measures, forecasts of losses exhibit far more dispersion than do forecasts of profits in both forecast periods. Companies that experience an earnings decline (relative to the same quarter of the prior year) have greater COV but lower NSD.¹⁸

C. Subsample Results

We next examine whether post-FD changes in forecast dispersion differ based on firm size, industry, and post-FD time period. In each case, we estimate variants of equation (6) and treat company-quarter effects as fixed.

17. These results are qualitatively similar when we winsorize all continuous variables in the regression at the first and 99th percentiles of the sample.

18. In untabulated regressions, we add an explanatory variable measuring negative special items, NEGSPEC, as defined in n. 13 above. The coefficient of this variable is statistically insignificant, and its addition does not change the sign or significance of the coefficient of REGFD.

TABLE 7 Fixed-Effects Panel Regressions of Dispersion in Analysts' Forecasts

Explanatory Variable	A. Normalized Standard Deviation		B. Coefficient of Variation	
	Early Forecasts	Late Forecasts	Early Forecasts	Late Forecasts
REGFD	.0011 (7.17) ^a	.0006 (5.53) ^a	.0168 (8.40) ^a	-.0024 (-1.61)
LAGE	.0018 (3.06) ^a	-.0003 (-.80)	.0318 (2.84) ^a	.0037 (3.29) ^a
LOSS	.0045 (7.60) ^a	.0063 (8.02) ^a	.1460 (13.89) ^a	.1530 (13.54) ^a
DECLINE	-.0005 (-2.49) ^b	-.0002 (-.63)	.0188 (9.53) ^a	.0370 (21.00) ^a
SHOCK	.0029 (.58)	-.0006 (-.31)	-.0679 (-2.21) ^b	.0851 (1.34)
Overall R ²	.0499	.0229	.1154	.1291
Sample size	46,285	57,063	31,834	39,464
p-value for the difference*	.5505		.0000	

NOTE.—Each column in the table shows coefficient estimates from the following cross-sectional time-series regression for either early or late forecast period (defined in table 3):

$$\text{DISPERSION}_{jt} = b_1 \text{REGFD}_t + b_2 \text{LAGE}_{jt} + b_3 \text{LOSS}_{jt} + b_4 \text{DECLINE}_{jt} + b_5 \text{SHOCK}_{jt} + u_{jt}$$

where DISPERSION equals normalized standard deviation (NSD) or coefficient of variation (COV). LAGE_{jt} is the natural log of one plus the number of days between earnings release and the date at which the standard deviation is computed. The variables are as defined in table 2, and company-quarter effects are treated as fixed. Early and late forecast periods are as defined in table 3. The sample includes quarters ending between January 1995 and June 2004; the September 2000 quarter is excluded for the late forecast period. Observations are also excluded if there are fewer than three analysts following a company, or if $p_{jt} < \$1$ (for NSD) or $\bar{X}_{jt} < \$0.10$ (for COV). Reported *t*-statistics (shown in parentheses) are from a robust variance estimator, and R² values are based on overall variation within and across analyst-company pairs.

^a Denotes statistical significance at the 1% level, in two-tailed tests.

^b Denotes statistical significance at the 5% level, in two-tailed tests.

* Test for the difference in the coefficient of REGFD between early and late forecasts.

1. Firm Size

As discussed in Section III.C.1, small firms may have engaged more in selective disclosure pre-FD in order to attract and retain analyst coverage. To the extent that this is true, we would expect the post-FD increase in forecast dispersion to be more pronounced in small firms. We examine this issue by estimating the following panel regression:

$$\begin{aligned} \text{DISPERSION}_{jt} = & b_{1S} \text{REGFD}_t \times \text{SMALL}_j + b_{1L} \text{REGFD}_t \times \text{LARGE}_j \\ & + b_2 \text{LAGE}_{jt} + b_3 \text{LOSS}_{jt} + b_4 \text{DECLINE}_{jt} \\ & + b_5 \text{SHOCK}_{jt} + u_{jt}, \end{aligned} \quad (7)$$

where the variables are as defined in Sections III.B, III.C.1, and IV.B above.

Part 1 of table 8 shows estimates of equation (7). The normalized standard deviation (NSD) increases following Reg FD for both small and large firms, but there is no evidence of a greater increase for small firms than for large firms. The coefficient of variation (COV) increases for early forecasts for large

TABLE 8 Fixed-Effects Panel Regressions of Forecast Dispersion: Differences across Firm Size, Industry, and Post-FD Time Period

	A. Normalized Standard Deviation				B. Coefficient of Variation			
	$\hat{b}_{1,k}$	$t(\hat{b}_{1,k})$	R^2	N	$\hat{b}_{1,k}$	$t(\hat{b}_{1,k})$	R^2	N
1. Company size:								
Early forecasts								
Small firms	.0008	4.49 ^a			.0072	1.71		
Large firms	.0011	5.33 ^a	.0701	41,388	.0195	9.19 ^a	.1245	29,005
<i>p</i> -value for the difference	.3885				.0092			
Late forecasts:								
Small firms	.0003	1.75			-.0114	-3.71 ^a		
Large firms	.0008	5.19 ^a	.0215	50,578	.0011	.73	.1394	35,465
<i>p</i> -value for the difference	.0348				.0002			
2. Industry:								
Early forecasts:								
“Guidance more likely” industries	.0009	6.16 ^a			.0197	4.49 ^a		
“Guidance less likely” industries	.0012	4.94 ^a	.0499	46,285	.0158	7.17 ^a	.1150	31,834
<i>p</i> -value for the difference	.2862				.4187			
Late forecasts:								
“Guidance more likely” industries	.0003	1.72			-.0037	-1.06		
“Guidance less likely” industries	.0008	5.03 ^a	.0231	57,062	-.0020	-1.28	.1293	39,464
<i>p</i> -value for the difference	.0170				.6547			
3. Post-FD time period:								
Early forecasts:								
First post-FD year	.0007	4.72 ^a			.0126	4.48 ^a		
Subsequent post-FD years	.0013	6.59 ^a	.0491	46,285	.0191	9.03 ^a	.1153	31,834
<i>p</i> -value for the difference	.0015				.0191			
Late forecasts:								
First post-FD year	.0003	1.77			-.0014	-.59		
Subsequent post-FD years	.0007	5.45 ^a	.0227	57,063	-.0028	-1.80	.1291	39,464
<i>p</i> -value for the difference	.0279				.5456			

NOTE.—Part 1 of the table shows estimated coefficients $\hat{b}_{1,k}$ ($k = S, L$) from the following cross-sectional time-series regression for either early or late forecast period (defined in table 3):

$$\text{DISPERSION}_{jt} = b_{1,S}\text{REGFD}_{jt} \times \text{SMALL}_{jt} + b_{1,L}\text{REGFD}_{jt} \times \text{LARGE}_{jt} + b_2\text{LAGE}_{jt} + b_3\text{LOSS}_{jt} + b_4\text{DECLINE}_{jt} + b_5\text{SHOCK}_{jt} + u_{jt}$$

where DISPERSION equals normalized standard deviation or coefficient of variation, and the variables are as defined in tables 2, 5, and 7. Company-quarter effects are treated as fixed. The sample includes quarters ending between January 1995 and June 2004; the September 2000 quarter is excluded for the late forecast period. Observations are also excluded if there are fewer than three analysts following a company, or if $p_{jt} < \$1$ (for NSD) or $\bar{X}_{jt} < \$0.10$ (for COV). Reported *t*-statistics are from a robust variance estimator, and R^2 values are based on overall variation within and across analyst-company pairs. *N* denotes sample size. In parts 2 and 3, estimates are shown from regressions similar to those in part 1 with SMALL and LARGE replaced, respectively, by GMLIND and GLLIND (in pt. 2) and by FIRST and LATER (in pt. 3). The last four variables are as defined in table 5. *p*-values are for tests of differences in the coefficient of REGFD between the two groups.

^a Denotes statistical significance at the 1% level, in two-tailed tests.

firms and decreases for late forecasts for small firms. Once again, there is no evidence of a greater post-FD increase in dispersion for small firms than for large firms.

2. Industry

We next examine whether FD has a more pronounced effect on forecast dispersion in industries where guidance was more likely pre-FD. We estimate a panel regression similar to equation (7) above, except that we replace the SMALL and LARGE variables by the GMLIND and GLLIND variables, respectively. The latter two variables are as defined in Section III.C.2.

Part 2 of table 8 shows that for early forecasts, both measures of dispersion increase post-FD for both groups of industries, with no significant difference between the two industry groups. For late forecasts, NSD increases only for industries where guidance was less likely pre-FD. There is no increase in COV for either industry group.

3. Post-FD Time Period

Finally, we examine how FD's effects on forecast dispersion change over time as analysts and companies adjust to the new regulatory environment. We replace the SMALL and LARGE variables in equation (7) by two variables, FIRST and LATER, as defined in Section III.C.3. The results are shown in part 3 of table 8.

We find that the post-FD increase in NSD is not confined to the period immediately following FD's adoption. NSD generally increases significantly in the first post-FD year as well as in subsequent years. But the increase is significantly bigger for the latter years. For the early forecast period, there is a similar pattern for COV. For late forecasts, there is no increase in COV post-FD.

D. Comparison with Prior FD Research

Prior research finds mixed results on post-FD changes in forecast dispersion across analysts. While Irani and Karamanou (2003) find that dispersion increases, Heflin et al. (2003) find that it does not. To compare our dispersion results with the results of prior research that examines late forecasts for large firms, we restrict our post-FD sample period to the first 3 quarters after FD's adoption. We then reestimate regressions similar to those in part 1 in panel A of table 8. Our results are consistent with those of Heflin et al. for the sample period and type of forecasts that they examine. In particular, we find no significant increase in NSD for late forecasts for either large or small firms. However, for early forecasts, we find a significant increase in forecast dispersion for both small and large firms, an effect not examined in prior research. To save space, these results are not shown here. Furthermore, while prior studies provide early evidence on Reg FD's adoption based on 3 quarters of data, we examine its medium-term effects over a nearly 4-year post-FD period. As discussed in Section IV.C.3, we find that the magnitude of the increase in analyst forecast dispersion (NSD) increases with the passage of time after FD's adoption.

V. Summary and Concluding Remarks

This article analyzes changes in the behavior and performance of sell-side equity analysts following the October 2000 implementation of the SEC's fair disclosure rules. These rules place severe restrictions on one-on-one communication between a company and a market participant such as an analyst

or an investor. Generally referred to as Reg FD, these rules ban the practice of “selective guidance,” where a company provides future earnings or other crucial business information to analysts and large investors without simultaneously releasing it to all investors. Advocated by the then SEC chairman Arthur Levitt, these new rules, like existing insider trading rules, are intended to level the playing field for all investors.

We analyze a large sample of individual analyst and consensus forecasts of earnings over a roughly 10-year period surrounding the adoption of Reg FD. We perform panel regressions that treat analyst-company-quarter effects (for individual analyst forecasts) or company-quarter effects (for consensus forecasts) as fixed and that control for forecast age and several characteristics of companies’ earnings shocks. We investigate whether FD’s impact differs for early versus late forecasts, or for small versus large companies. We also examine how FD’s effects evolve over time as analysts and companies adjust to the new regulatory environment.

We have two main sets of findings. First, earnings forecasts become less accurate following Reg FD, both at the level of the individual analyst and the consensus. For individual analysts, the magnitude of this effect is significantly larger for early forecasts than for late forecasts. Prior research on the short-run impact of Reg FD (e.g., Heflin et al. 2003) finds that by the time earnings are released, analyst forecasts post-FD are essentially no less accurate than they were pre-FD. We find that the story is quite different for forecasts made earlier. Our point estimate indicates that for a \$10 stock, the latest EPS forecast made by an individual analyst over a 2-month period before the beginning of a quarter (the “early forecast period”) is about 2.3 cents less accurate post-FD than it was pre-FD. The magnitude of this effect declines significantly—by almost one-half—for the latest forecast made over the 2-month period before earnings release (the “late forecast period”).

For consensus forecasts, the post-FD decrease in forecast accuracy is even more striking for smaller firms. For firms in the bottom half of our sample by market capitalization, the corresponding decrease in EPS forecast accuracy for late forecasts is as much as 4.5 cents compared to only 0.7 cents for firms in the top half of the sample. For consensus forecasts, the magnitude of this effect is quite large in the first post-FD year, but it later declines substantially. For late forecasts, the figure is 4 cents for the first post-FD year, declining to an average of 1.6 cents over the following 3 years. For individual analysts, the effect starts out as small, then increases with the passage of time.

In our second set of findings, individual analysts following a company are more dispersed in their earnings forecasts post-FD. The magnitude of this effect is larger for early forecasts than for late forecasts. The evolution of the post-FD change in forecast dispersion displays an interesting pattern. The increase in dispersion starts out as a relatively small effect in the first post-FD year, and then it increases substantially over the following 3 years. In the absence of direct, one-on-one communication from company management that can point all analysts to a common EPS number, analysts increasingly arrive

at forecasts that are different from each other. Overall, our findings suggest that there has been a reduction in both selective guidance and the quality of analyst forecasts post-FD.

While this research has examined changes in the behavior and performance of sell-side analysts over the medium term following the adoption of Reg FD, an analysis of the long-term effects of these rules will also be interesting. Of course, far more time needs to pass before such analysis becomes feasible. Detailed knowledge of the long history of interactions between analysts and companies will be useful in putting the effects of the new rules in perspective. For instance, how old is the practice of selective earnings guidance? How was information transmitted from companies to analysts and investors before the advent of selective guidance? And how does the post-FD equilibrium differ from that in the pre-selective-guidance era? All of these are interesting questions for future research.

References

- Bailey, Warren, Haitao Li, Connie X. Mao, and Rui Zhong. 2003. Regulation Fair Disclosure and earnings information: Market, analyst and corporate responses. *Journal of Finance* 58: 2487–2514.
- Brown, Lawrence D. 2001. A temporal analysis of earnings surprises: Profits versus losses. *Journal of Accounting Research* 39:221–41.
- Clement, Michael B. 1999. Analyst forecast accuracy: Do ability, resources, and portfolio complexity matter? *Journal of Accounting and Economics* 27:285–303.
- Eleswarapu, Venkat R., Rex Thompson, and Kumar Venkataraman. 2004. The impact of Regulation Fair Disclosure: Trading costs and information asymmetry. *Journal of Financial and Quantitative Analysis* 39:209–25.
- Gintschel, Andreas, and Stanimir Markov. 2004. The effectiveness of Regulation FD. *Journal of Accounting and Economics* 37:293–314.
- Heflin, Frank, K. R. Subramanyam, and Yuan Zhang. 2003. Regulation FD and the financial information environment: Early evidence. *Accounting Review* 78:1–37.
- Hutton, Amy. 2003. The determinants and consequences of managerial earnings guidance prior to Regulation Fair Disclosure. Working paper, Dartmouth College (April).
- Irani, Afshad J., and Irene Karamanou. 2003. Regulation Fair Disclosure, analyst following, and analyst forecast dispersion. *Accounting Horizons* 17:15–29.
- Jacob, John, Thomas Z. Lys, and Margaret A. Neale. 1999. Expertise in forecasting performance of security analysts. *Journal of Accounting and Economics* 28:51–82.
- Jorion, Philippe, Zhu Liu, and Charles Shi. 2005. Informational effects of Regulation FD: Evidence from rating agencies. *Journal of Financial Economics* 76:309–30.
- Mikhail, Michael B., Beverly R. Walther, and Richard H. Willis. 1997. Do security analysts improve their performance with experience? *Journal of Accounting Research* 35, suppl.: 131–57.
- SEC (Securities and Exchange Commission). 1998a. The numbers game. Remarks by Chairman Arthur Levitt. New York University Center for Law and Business (September 28). <http://www.sec.gov/news/speech/speecharchive/1998/spch220.txt>.
- . 1998b. A question of integrity: Promoting investor confidence by fighting insider trading. Remarks by Chairman Arthur Levitt. SEC Speaks Conference, Washington, DC (February 27). <http://www.sec.gov/news/speech/speecharchive/1998/spch202.txt>.
- Wooldridge, Jeffrey M. 2002. *Econometric analysis of cross section and panel data*. Cambridge, MA: MIT Press.