SEC Regulation Fair Disclosure, Information, and the Cost of Capital*

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October 19, 2006

Abstract

Regulation Fair Disclosure ("Reg FD"), adopted by the U.S. Securities and Exchange Commission in October 2000 was intended to stop the practice of "selective disclosure," in which companies give material information only to a few analysts and institutional investors prior to disclosing it publicly. Our analysis shows that the adoption of Reg FD caused a significant shift in analyst attention, resulting in a welfare loss for small firms, which now face a higher cost of capital. The loss of the "selective disclosure" channel for information flows could not be compensated for via other information transmission channels. This effect was more pronounced for firms communicating complex information and, consistent with the investor recognition hypothesis, for those losing analyst coverage. Moreover, we find no significant relationship of the different responses with litigation risks and agency costs. Our cross-sectional results suggest that Reg FD had unintended consequences and that "information" in financial markets may be more complicated than current finance theory admits.

* We thank Thompson Financial for providing access to the First Call database, the Rodney White Center for Financial Research for financial assistance We also thank Harold Mulherin (the Editor), the referee, Marshall Blume, Brian Bushee, John Core, Wayne Guay, Andrew Metrick, David Musto, Mitch Petersen, Michael Roberts, Catherine Schrand, Nick Souleles, Ayako Yasuda, and seminar participants at Wharton Finance, Wharton Accounting, Moody's Investors Services, the 2004 European Finance Association Meeting, the 2006 American Finance Association Meeting, the First Annual NYU/Penn Conference on Law and Finance, and the Boundaries of SEC Regulation 2006 Conference for their helpful comments. Please address correspondence to: Leonardo Madureira, Department of Banking and Finance, Case Western Reserve University, 364 PBLB, 11119 Bellflower Rd, Cleveland, OH 44106. E-mail: leonardo.madureira@case.edu.

1. Introduction

We empirically investigate the effects of the adoption of Regulation Fair Disclosure ("Reg FD") by the U.S. Securities and Exchange Commission ("SEC"). Reg FD, which took effect on October 23, 2000, was intended to stop the practice of "selective disclosure," in which companies give material information only to certain selected analysts and institutional investors prior to disclosing it publicly. To provide an evaluation of Reg FD it is important to understand both how information is transmitted from firms to capital markets and how the allocation of information-producing resources affects securities prices. We find that the adoption of Reg FD caused a significant reallocation of information-producing resources, resulting in a welfare loss for small firms, which now face a higher cost of capital. The loss of the "selective disclosure" channel for information flows could not be compensated for via other information transmission channels. This unintended consequence of Reg FD shows that "information" in financial markets is more complicated than current theory admits and has some important public policy implications.

There were three reasons given by the SEC for the adoption of Reg FD. First, it was argued that selective disclosure leads to a loss of investor confidence. If small investors fear that insiders will regularly profit at their expense, they will not be nearly as willing to invest. A second rationale concerned the link between corporate governance and the incentives to engage in selective disclosure. This problem was the use of information by management to essentially bribe analysts, perhaps in exchange for a quid pro quo. Finally, the SEC stated the view that selective disclosure is not required for market efficiency because of technological change. The basic idea seems to be that companies can now use websites and/or "webcast" conference calls, making the channel of information flow from firm management to analysts less important.

Is Reg FD a desirable public policy? We focus on assessing the effects of Reg FD on information production and transmission in capital markets; we ask whether the same information is transmitted to capital markets since the passage of Reg FD, just via a different channel now (albeit in a possibly "fairer" way), or whether, for some reason, there is less information transmitted to capital markets. We view this issue as of independent interest. Little is known about whether the sources of information or the costs of producing the information have any impact on firm values and security prices. Ultimately, we care about the effects on security prices and the resulting allocation of resources. We use the natural experiment of the adoption of Reg FD to investigate these issues.

Information can be transmitted from firms to markets via four channels: (1) firms, in addition to mandatory disclosures, can disclose information to the public voluntarily (e.g., earnings pre-announcements); (2) firms can selectively disclose information, e.g., phone calls, or

one-on-one meetings; (3) "sell side" analysts can produce research which is released to the public, e.g., analysts reports; (4) private information can be produced by outsiders, "informed traders," who then trade on the basis of their information. Reg FD sought to eliminate the second channel of information flow, under the implicit assumption that the same information would still flow into markets but by the other channels, particularly channel (1). But, Reg FD also affects channel (3) because the biggest impact of Reg FD is on analysts. Some have predicted that Reg FD will either lead to a diminished role for analysts since the information will now be available for everyone or a large-scale reduction in analysts' jobs since many simply cannot perform an adequate analysis without the aid of selective disclosure (Coffee, 2000). If analysts' previous role is subsumed by the other channels of information flow, then market efficiency is not changed. This is the logic of Reg FD that is our focus.

Our main empirical strategy is to explore various cross-sectional differences among firms pre- and post-Reg FD. Our main findings are that there was a reallocation of information-producing resources and that this reallocation had asset pricing effects. We document that small firms on average lost 17 percent of their analyst following, while big firms gained seven percent, on average. Moreover, while the odds of the big firms voluntarily disclosing information (through pre-announcements) after Reg FD are twice as large as in the period before Reg FD, small firms did not increase their pre-announcements significantly. We find consistent effects of this reallocation on earnings forecast errors and market responses to earnings announcements: small firms experience higher forecast errors (Agrawal and Chadha, 2002 find similar results) and volatility at earnings announcements, consistent with a higher information gap; no significant increases occur for big firms. These results suggest that big firms were able to replace the loss of channel (2) with channels (1) and (3), but that small firms were not able to do so. We demonstrate that this reallocation resulted in a higher cost of capital for small firms (and no significant change for big firms).

We further investigate other characteristics of firms that may explain the cross-sectional impact of Reg FD. We explore Merton's (1987) investor recognition hypothesis, that firms which are not covered by analysts or receive little publicity have higher costs of capital. We look at the complexity of information disclosed by firms, differences in litigation risks among firms, and we examine the link between agency problems in firms and incentives to make voluntary disclosures. Consistent with the investor recognition hypothesis, we find that the stocks of small firms that completely lost analyst coverage after Reg FD experienced significant increases in the cost of capital, while small stocks with no previous analyst coverage—which presumably did not have any analysts benefiting from selective disclosure pre-FD—experienced no significant change in

the cost of capital. Moreover, we find that more complex firms (using intangible assets as a proxy for complexity) are more adversely affected by Reg FD than less complex firms.

The post-Reg FD period coincides with the onset of a recession in early 2001 and the bursting of the technology bubble. We conduct various robustness tests to show that our results are driven by Reg FD and not by other contemporaneous effects. In particular, we conduct our analysis excluding high tech firms, which were the ones most affected by the bursting of the bubble, and include a recession dummy interacted with the post-FD period. The cross-sectional results and the robustness tests, while not conclusive proof that the effects are exclusively due to Reg FD, provide strong evidence of Reg FD being an important driving force behind the results.

Several papers examine the impact of Reg FD in the information environment. There is a consensus in the literature that the quantity of voluntary public disclosures increased after Reg FD as reported in, for example, Heflin et al. (2003), Bailey et al. (2003), and Straser (2002). The evidence is mixed on other relevant aspects such as the dispersion and accuracy of analyst forecasts, volatility around earnings announcement, and the degree of information asymmetry and informed trading. For example, with respect to the accuracy or dispersion of analyst forecasts, Shane et al. (2001) and Heflin et al. (2003) find no significant change in either, and Bailey et al. (2003) find no increase in the accuracy but significant increases in dispersion. Agrawal and Chadha (2002) and Mohanram and Sunder (2004) find increases in both, and Irani and Karamanou (2003) find increases in dispersion. On measures of the information gap, like return volatility around earnings announcement, Heflin et al. (2003), Shane et al. (2001), and Eleswarapu et al. (2002) find decreases, but Bailey et al. (2003) and Ahmed and Schneible (2005) find no increase after controlling for important factors. Similarly, with respect to the level of information asymmetry reflected in trading costs, Eleswarapu et al. (2002) find that it decreases, consistent with SEC goals to level the playing field, but Straser (2002) finds opposite results.[1]

Our results contribute to the extensive literature in essentially two dimensions. First, we identify several firm characteristics that contribute to cross-sectional variations in the information environment pre- and post- Reg FD. In particular, we explore the effect of cross-sectional variations on firm size, complexity - as measured by the amount of intangible assets-, exposure to litigation risk, and proxies for the intensity of use of the selective disclosure channel pre-FD. By

[1] Other studies that explored interesting aspects of Reg FD include: Bushee et al. (2003), who analyzed how firms previously using closed or open conference calls responded to the rule change; Jorion et al. (2005), who investigated whether credit rating agencies – exempted from the application of Reg FD – gained an informational advantage; Collver (2005), who examined the impact of the regulatory changes in informed trading; and Gintschel and Markov (2004), who compared the informativeness of financial analysts' outputs pre- and post-FD.

breaking down the sample into subgroups with different exposures to the closure of the selective disclosure channel, we are able to better pinpoint Reg FD as the driving force behind the results. Our second main contribution is to examine the asset pricing implications of the regulatory changes. Our findings indicate that firms more exposed to the selective disclosure channel experienced a higher cost of capital after the passage of the regulation.

The paper proceeds as follows. In Section 2 we investigate the reallocation of information-producing resources following the enactment of Reg FD. In Section 3 we look at the effects of this reallocation, in terms of the effects on earnings forecast errors, market responses to earnings announcements, and the cost of capital. In Section 4 we investigate whether characteristics aside from size help explain the results. Some robustness results are discussed in Section 5. The implications for inferences about information and public policy are in Section 6.

2. The Post-Reg FD Reallocation of Information-Producing Resources

In this section we investigate whether there is a change in information production among firms of different sizes before and after Reg FD. There are several reasons to believe that there are cross sectional differences of Reg FD on firms of different size. King, Pownall and Waymire (1990) argue that large firms have better disclosure policies because the incentives for private information acquisition are greater in their case. Lang and Lundholm (1993) argue that production of information entails fixed costs and thus disclosure costs per unit of size are more likely to decrease with size. In addition, Goshen and Parshomovsky (2001) argue that small firms may need selective disclosure of information to maintain and/or attract analyst following, because for small firm liquidity may be so low that the costs of obtaining private information may be higher than the gains from selling or trading on private information.[2]

We first discuss the data sets and overall methodology, and then we investigate whether there is a change in information production by analysts (channel (3)), and whether firms have changed the use of voluntary disclosures (pre-announcements) – channel (1).

A. Data and Methodology

We collect NYSE and NASDAQ firm-quarter observations from CSRP for the period 1997:2002 and merge them with information from First Call (actual earnings announcements,

[2] A survey of members of the securities bar by the American Bar Association (2001) found that 67 percent of respondents believed that Reg FD had a greater impact on small and mid-size companies than on big companies. A survey by the National Investor Relations Institute (2001) found that the fraction of firms that responded that less information was being provided post-FD was higher for small firms when compared to the group of mid-size and big firms. The same survey found that the fraction of firms that perceived a

analysts forecasts and pre-announcements), COMPUSTAT (accounting data) and IRRC (corporate governance index). The Appendix describes details on the construction of our sample.

As discussed in the Introduction, many tests are based on a division of the sample according to firm size. Each firm is allocated to one of three groups based on its average size during the entire sample period, 1997-2002. The group of small firms is formed by taking firms with average size below the 50th percentile of the distribution; the group of mid-size firms is formed by firms with average size between the 50th and the 80th percentiles and the group of big firms is formed by firms in the upper quintile of the distribution (see the Appendix for details).

We analyze the effects of Reg FD on market variables (analyst following, use of pre-announcements, forecast error and volatility at earnings announcements) by running panel data (cross-sectional time series) firm fixed effects regressions on the variables of interest. For each such variable, we run panel data regressions with the aggregated data from the pre-FD and post-FD subsamples, using as explanatory variables one or more variables related to the Reg FD period and other variables that control for factors other than Reg FD. (See the Appendix for the definitions of the pre-FD and post-FD periods.)

B. The Reallocation of Analysts

Analyst following is an important part of a firm's information environment.[3] In order to proxy for the activity of production of public information by market professionals, we track analyst following of firms by sell-side financial analysts. Sell-side analysts release different kinds of information, from forecasts about upcoming financial releases to more complex text reports analyzing the firm's status, future prospects, state of the industry, etc. Earnings forecasts are closely tracked and they can be compared with the subsequent actual earnings releases, so we can extract a simple measure of the quality of analysts' research. We adopt the release of sell-side earnings forecasts as our proxy for information production by market research professionals (hereafter referred to as "analyst following").

Our first measure of analyst following is $NOFOR_{i,q}$, the number of outstanding analyst forecasts for firm i's upcoming earnings release for quarter q, released up to 2 days before the quarter q's actual earnings release. Since we are trying to examine the determinants of this variable along a time series dimension, we have to worry about possible time trends in the market

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decrease in analyst following post-FD was higher for the group of small firms, while the fraction of firms that perceived an increase in analyst following was higher for the group of big firms.

[3] Many papers examine the activity of security analysts as a component of the firm's information environment, e.g., Bhushan (1989a), Brennan and Hughes (1991), Shores (1980) and Brennan and Subrahmanyam (1995).

for financial analysts. To tackle this issue, we define a measure of standardized analysts following, $NOFOR\_STD_{i,q}$, which is computed by dividing $NOFOR_{i,q}$ by the total amount of analyst forecasts available for all firms in quarter q. Roughly speaking, $NOFOR\_STD_{i,q}$ is firm i's share of the market for financial analysts in quarter q, measured in percentage terms.

Table 1 presents univariate statistics on analyst following before and after Reg FD. Results for aggregated data in Panel A indicate that, after Reg FD is adopted, there is a significant increase in the average number of forecasts accompanied by a decrease in the median number of forecasts, which might suggest a shift in the distribution of the number of forecasts, with the mass being more concentrated on the right side of the distribution. Panel B breaks down the analysis based on firm size, allowing us to better assess the shift in the distribution of the number of forecasts. The average number of forecasts significantly increases for the big firms and decreases for small firms, and the results are robust to using the standardized measure of analyst following. For the portfolio of mid-size firms, the results are not clear cut: the average number of forecasts seems to increase, but one cannot reject the hypotheses that the median number of forecasts and the standardized measures of analyst following are the same for the periods pre- and post-FD.

Turning now to a multivariate analysis, we estimate a panel data firm-fixed effects regression of the number of forecasts. Let the subscript q indicate the quarter of the observation, and i identify the ith firm. Then the basic regression model is:

$$N_{i,q}=a_{0i}FIRM_i+a_1\,POSTFD_{i,q}+a_2\,SIZE_{i,q}+a_3\,LOSS_{i,q}+a_4\,ABSCAR_{i,q}+a_5\,SIGNCAR_{i,q}+\varepsilon_{i,q} \qquad (1)$$

where

$N_{i,q}$	=	Dependent variable, either $NOFOR_{i,q}$ or $NOFOR\_STD_{i,q}$
$FIRM_i$	=	Dummy set to 1 for the i^{th} firm
$POSTFD_{i,q}$	=	Dummy set to 1 when the data point is observed after Reg FD was adopted
$SIZE_{i,q}$	=	Log of market value of the firm i at the end of the quarter q divided by the market index
$LOSS_{i,q}$	=	Dummy set to 1 when the actual earnings for firm i in quarter q are negative
$ABSCAR_{i,q}$	=	The absolute value of the cumulative abnormal return for firm i in quarter q
$SIGNCAR_{i,q}$	=	Dummy set to 1 when the cumulative abnormal return for firm i in quarter q is negative

To assess the importance of Reg FD, we include dummies that identify whether the data point is from the period after Reg FD was adopted. These dummies should then capture any effect of Reg FD on analyst following. The control variables are motivated by the extant literature on analyst following. First, there is overwhelming evidence that size can explain analyst following

(e.g., Bhushan, 1989b; Brennan and Hughes, 1991; Lang and Lundholm, 1993, 1996; and Chung and Jo, 1996). The three other explanatory variables – whether the firm is about to release a negative earnings report and the recent path of abnormal returns for the firm – are different dimensions of firm performance, which might influence an analyst's decision to track a firm (e.g., Bhushan and O'Brien , 1990). [4]

The results for the panel data fixed effects of analyst following are reported in Table 2. When all the data are examined together, in specifications I and III in panel A of Table 2, the coefficient on the post-FD dummy is positive and statistically significant, indicating an overall increase in the number of quarterly forecasts available after Reg FD is adopted. A more distinctive picture is available when we examine differential effects on groups of firms based on size. For this, we break down the post-FD dummy in specifications II and IV into different dummies according to the size group each firm belongs to. The results indicate that while big firms have increased their analyst following post-FD, mid and small firms suffered the opposite effect, having their analyst following decreased (the coefficients are significantly different from each other). The models in panel A of Table 2 have significant explanatory power: the R^2 is around 15 percent even after accounting for firms' fixed effects characteristics.[5]

The models used in panel A impose the same regression coefficients independently of the size group that the firm belongs to. Since specifications II and IV allow for different post-FD dummies depending on the firm's group, one might argue that we should allow for other control variables' responses to vary as well with the firm's group. To address this concern, we repeat the panel data fixed effects regression (1) separately for each group. The results reported in panel B indicate that the coefficients on the control variables indeed vary among the groups. The results regarding the effects of Reg FD on analyst following do not change qualitatively: each model keeps its high explanatory power and big firms experience an increase in analyst following at the expense of mid-sized and small firms, whose following decreased post-FD.[6]

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[4] Despite the presence of the fixed effects dummy a_{0i} for each company in the sample, we opt to keep SIZE in the regression because, in the period over which the panel data is applied, a firm might have changed its size to such an extent that it would influence analyst following. The other explanatory variables are firm characteristics that are clearly dependent on the time-period in which they are measured, and thus are not likely to be absorbed by the company fixed effects' intercept.

[5] All the R^2's reported for OLS panel data are *within-groups* R^2's. The *within* R^2 is obtained from a regression using demeaned variables. Since we are mostly interested in the effect of the post-FD dummy, we avoid using the *between* or *overall* R^2's because they are driven more by the explanatory power coming from the cross-sectional variation between firms. For example, the *between* R^2 for specification IV in Table 2 is 0.60, but this is largely due to the high correlation between size and analyst following.

[6] All the results discussed above from an unbalanced panel, but they are qualitatively similar when regressions are run with a balanced panel of firms with data available for all 16 quarters.

To give a sense of the magnitude of the changes in analyst following post-FD, we can compare the coefficients on the post-FD dummy to the pre-FD mean analyst following. The comparison using the coefficients in specification VI of panel A of Table 2 and the pre-FD averages from Table 1 indicates that big firms on average experience an increase of about 7 percent in quarterly analyst following; mid-size firms have an average decrease of 5 percent and small firms face an average decrease of 17 percent in the their analyst following.

C. Response of Firms' Pre-Announcements to Reg FD

In this section we examine whether firms changed the way they employ voluntary public disclosures after Reg FD. We focus on the firm's use of public pre-announcements of earnings before the date of mandatory earnings announcement. Earnings pre-announcements are an important element of the firm information environment (see for example the 2001 survey of the National Investor Relation Institute, NIRI, 2001). They are systematically compiled by First Call Corporation from corporate press releases and interviews, which is the dataset we use here.

Although earnings pre-announcements are statements about future earnings releases, typically managers make these statements with a high degree of certainty, as they often refer to upcoming quarterly earnings releases, after management has already seen sales and operating costs, as well as other key components of income.[7] The approach we pursue is to examine the likelihood that a company, in the period between two weeks before the end of the quarter and two days before the earnings announcement date, will voluntarily disclose forward-looking earnings information (this is the same approach adopted by Soffer et al, 2000). In particular, our goal is to determine whether firms are using this channel to communicate information to the market more or less after the passage of Reg FD (see appendix for additional details about the definition of earnings pre-announcements).

Table 3 presents some descriptive statistics on the issuance of pre-announcement before and after Reg FD. Panel A includes the results for the complete sample. Overall, we observe a steep increase in the use of pre-announcements, from 2,990 before Reg FD to 4,078 after the regulation was adopted, and the fraction of firm-quarters with at least one pre-announcement jumped from 8.8 percent to 12.7 percent. A more interesting picture is presented in Panel B, where the summary statistics are broken down according to groups of firms based on size. We

[7] Soffer et al (2000) point out to the distinction between earnings pre-announcements and earnings forecasts. While both refer to yet-to-be-released earnings, managers make these announcements with different levels of certainty: a statement about the fourth quarter profits made during the third quarter is a forecast, while a statement made around or after the end of the fourth quarter, before the mandatory release

observe that the increase in the use of pre-announcements after FD is confined to the big and mid-size firms; big (mid-size) firms voluntary disclosure in 10.1 percent (9.6 percent) of firm-quarters pre-FD and in 18.1 percent (14.6 percent) of the firm-quarters post-FD, while small firms do not significantly change their use of voluntary disclosures around Reg FD.[8]

We now turn to multivariate analysis. Our dependent variable is a dummy that, for each firm-quarter, is set to one whenever the firm issues one or more pre-announcements in the period from 15 days before the end of the quarter, say date τ, until two days before the actual earnings release. Our multivariate cross-sectional approach is to run a panel data logistic regression. Similar to the traditional panel data regression, the fixed effects logistic regression is equivalent to having one intercept for each firm. The fixed effects logistic models are presented below.

$$Prob[PREANN_{i,q}=1] = f(a_{oi} FIRM_i + a_1 POSTFD_{i,q} + a_2 SIZE_{i,q} + a_3 SURPRISE_{i,q} +$$

$$a_4 NEG\_SURPRISE_{i,q} + a_5 ABSCAR_{i,q} + a_6 SIGNCAR_{i,q} + \boldsymbol{\varepsilon_{i,q}}) \quad (4)$$

and

$$Prob[PREANN_{i,q}=1] = f(a_{oi} FIRM_i + a_1 POSTFD_{i,q} +$$

$$a_2 SIZE_{i,q} + a_3 LOSS_{i,q} + a_4 ABSCAR_{i,q} + a_5 SIGNCAR_{i,q} + \boldsymbol{\varepsilon_{i,q}}) \quad (5)$$

where, $SIZE_{i,q}$ and $LOSS_{i,q}$ are as defined in section 2.B, and

$PREANN_{i,q}$ = Dummy set to 1 when there is at least one pre-announcement issued by the firm between 15 days before the end of the quarter q (date τ) and 2 days before the actual release of that quarter's earnings announcement

$SURPRISE_{i,q}$ = Absolute value of the difference between the actual earnings and the mean forecast at date τ, scaled by the end of the quarter book equity per share

$NEG\_SURPRISE_{i,q}$ = Dummy set to 1 when the actual earnings is below the consensus forecast available at date τ

$ABSCAR_{i,q}$ = The absolute value of the cumulative abnormal return for firm i along quarter, up to date τ

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date, is a pre-announcement. They report that pre-announcements occur on average about 20 calendar days before earnings announcements.

[8] In unreported results, we also examine pre-announcements issued in other periods (e.g., prior to two weeks before the end of the quarter), and the changes around Reg FD are similar to what we report here, with one exception: If we consider all pre-announcements in the sample, independently of when they are issued along the quarter, the fraction of small firms voluntarily disclosing indeed increases significantly after Reg FD, but this pattern is solely driven by an increase in the pre-announcements that are issued together with mandatory earnings releases.

$SIGNCAR_{i,q}$ = Dummy set to 1 when the cumulative abnormal return for firm i along quarter q (up to date τ) is negative

Note that the above explanatory variables are constructed with reference to date τ.[9] The explanatory variables are motivated by extant literature on the firm's decision to disclose information. First, firm size seems to be an important determinant of a firm's disclosure policy, both from an empirical (Lang and Lundholm, 1993; Bushee and Leuz, 2003) as well as theoretical perspective (e.g., King et al., 1990; Diamond and Verrecchia, 1991; Skinner, 1994, 1997). Also, a recent survey conducted by the National Investor Relations Institute (NIRI, 2001) found responses that differ, based on size of the firm, as to whether firms are releasing more or less information after Reg FD: the fraction of firms that responded that less information is being provided post-FD is higher for the group of small-cap firms when compared to the group of mid- and large-cap firms.

The inclusion of SURPRISE and NEG_SURPRISE is motivated by research that posits voluntary disclosures as instruments used to align market expectations with the manager's private information – e.g., Ajinkuya and Gift (1984) and Matsumoto (2002). Skinner (1994) argues that firms tend to be more forceful in disclosing bad news than good news, first because of fear of lawsuits if a big negative surprise at the earnings announcement provokes a large decline in stock price, but also to maintain a good reputation with security professionals; to account for this possibility we also include the LOSS control variable.

The first regression specification uses only a subset of the data available on pre-announcements. For a data point to be included in the regression it is necessary that a proxy for market expectations regarding future earnings releases can be obtained; using the analysts' consensus forecast as a proxy for this expectation, our sample selection requires that at date τ there must be at least one valid earnings forecast available. The second specification drops the explanatory variables based on market expectations and instead use only a dummy based on the actual earnings value to be released. Thus, all data points can be used in the second specification.

Estimation results are reported in Table 4. The coefficient on SURPRISE is significantly positive, suggesting that managers use pre-announcements to correct market expectations and increase their use when the consensus forecast prevailing in the market is far away from the

[9] SURPRISE, NEG_SURPRISE and LOSS use in their definition the actual value of the earnings to be announced in the future days. This definition is not troublesome if we assume that at date τ the manager already has this knowledge (that's why it is crucial to establish τ at a point in time not much before the end of the quarter, when decisions about what and when to announce might be already done), because we are trying to model exactly the manager's decision on whether to pre-announce.

actual earnings. The coefficient on NEG_SURPRISE is also consistently positive and significant, indicating that managers' motivation for use of pre-announcements to correct expectations is amplified when the prevailing consensus is above the actual earnings. That firms like to disclose bad news early is also suggested by the coefficient on LOSS: in the face of upcoming negative earnings numbers firms are more willing to release pre-announcements, bringing the consensus forecast closer to the actual earnings and reducing an expectations gap more likely to be negative.

Regarding the effects of Reg FD, we observe that in specifications I and III of Table 4, that investigate post-FD effects for all companies as just one group, the coefficient on the post-FD dummy is significantly positive, confirming the univariate results we saw above of an overall increase in the use of pre-announcement by *all* the firms. A more detailed and interesting picture emerges from specifications II and V, though. When breaking up the post-FD dummy according to the size group the firm belongs to, only the coefficients identifying post-FD observations of big and mid-size firms are significantly positive (and significantly different from the post-FD coefficient for small firms). In other words, the increase in the use of pre-announcements occurs for big and mid-size firms, but not for small firms. Moreover, Panel B indicates that these results are robust to whether we allow the coefficients of the other control variables to vary according to the firm's group.

To give a sense of the magnitude of the changes in the use of the voluntary disclosure we examine the odds ratio associated with the post-FD dummies in panel A of Table 4. For big firms, the odds ratio of 1.97 indicates that, controlling for the explanatory variables discussed above, the odds of the big firms voluntarily disclosing information after Reg FD are twice as large as in the period before Reg FD; for mid-size firms, the effects are also substantial, with an odds ratio of 1.65; finally, the odds ratio of small firms is indistinguishable from 1, indicating no change in the odds of having voluntary disclosures associated with the adoption of the regulation.

Our results indicating an increase in the use of pre-announcements by firms after Reg FD confirm the current literature by using a more stringent definition of the use of pre-announcements, more data both in the dimension of the number of firms and the time period, and a robust logistic regression that addresses company fixed effects. [10] More importantly, our analysis makes clear that the use of pre-announcements varies according to firm size.

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[10] Straser (2002), Heflin et al. (2003) and Bailey et al. (2003), using different definitions of pre-announcement and different statistical tests, all report increases in the use of pre-announcements after Reg FD. Bailey et al. (2003) and Heflin et al. (2003), for example, use as a measure of voluntary disclosures the total number of pre-announcements issued by the firm between two consecutive quarterly earnings announcement. Bailey et al. then make use of a univariate analysis based on matched pairs of pre-FD and

3. Effects of the Reallocation

A. Forecast Errors

News shocks at earnings announcement dates are a result of a gap between the information contained in the (mandatory) earnings announcement and the amount of information available about the firm prior to the earnings announcement. That information could be privately produced or voluntarily released by the firm. For example, in a survey released by the Association of Information Management and Research in March 2001 (AIMR, 2001), 71 percent of the respondents reported that Reg FD had contributed to an increase in market volatility, with many blaming it on a reduction of earnings guidance (from firms), that is, on an increase in forecast errors at the earnings announcement. In this section we examine whether earnings announcement date surprises change in relation to the adoption of Reg FD.

We first examine forecast errors at earnings announcement dates. We define the "unscaled forecast error" as the absolute value of the difference between the actual earnings per share for firm i at quarter q and the consensus forecast as of two days before the actual earnings announcement day for firm i's quarter q. We take the mean forecast as the consensus measure, but results are qualitatively the same if we adopt the median forecast. In order to get a comparable measure across firms, we define the "scaled forecast error" (henceforth "forecast error") as the unscaled measure divided by firm i book equity per share computed at the end of quarter q.

To examine the effects of Reg FD, we run the following panel data regression:

$$EA\_SURPRISE_{i,q} = a_{0i}FIRM_i + a_1\, POSTFD_{i,q} + a_2\, SIZE_{i,q} + a_3\, LOSS_{i,q} + a_4\, ABSCAR_{i,q} + a_5\, SIGNCAR_{i,q} + \varepsilon_{i,q} \qquad (6)$$

where the explanatory variables are as defined in section 2.B. and EA_SURPRISE is the scaled forecast error as defined above.

Besides the dummies that isolate effects of Reg FD, we include control variables. Given that firm size seems to be an important determinant of the quality of the firm's information environment, the ability of analysts to forecast earnings could be related to SIZE. LOSS is included because there is evidence that forecast errors at earnings announcements differ between profits and losses (see Brown, 2001). Finally, we include ABSCAR and SIGNCAR to analyze

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post-FD quarters. Heflin et al. (2003) also uses logistic regression to explain the use of pre-announcements, although in their case, by summing up pre-announcements during the entire quarter, they are not able to use the current market consensus *inside the quarter* as an explanatory power, which as we see from Table 4 adds much explanatory power to the regression.

possible effects from contemporaneous firm's return on the ability of analysts to predict upcoming earnings.

Table 5 presents results of the panel data regressions to explain scaled forecast error. Specifications I and II try an alternative definition of forecast error in which the measure is scaled by share price instead of book equity per share. [11] Using this alternative measure, the results indicate an overall increase in forecast error post-FD: the post-FD coefficients for the sample as a whole (specification I) as well as for each group of firms (specification II) is positive and highly significant. In fact, these results are distorted by the fact that the post-FD period is a period of market decline. The market decline induces a downward trend in the deflator measure used as the denominator in the definition of the scaled forecast error; even if the forecast error had not decreased post-FD, the scaled forecast error could still have increased due solely to the declining share price.[12]

To correct for this bias, we instead adopt the measure of forecast error scaled by book equity per share. These results are reported in specifications III and IV of panel A of Table 5. (Results are qualitatively the same if forecast error is scaled by assets per share.) When all firms are examined together as just one group in specification III, the coefficient on the post-FD dummy is insignificant. However, the break-up of the post-FD dummy – according to the size group each firm belongs to – provides evidence of movements in the scaled forecast error that are negatively correlated with size: forecast error increases for small firms, decreases for big firms and reveals no significant change for mid-size firms. The result is robust to whether we also allow the coefficients on the other explanatory variables to vary according to the firm's group, as evidenced by the results in panel B of Table 5.[13]

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[11] Shane, Sonderstrom and Yoon (2001), Mohanram and Sunder (2001), and Agrawal, Chadha and Chen (forthcoming, 2006) define the earnings surprise by deflating the basic forecast error by the share price.

[12] To further examine this issue, we simulate a distribution of each company's unscaled forecast errors for the post-FD period based on the actual distribution of unscaled forecast errors pre-FD for that same company (i.e., by construction forecast errors do not change post-FD). Regressions on forecast error scaled by share price indicate an increase in forecast error post-FD (results not reported).

[13] Given the definition of forecast error, these inferences apply to the sample of firm-quarters having at least one earnings forecast issued for the quarter. However, it is reasonable to think that, for a firm-quarter with no forecasts available, the surprise – as a measure of how much news was really incorporated in the released number – at the earnings announcement can be even more substantial than that for a firm-quarter with some earnings forecasts. In fact, the deterioration in analyst following for small firms diagnosed in Section 2 materializes also as a reduction in the number of firm-quarters being researched at least by one analyst. In unreported results, we show that, for small firms, the fraction of firms-quarters with analyst following seems to follow two different regimes in relation to Reg FD: before Reg FD around 65 percent of the quarterly observations have forecasts available, while after Reg FD this number runs close to 50 percent, and the difference on these averages is both significant and substantial (no changes are observed for the samples of big and mid-size firms).

In conclusion, the multivariate analysis indicates no reliable evidence of an overall increase in forecast errors at quarterly earnings announcements, corroborating some results from other papers in the literature. Our panel data adds to the picture by revealing strong evidence of size as a cross-sectional determinant of the effect of Reg FD on surprises at earnings announcements. While no deterioration is observed for big and mid-size firms, small firms were indeed affected by Reg FD. Small firms lost analyst following after Reg FD was adopted, and for those still covered by analysts there are larger forecast errors.

B. Market Response to Earnings Announcements

The market response to news shocks at earnings announcements is another dimension likely to be affected by changes in the way information about the firm is produced and released. In fact, one main argument voiced by critics of Reg FD is that the regulation would cause an increase in volatility because information would not be released smoothly as when there is constant contact between the company and the analysts, but rather in lumps, e.g., if information is held up until the next mandatory earnings announcement. We now investigate this possibility by examining whether volatility at earning announcements changes in relation to Reg FD.

Volatility at earnings announcement dates is computed as the cumulative absolute abnormal return over the window [-1,+1] around the earnings announcement day, where the abnormal return is obtained as the residual of a market model based on the value-weighted market index returns.[14] Figure 1 plots the quarterly average volatility for each group of firms. In the cross-sectional dimension, we observe that volatility is correlated across groups. Since this volatility measure is idiosyncratic (by the definition of market model residuals), the pattern seen in the figure suggests the existence of a common factor in volatility across size (that is not part of the market model).

When we look at the time-series evolution of average volatility before and after Reg FD, there is a discernable pattern of decreasing volatility for three consecutive quarters right after Reg FD was adopted (Q3:2000, represented by the horizontal line to the right of the figure, is the last quarter before Reg FD is adopted). In addition, decreasing volatility can also be observed if one takes pairs of quarters separated by one year right around the adoption of the regulation (more

[14] This is the measure of volatility used in Bailey et al. (2003). Heflin, Subramanyam and Zhang (2003) use a similar measure, defining volatility as the sum of squared – instead of absolute – market model prediction errors. Eleswarapu et al. (2002) aggregate squared prediction errors. We also use as an alternative simple excess returns, i.e., the residuals from a constant-mean-return model, and all the results are qualitatively the same.

specifically, Q1:2000 against Q1:2001, Q2:2000 against Q2:2002 or Q3:2000 against Q3:2001).[15] When we extend the analysis to other quarters, post-FD, and to the quarters before Reg FD was proposed, the pattern of decreasing volatility after Reg FD is missing. For example, in the last quarter before Reg FD was proposed, the average volatility for each group is lower than in the first quarter after Reg FD was adopted. To take into account seasonality in quarterly results, we can compare the volatility in Q2:1999 – two quarters before Reg FD was proposed – with Q2:2001 (or, for that matter, with all the three consecutive quarters right after Reg FD was adopted), and we see an increase in the volatility post-FD for all groups of firms.

To summarize, univariate analysis of average volatility across size and through time does not suggest any specific effect related to the adoption of Reg FD. Of course, univariate pictures do not control for changes in firms' characteristics that are determinants of market responses to earnings announcements. For that, we turn to the following panel data regression:

$$VOLAT_{i,q}=a_{0i}FIRM_i+a_1\,POSTFD_{i,q}+a_2\,SIZE_{i,q}+a_3\,LOSS_{i,q}+$$

$$a_4\,NEG\_SURPRISE_{i,q}+a_5\,SURPRISE_{i,q}+a_6\,ABSCAR_{i,q}+a_7\,SIGNCAR_{i,q}+a_8\,VIX_{i,q}+\varepsilon_{i,q} \qquad (7)$$

where

$VOLAT_{i,q}$ = Cumulative absolute abnormal return during the 3 days (window [-1,+1]) around the earnings announcement day

$NEG\_SURPRISE_{i,q}$ Dummy set to 1 when the actual earnings is below the consensus forecast available two days before the earnings announcement

$SURPRISE_{i,q}$ = Absolute value of the difference between the actual earnings and the mean forecast 2 days before the earnings announcement, scaled by the end of the quarter book equity per share

$VIX_{i,q}$ = Value of the VIX index at the earnings announcement day

and the other explanatory variables are as defined in section 2.B.

The control variables are motivated by an extensive literature related to volatility and returns at earnings announcement dates. First, there is evidence in the literature (Atiase, 1980, 1985; and Freeman, 1987), and Figure 1 suggests, that SIZE is correlated with volatility; besides, firm size can account for differences in risk that are not captured by the market model (e.g., Fama and French, 1992, 1993). LOSS allows for possible differences in market responses to negative

[15] Bailey et al. (2003) report results on these matched pairs without taking into consideration the separation of firms in groups based on size. Eleswarapu et al. (2002) analyzes effects of Reg FD based on comparison of the periods January 2000 through September 2000 (pre-FD) and November 2000 through May 2001 (post-FD) quarters.

earnings (Hayn, 1995). SURPRISE accounts for effects of news content of released earnings that goes beyond the consensus forecast, and NEG_SURPRISE captures the asymmetric responses of returns to good and bad shocks (Kothari, 2001). ABSCAR tries to control for patterns of volatility that are linked to stock market performance. SIGNCAR is included due to evidence that volatility tends to be higher in down markets – e.g., Christie (1982) and Wu (2001).

Despite using an 'idiosyncratic' measure of volatility at earnings announcement dates, the correlation of the measure of volatility among groups of firms suggests that there might still be some general component of volatility that we are not capturing. This motivates incorporating the VIX index on the earnings announcement day as an explanatory variable in the regressions. VIX is an expected volatility index traded on the Chicago Board Options Exchange; it is calculated by taking a weighted average of the implied volatilities from eight calls and puts on the S&P 100 index. By including it, we are investigating whether the market reaction to earnings news somehow relates to a proxy for the market expectations about future market volatility.

Table 6 presents the regression results. First look at panel A. Overall, controlling for firms' fixed effects, the coefficients on the explanatory variables are in the predicted direction and, in general, are significant. Volatility decreases with firm size and increases with the surprise that comes with the earnings announcement – more so when the surprise is negative. The coefficient on LOSS is significantly negative, supporting the hypothesis in Hayn (1995) that losses are less informative than positive profits. The positive coefficient on ABSCAR confirms the contemporaneous relation between the market return and the pattern of cumulated returns along the quarter, and the positive coefficient on SIGNCAR supports the idea that volatility is higher in down markets. Finally, the effects of Reg FD on volatility at earnings announcements are captured by the dummies for post-FD periods. In specifications I and III, in which all firms are treated as a single group, the coefficients on the post-FD dummy are significantly positive, indicating an increase in the volatility at earnings announcements after Reg FD is adopted.

The VIX index does have explanatory power with respect to the market reaction to earnings announcements: the inclusion of the VIX index as a control is responsible for an increase in the R^2 of the regression from 3.5 percent to 5.4 percent. Moreover, after the inclusion of VIX, the effect of Reg FD as measured by the post-FD dummy is reduced by 75 percent, suggesting that a big part of what might be interpreted as an effect of the regulation is in fact related to an increase in expectations about future volatility of the market.

Differential effects of Reg FD on firm groups based on size are analyzed by breaking up the post-FD dummy in specifications II and IV. Without the inclusion of the VIX index, the

coefficients on all post-FD dummies are positive, indicating that the market reaction to earnings announcement consistently increases across all the groups. After controlling for VIX in specification IV, only mid-size and small firms have significant post-FD dummies. Moreover, in panel B of Table 6 we report results from running regressions separately for each group, and they indicate that only the group of small firms has a significant coefficient on the post-FD dummy.[16,17]

C. The Cost of Capital

We now turn to the question of whether the changes in the information environment of small firms materialize as a risk factor, that is, whether they are priced in the cost of capital of those firms. The motivation for linking the quality of information environment to cost of capital comes from an extensive literature. See, e.g., Easley and O'Hara (2003) who link the firm's information environment to its cost of capital. In particular, the authors argue that, as a recipe to reduce its cost of capital, firms can adapt their corporate disclosure policies, e.g., releasing more public information or attracting an active analyst following. (Related theory papers include Diamond and Verrecchia, 1991; Kim and Verrecchia, 1994; Diamond, 1985; and Barry and Brown, 1984).

From an empirical standpoint, there are many studies that investigate the relation between disclosure of information and the firm's cost of capital. For example, Leuz and Verrecchia (2000) find evidence that increased levels of disclosure lower the information asymmetry's component of the cost of capital. Likewise, Botosan (1997) and Botosan and Plumlee (2000) find evidence that increased disclosure is associated with a lower cost of capital, and Sengupta (1998) provides

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[16] The evidence of an increase in the market response to earnings announcements – at least for small firms – contrasts with some other results in the Reg FD literature. Shane et al. (2001), Heflin et al. (2001), Eleswarapu et al. (2002), Bailey et al. (2003), find no significant evidence of increase, and sometimes evidence of a significance decrease, in market reactions to earnings announcements. None of these references investigate the possibility of cross-sectional differences on market reactions to earnings announcements based on firm size.

[17] The post-FD period coincides with the adoption, on January 29, 2001, of decimalization for trade prices, i.e., the switch in tick size from "teenies" to "decimals". Bailey et al. (2003) and Eleswarapu et al. (2004) attribute a decrease in post-FD return volatility around earnings announcements to the adoption of decimalization. However, those inferences are based on very short post-FD periods, both pre-decimalization (from October 2000 thru January 2001) and post-decimalization (from February 2001 through the second quarter of 2001). Our results using an extended sample indicate in fact an increase in the average return volatility post-FD, and the cross-sectional examination indicates that this increase is constrained to small and mid-size firms. Given the very short post-FD pre-decimalization period, we cannot isolate the effects from post-FD to the effects of the adoption of decimalization. However, if decimalization would have caused volatility to change – either increase or decrease – we would expect that change to affect all firms no matter what the size of the firm, which is not what the cross-sectional results indicate.

evidence that firms with high disclosure quality ratings from financial analysts are rewarded with a lower cost of issuing debt.

To investigate whether and how the cost of capital of small firms relates to the adoption of Reg FD, we adopt the Fama-French three-factor framework. Given that the evaluation of the cost of capital for individual firms can lead to very imprecise measures (see Fama and French, 1997), we opt to analyze the cost of capital for each portfolio based on firm size. Table 7 presents the results of estimating Fama-French three-factor regressions for monthly returns on the value-weighted size-based portfolios during the period 1997:2002. Specification I reproduces the basic Fama-French regressions, while specifications II through IV include some additional variables in order to examine potential effects of Reg FD. A POSTFD dummy allows us to investigate shifts in the cost of capital unrelated to the three risk factors in the Fama-French model. Given that the portfolios are constructed based on the size characteristic, we also interact POSTFD with the SMB factor to investigate whether there are changes in cost of capital related specifically to the loading on SMB—the factor intended to capture firm size differences.

The results indicate no evidence of changes in cost of capital that are unrelated to the Fama-French risk factors: the coefficients on POSTFD are insignificant in all specifications. The coefficient on the interacted variable POSTFD_SMB shows changes in the cost of capital formation in the period post-FD. This coefficient is significantly positive for the portfolios of mid-sized and small firms, whether it is modeled together with POSTFD or not, while it is negative for the portfolio of big firms (although not significantly so).

The results suggest a significant increase in the loading of the SMB risk factor for the period in which Reg FD is operating: for the group of small (mid-size) firms the coefficients indicate that the SMB loading pre-FD is 0.46 (0.47), while the same loading post-FD is 1.18 (0.96). Taking the three-factor model as a valid specification model for the riskiness of a portfolio and assuming the same pattern of the risk factors before and after Reg FD, the results here indicate a significant increase in the unconditional cost of capital for the portfolio of small and mid-size firms after Reg FD is adopted. SMB is the difference between average return on portfolios of small stocks and average return on portfolios on big stocks. Our POSTFD_SMB for small stocks is 0.71. So, the effect is 0.71 * (expected SMB). The average SMB over the sample is 0.16 (sixteen basis points), meaning that the effect would be 11 basis points per months, or 138 basis points per year.[18]

[18] These results might be driven by the way the portfolio of small firms is formed. In Gomes, Gorton, and Madureira (2004) we repeat the Fama-French three-factor regressions with the addition of the

4. Other Factors Behind Reg FD Effects

In this section, we explore other firm characteristics, besides firm size, that might contribute to cross-sectional variation in the information environment pre- and post-Reg FD.

A. Investor Recognition Hypothesis

Merton (1987) developed an asset pricing model in which investors are not aware of the existence of some assets, and he showed that firms with a smaller investor base have lower values (and higher costs of capital). The investor recognition hypothesis has received substantial empirical support (Kadlec and McConnell, 1994; Foerster and Karolyi, 1999; and more recently Kaniel et al., 2005) and has been extended in many directions (e.g, Basak and Cuoco, 1998; Shapiro, 2002). In this section, we investigate whether firms that lost analyst recognition after Reg FD experienced significant increases in the cost of capital using firms with no previous analyst coverage as a control sample—these firms are likely to be unaffected by Reg FD because they did not have any analysts benefiting from selective disclosure pre-FD.

To empirically evaluate this hypothesis we divide our sample of small firms into further groups: those that had no analyst following before Reg FD and those that had at least one analyst covering before. This division only makes sense for the group of small firms because a large majority of mid-size and big firms have analyst coverage. The results are reported in Table 8. The results in the table show that there is no increase in the cost of capital for the group with no analyst coverage before Reg FD (the POSTFD_SMB dummy is not significantly different from zero). The cost of capital increases significantly only when we look at the groups of small firms with some analyst coverage before the rule change. Notice that we break the sample of firms with some analyst covering before between those who completely lost coverage and those who lost coverage but not completely. This allows us to isolate a subgroup that had some coverage before and with very comparable sizes pre- and post-FD. The results indicate that the loading on the size

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POSTFD_SMB variable for the 25 portfolios formed on size and book-to-market from Fama and French (1993). Since these portfolios are also formed based on the size dimension, we are able to investigate the effects of Reg FD period on portfolios of small firms without depending on the details on how our portfolios were constructed. To examine on how well our size-based portfolios in reality proxy for Fama-French portfolios' returns, we check the correlation between monthly returns of our portfolios and monthly returns of Fama-French portfolios. The correlation between our portfolio of small firms and Fama-French small portfolios reaches 0.93 and decreases as Fama-French portfolios increase in size. The results suggest that our portfolios represent well the Fama-French portfolios across size. Similarly, the correlation between our portfolio of mid-size firms and the Fama-French portfolios peaks at the second and third quintile, and our portfolio of big firms indeed mirrors the Fama-French big portfolios. Our portfolio of small firms very closely matches Fama-French portfolios at the fifth quintile. The average size of our portfolio through time is 0.66 million while the average size of the Fama-French fifth quintile is 0.69 million.

factor increases for both subgroups (the POSTFD_SMB dummy is 0.58 and 0.77, both significant at 5 percent).

B. Information Complexity

There are both empirical and theoretical reasons to believe that more complex information can be better communicated in private one-on-one meetings than publicly before a large audience. Bushee et al. (2004) empirically find that firms with more complex information (as proxied for by the level of intangible assets) were more likely to use closed conference calls to disseminate information in the pre-FD period (i.e., calls that restrict access to invited professionals, typically buy- and sell-side analysts). To empirically explore this possibility we first sorted and divided into groups based on size. Then each firm is classified into low or high complexity, relative to the median complexity inside the firm's size group. The six resulting groups (big, mid-size and small firms combined with low and high complexity) are then examined using the same multivariate regression setups from Table 2 through Table 7.

Table 9 presents the results of the estimation taking the presence of intangible assets (as a fraction of the firm's assets) as a proxy for complexity.[19] To save space, the estimates of the other explanatory variables are omitted from the table. First, note that the results indicate that firms of the same size behave qualitatively as before, regardless of their complexity level; for example, big firms in both complexity subgroups enjoy an increase in analyst coverage and increase the use of pre-announcements. Both subgroups of mid-size firms have analyst coverage decreased post-FD but increase the use of pre-announcements; and both subgroups of small firms have analyst coverage decreased post-FD and do not increase significantly the use of pre-announcements.

Within size groups, the differences in output variables among complexity groups are largely as predicted. First, regarding changes in analyst following, the subgroups of firms with high intangibles tend to suffer a significantly larger loss of analyst following than the subgroup of firm with low intangibles and similar size (the difference is significant for mid-size and small firms, but not significant for big firms). This difference is also economically significant (high-intangible and low-intangible small firms lost 21 percent and 11 percent of analyst coverage, and high-intangible and low-intangible mid-size firms lost 9 percent and 5 percent, respectively). Second, the changes in public voluntary disclosure are consistent with the view that the public channel is an imperfect substitute for private communications: there is no significant difference at

[19] We also used low versus high book-to-market as a proxy for complexity. The results are qualitatively the same. We decide to focus the results on intangibles as a proxy for complexity because book-to-market is highly correlated with our first determinant of the partitioning of group, size.

the 5 percent level between the subgroups of high and low intangibles of same size with respect to the propensity to release pre-announcements. Finally, the differences in changes in forecast error, volatility and cost of capital among high- and low-intangibles are only significant for small firms: volatility increases significantly more for high-intangibles than low-intangibles for small firms (p-value <.0001), and the cost of capital for high-intangibles small firms seem to have increased by more than low-intangibles firms (POSTFD_SMB coefficients are respectively 0.75 (p-value 0.02) and 0.65 (p-value 0.05)). Overall the results are consistent with the view that more complex small firms were more adversely affected by the policy change than less complex firms.

C. Governance

One of the goals of the SEC when adopting Reg FD was to curb managers from treating material information as a commodity by selectively disclosing it to analysts in exchange for private gains (e.g., allocations in hot IPOs) or slanted analysis – see, e.g, SEC (2000) and Lowenstein (2004). Are firms with more severe management-shareholder agency problems particularly affected by Reg FD?

To address this question, we use the corporate governance provisions in firms' charters and bylaws and state takeover laws, as proxies for the degree of agency costs. The data on the corporate governance provisions for each individual firms is from the Investor Responsibility Research Center (IRRC), and we follow the approach used in Gompers et al. (2003) to compute a governance index (G index) for each firm. Firms with good governance (democracies) are defined as the ones with G in the lower quintile of the distribution, while firms with bad governance (dictatorships) are the ones in the upper quintile of the distribution. Unfortunately, the partition based on G cannot be carried out for the group of mid-size and small firms, as G is defined primarily for big firms: while the fraction of big firms without G is only 15 percent, for mid-size and small firms this fraction jumps up to 65 percent and 90 percent, respectively.

We analyzed the effect of Reg FD breaking up the sample into high and low G. Analyst following exhibits a significantly higher increase in the good vs. the bad governance group (table with results, not reported here, is available upon request). This result is consistent with the view that bad governance firms became less attractive to analysts relative to the good governance firms, because perhaps now they cannot be spoon fed anymore to the same extent. We find that there is no significant difference between the two groups in all other measures that we follow such as pre-announcement, forecast error, volatility, and cost of capital. In summary, the analysis suggests that overall the flow of information and asset prices did not change in any significantly different way between firms with good and bad governance.

D. Litigation Risk

Reg FD may have had a differential impact on the level of information produced by firms with ex-ante different exposures to litigation risk. There is no clear prediction about how the imposition of Reg FD affected firms facing different litigation risks. Public announcements may create higher legal liability costs than private communication because the latter is off-the-record, and it may be harder for shareholders to file lawsuits on the basis of a duty to update information. This view would suggest that less information would be produced by high litigation firms after Reg FD. The concern that legal liability could create a chilling effect under Reg FD influenced the SEC in the original drafting of the regulation. But Frankel et al. (2003) find that after Reg FD there was a substantial increase in the number of firms adopting a "quiet period" in order to reduce the legal risks associated with selective disclosures, and this increase was particularly pronounced among firms with high litigation risks.

Francis et al. (1994) find that biotechnology, computers, electronics, and retailing are the industries with a higher incidence of litigation. Following Frankel et al. (2003), we consider firms in these industries as having ex-ante higher litigation risk, and we then analyze the effect of Reg FD breaking up the sample into high and low litigation risk (again, the table with results, not reported here, is available upon request). The first key finding of the analysis is that litigation risk does not seem to explain why small firms were adversely impacted by the rule change; small firms in both high and low litigation risk categories seem to have been equally negatively affected. Interestingly, mid-size and big firms in the high litigation risk category seem to have increased their analyst following and increased the use of pre-announcements by more than firms of the same size but in the low litigation risk category. This evidence is not consistent with the view that Reg FD had a chilling effect on high litigation risk firms. The evidence seems more consistent with the view that high litigation firms were less exposed to the change in legislation, presumably because they made less use of selective disclosure beforehand. This puzzling finding is an interesting issue for future research to explore.

5. Robustness Checks and Other Issues

In this section we briefly report on some results that take into account the onset of recession and the bursting of technology stocks bubble. Also, we summarize results on the use of conference calls by firms, another way to publicly disclose information. Finally, we report on the effects of Reg FD on American Depository Receipts (ADRs) and foreign common stock.

A. The 2001 Recession and the Bursting of the Bubble

The post-Reg FD period coincides with the business cycle downturn in early 2001. The business cycle downturn might play a role in the analyst coverage scenario. If a general recession also means recession in the sell-side industry, then the downturn in early 2001 could have caused the reduction in the supply of analysts. This could mean an overall reduction in the coverage of firms in the market. If this is the case, though, the recession effect is likely to be captured in a panel data design because the recession would also affect the explanatory variables. What we see in the post-FD period is that only mid-size and small firms suffer this reduction in coverage, while big firms actually enjoy an increase in coverage. This pattern could be related to the business cycle if a reduced supply of analysts during a recession is also linked to a reshuffling of coverage between firms of different sizes. To control for this we reran the multivariate regressions on analyst following including a recession dummy - for the quarters classified by NBER as recessions (2001:2 through 2001:4) - interacted with the post-FD dummies for each group (i.e., allowing for the computation of two post-FD coefficients for each group, one related to the recession quarters and another related to the non-recession quarters) and the results presented before do not change qualitatively.

The "bursting" of the technology stock bubble, which coincides with the post-Reg FD period, could also have played a role in determining the empirical results discussed here. For example, the decrease in coverage for mid-size and small firms is consistent with analysts redirecting their efforts away from tech firms after the crash in tech stocks. The concern, thus, is that what we report here might be a bubble effect rather than a Reg FD effect. To account for this possibility we repeat the examinations from Sections 2 and 3 after separating the original sample between high tech and non-high tech firms (high tech firms are defined as in Loughran and Ritter, 2004). Results (not reported, available upon request) on all 5 measures – analyst following, use of pre-announcements, forecast error, volatility and cost of capital – for the non-high tech sample are qualitatively the same as found for the all-firms sample (the only difference is that non-high tech small firms also increase the use of pre-announcements significantly in the post-Reg FD period). Thus, our results are not driven by high tech firms that were hit by the bubble burst.

B. Conference Calls

Conference calls are another important method used by firms to voluntarily disclose information (alongside earnings pre-announcements which we analyzed before). Former SEC Chairman Arthur Levitt explicitly noted that closed conference calls (those where only invited investors have access) put the general public at a competitive disadvantage. Advances in

information technology now allow firms to "webcast" conference calls via the internet at low cost, disseminating the information promptly to all investors. Curbing the widespread use of closed conference calls and enhancing the use open-access conference calls were an important motivation behind the adoption of Reg FD.

In order to have a more complete picture of how the information environment changed around Reg FD, it is also important to examine changes regarding the use of conference calls (see Bushee et al., 2004 for an in-depth analysis of this issue). Figure 2 shows a plot of the quarterly fraction of firms within each size group that use conference calls around earnings announcements. The figure displays a pattern of sharp increase in the use of conference calls, but there are no cross-sectional differences between groups based on size: big, mid-size and small firms all present a pattern of increasing the use of conference calls. More importantly, the increase seems to have no relation to the timing of the adoption of Reg FD; it starts well before the beginning of the discussion on Reg FD - actually, starting in the beginning of our sample–- and continues steadily through time. By the time Reg FD was proposed, around 70 percent of big firms were already using quarterly conference calls. While a multivariate regression would indicate a significant post-FD dummy for the use of conference calls, the pattern in Figure 2 does not lend much credibility to the view that this increase is related solely to the adoption of the regulation.

C. American Depository Receipts (ADRs) and Foreign Common Stocks

We explore in this section the possibility of U.S. listed ADRs and foreign common stocks serve as a control sample to the adoption of Reg FD (see Francis et al., 2005 for another comparison of US firms versus ADRs). These securities are exempted from Reg FD, but nonetheless, they are potentially not a flawless control sample. First, foreign issuers may be following the practices of US firms simply because of herd behavior. Second, in the SEC comments about Reg FD it suggests that foreign issuers were also expected to follow the practices of U.S. companies, and it was considering extending the regulation to foreign issuers. Finally, companies incorporated outside US are also subject to their own home country legislation, and some countries already have regulations that mirror, to some extent, the goals of Reg FD – e.g., United Kingdom and Canada.

To evaluate the impact of Reg FD on U.S. listed ADRs and foreign common stocks, we repeat the regressions in Table 2 through Table 7 after adding two new groups: one for ADRs and another for foreign common stocks. The results (not reported here; available upon request) do not contribute to disentangling Reg FD effects from other possible intervening events. Overall, foreign firms and ADRs behave according to their size: foreign firms, which on average are big

firms, increase analyst following and increase their use of pre-announcements post-FD, like big US firms. ADRs, which on average are smaller in size, resemble the behavior of small U.S. firms; they do not increase analyst following and the use of pre-announcements marginally decreases.

6. Summary and Conclusion

Overall, our results suggest that Reg FD had unintended consequences and that "information" in financial markets may be more complicated than current finance theory admits. We found that small firms were adversely affected by Reg FD; their cost of capital rose. Some small firms just completely stopped being followed by analysts, and consistent with the investor recognition hypothesis, the cost of capital increased for those firms. Moreover, public communication does not seem to be a good substitute for private one-on-one communication, where there is a free give and take, especially for firm communicating complex information.

This finding is reminiscent of the "small-firm effect" which was first documented by Banz (1981) and Reinganum (1981). Our finding of the return of a small firm effect suggests a reason for this finding, namely, there was a lack of information, perhaps a certain kind of information about small firms. Schwert (2003) suggests that this information was subsequently forthcoming because investors responded to the academic studies. But that was prior to Reg FD.

Are our results driven by Reg FD? One final piece of evidence concerns recent developments. The decline in analyst research documented in here has not gone unnoticed by public firms losing coverage or by the marketplace generally. Notably, there has been a significant increase in paid-for-research, in which companies pay research providers for coverage.[20] Interestingly, two new firms, the National Exchange Network (NRE) and the Independent Research Network (IRN), have recently been created to act as intermediaries between research providers and public companies. A press release launching the IRN – a joint venture between NASDAQ and Reuters formed June 7, 2005 – provides some further confirmation for the main results in our paper: "Regulation FD (Reg FD) and the Global Analyst Settlement have brought sweeping changes to the research industry. As major broker dealers have focused resources on large capitalization stocks, a growing number of small- or mid-cap companies and ADRs have lost research sponsorship. 38% of all NASDAQ-listed companies and approximately 17% of NYSE companies have no analyst coverage. Over 50% of all publicly listed U.S. companies have two or fewer analysts covering them."

[20] See, for example, "Research-for-Hire Shops Growing, Seeking Legitimacy", *Wall Street Journal*, March 07, 2002, p. C1, and "Desperately Seeking Research", *Wall Street Journal*, July 19, 2005, p. C1.

Appendix: Data Description

We use the First Call Historic Database for data on analyst following and forecasts, actual earnings announcements and pre-announcements. Data on prices, returns and shares outstanding come from the CRSP database and are complemented with some additional information on firm characteristics from COMPUSTAT.

We study firm-quarter data points. Our sample consists of all firms on the NYSE and NASDAQ (common stocks; share code 10 or 11), ADRs (share code 30, 31 or 32) and foreign stocks (share code 12) that are in the CRSP database at any point between 1997 and 2003. For each of these firms, we collect all quarterly earnings announcement data from Q4:1997 to Q3:2002 that are in the pre-FD and post-FD subsamples as defined below. We then complement our data with security returns and prices from CRSP and additional firm characteristics from COMPUSTAT. For a firm-quarter to be included in the sample, some conditions must hold. The usual availability restrictions apply regarding First Call, CRSP and COMPUSTAT databases. For example, when examining data on market returns we require that price and return data from CRSP be available for that firm-quarter. In particular, in order to use the market model to compute abnormal returns, we require that all returns over the window [-200,-11] must also be available in CRSP.

Reg FD was formally proposed by SEC on December 20, 1999, was approved on August 10, 2000 and became effective on October 23, 2000. These are the relevant dates we use to establish our pre- and post-FD subsamples. A firm-quarter data point is considered post-FD when the observation refers to a quarter equal to or after Q4:2000 and whose earnings announcement day is after October 23, 2000, i.e., after the adoption of the rule.[21] We view the period between the date Reg FD was proposed and the date it was adopted as a transition period, in which it is especially difficult to predict the behavior of firms and markets in regard to the regulation. The post-FD sample contains data from 8 quarters, from Q4:2000 to Q3:2002. In order to use a pre-FD sample of comparable size, we define our pre-FD sample also with 8 quarters, from Q4:1997 to Q3:1999. Notice that by using 8-quarters subsamples, we guarantee that both subsamples have

[21] It is possible that for some of the observations classified as post-FD, the period in which the effects of Reg FD could be felt would in fact fall before the adoption of the rule. For example, if there is an observation with fiscal quarter at October 2000 and that releases its earnings on Nov 1, 2000, most of the period in which the production of information for that quarter would occur would fall before the limit date of October 23, 2000, but the observation would still be deemed as post-FD according to the classification procedure above. This does not seem to be a concern given that 87 percent of the firms in the Q4:2000 sample has fiscal calendar in December and that the median earnings announcement day for that quarter is January 31, 2001.

2 of each calendar quarter (i.e., 2 first quarters, 2 second quarters etc). This can ameliorate effects of potential seasonal differences in measured variables across calendar and/or fiscal quarters.

Several tests in the paper are based on a classification of the firm into subgroups based on the average firm size during the sample period, so a firm is classified as belonging to one and only one group throughout the whole sample. This is important for our research design based on panel data, since we use group membership as a company: if a firm were allowed to change groups through time, we would not be able to use the fixed effects control in the regression specification, given that the same firm would show up in two different groups. As a robustness check, we repeat the univariate tests in Section 2 with a time-varying definition of group membership, by which a firm is allocated to a (possibly) different group each quarter, according to the percentile of that firm's size compared to the distribution of size among all firms on that quarter. The results (not reported) do not change qualitatively.

We include all pre-announcements, whether they refer to quarterly or annual earnings, and whether they are of a quantitative nature (e.g., point or range estimate) or qualitative nature. Although our examination focuses on the dissemination of information regarding the next earnings announcement release, because annual earnings pre-announcement may contain information regarding the upcoming quarterly earnings, we believed that annual pre-announcements should also be included. This choice turns out not to be restrictive based on how annual pre-announcements are used. In our sample, 55 percent of annual pre-announcements were released together with actual earnings announcements. Another 14.9 percent of the pre-announcements described as referring to annual numbers were actually for the upcoming release that includes both annual and quarterly numbers, and therefore can be considered to be quarterly pre-announcements. A further 16.3 percent were issued concomitant with another quarterly pre-announcement. From the remaining, sample, 3.8 percent were doubled pre-announcements. Therefore, if we choose to analyze pre-announcements that are not doubled and are not issued with mandatory earnings announcement, the decision to drop from our sample the annual earnings announcement would amount to a removal of, in fact, only 10 percent of the initial sample of annual pre-announcements.

More details are contained in the Appendix in Gomes, Gorton, and Madureira (2004).

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Table 1. Summary Statistics on Analyst Following

This table presents summary statistics on the measures of quarterly analyst following. Quarterly analyst following is proxied by two measures of number of forecasts outstanding for firm *i* in quarter *q*. Number of forecasts is measured as the number of analyst forecasts outstanding for firm *i* at the day the earnings for quarter *q* are announced; the standardized number of forecasts is a standardized measure of analyst following, computed as number of forecasts for firm *i* in quarter *q* divided by the total number of forecasts available for all firms in quarter *q* (the summation of number of forecasts across *i* and keeping *q* fixed). The standardized number of forecasts is presented in percentage terms, i.e., multiplied by 100. Details on the construction of subgroups of big, mid-size and small firms are described in the Appendix. Significance of change presents the p-values of two-tailed test of differences for mean (t-test) and median (Wilcoxon). The sample comprises observations in the periods Q4:1997-Q3:1999 (pre-FD sample) and Q4:2000-Q3:2002 (post-FD sample), except that observations with actual earnings announcements between 12/20/1999 and 10/23/2000 are excluded.

	Panel A:			Panel B:								
	Pane A: All observations			Panel B: Subgroups based on firm size								
				Big firms			Mid-size firms			Small firms		
	Pre-FD	Post-FD	Significance of Change	Pre-FD	Post-FD	Significance of Change	Pre-FD	Post-FD	Significance of Change	Pre-FD	Post-FD	Significance of Change
Number of forecasts												
Mean	4.4544	4.772	<.0001	9.855	10.997	<.0001	3.9813	4.1066	0.0071	1.3951	1.0031	<.0001
Median	3	3	<.0001	9	10	<.0001	3	3	0.0612	1	0	<.0001
Standardized number of forecasts												
Mean (x 100)	0.0247	0.0261	<.0001	0.055	0.060	<.0001	0.022	0.022	0.0981	0.008	0.005	<.0001
Median (x 100)	0.0162	0.0159	<.0001	0.049	0.055	<.0001	0.018	0.017	0.0782	0.005	0.000	<.0001
Total number of firm-quarters	32450	30656		8495	8257		10598	10639		13357	11760	

Table 2. Panel Data Fixed Effects Regression to Explain Analyst Following

This table presents results of panel data fixed effects regression to explain quarterly analyst following. The dependent variables that proxy for analyst following are $NOFOR_{i,q}$ and $NOFOR\_STD_{i,q}$: $NOFOR_{i,q}$ is the number of analyst forecasts outstanding for firm *i* at the day the earnings for quarter *q* are announced, while $NOFOR\_STD_{i,q}$ is a standardized measure of analyst following, computed as $NOFOR_{i,q}$ divided by of total number of forecasts available for all firms in quarter *q* (the summation of $NOFOR_{i,q}$. across *i* and keeping *q* fixed). The explanatory variables are defined as follows. $SIZE_{i,q}$ is the log of market value of the firm at the last day of the month in which the earnings announcement is released, scaled by the market index. $LOSS_{i,q}$ is a dummy variable set to 1 when the actual earnings are negative. $ABSCAR_{i,q}$ is the absolute value of the cumulative abnormal return for firm *i* along quarter *q*. $SIGNCAR_{i,q}$ is a dummy set to 1 when the cumulative abnormal return for quarter *q* is negative. The cumulative abnormal return for firm *i* during quarter *q* is the summation of market model's residuals from 3 days after the previous quarter's earnings announcement day up to 2 days before quarter *q*'s earnings announcement day. $POSTFD_{i,q}$ is a dummy set to 1 for a quarterly earnings release after the adoption of Reg FD, and 0 otherwise. $POSTFD\_Big_{i,q}$, $POSTFD\_Mid_{i,q}$ and $POSTFD\_Small_{i,q}$ are the interactions of $POSTFD_{i,q}$ with dummies identifying whether the firm belongs, respectively, to the portfolio of big, mid-size or small firms. Details on the construction of portfolios of big, mid-size and small firms are described in Appendix. The p-values are shown below each coefficient estimate.). The sample comprises observations in the periods Q4:1997-Q3:1999 (pre-FD sample) and Q4:2000-Q3:2002 (post-FD sample), except that observations with actual earnings announcements between 12/20/1999 and 10/23/2000 are excluded.

Panel A: Aggregating all data together

	NOFOR		NOFOR_STD	
	I	II	III	IV
POSTFD	0.1186	-	3.72E-06	-
	<.0001	-	<.0001	-
POSTFD_Big	-	0.8567	-	4.09E-05
	-	<.0001	-	<.0001
POSTFD Mid	-	-0.1868	-	-1.25E-05
	-	<.0001	-	<.0001
POSTFD_Small	-	-0.2346	-	-1.33E-05
	-	<.0001	-	<.0001
SIZE	1.3693	1.3330	7.72E-05	7.55E-05
	<.0001	<.0001	<.0001	<.0001
LOSS	0.0512	0.0543	2.22E-06	2.39E-06
	0.0370	0.0258	0.0975	0.0721
ABSCAR	0.1954	0.1893	8.47E-06	8.17E-06
	<.0001	<.0001	<.0001	<.0001
SIGNCAR	0.3465	0.3410	1.89E-05	1.87E-05
	<.0001	<.0001	<.0001	<.0001
# Observations	63106	63106	63106	63106
R^2	0.131	0.145	0.139	0.150

Panel B: Running regressions in each group

	NOFOR_STD		
	Big firms	Mid-size firms	Small firms
POSTFD	3.49E-05	-1.51E-05	-1.71E-05
	<.0001	<.0001	<.0001
SIZE	1.09E-04	8.99E-05	4.71E-05
	<.0001	<.0001	<.0001
LOSS	8.00E-06	6.87E-06	-3.29E-06
	0.0983	0.0024	0.0006
ABSCAR	4.39E-05	1.42E-05	-1.94E-06
	<.0001	<.0001	0.1457
SIGNCAR	2.87E-05	1.94E-05	9.80E-06
	<.0001	<.0001	<.0001
# Observations	16752	21237	25117
R^2	0.133	0.201	0.216

Table 3. Summary Statistics on the Use of Pre-Announcements before and After Reg FD per Period of Issuance

This table presents summary statistics on the use of pre-announcements (PAs) before and after Reg FD. We consider pre-announcements issued between 15 days before the end of the current quarter and 2 days before the current quarter's earnings announcement day. Details on the construction of subgroups of big, mid-size and small firms are described in the Appendix. Significance of change presents the p-value of two-tailed test of differences in proportions. The sample comprises observations in the periods Q4:1997-Q3:1999 and Q4:2000-Q3:2002, except that observations with actual earnings announcements between 12/20/1999 and 10/23/2000 are excluded.

	Panel A: All Observations			Panel B: Subgroups Based on Firm Size								
				Big firms			Mid-size firms			Small firms		
	Pre-FD	Post-FD	Significance of Change	Pre-FD	Post-FD	Significance of Change	Pre-FD	Post-FD	Significance of Change	Pre-FD	Post-FD	Significance of Change
Total of PAs	2990	4078		905	1572		1055	1619		1030	887	
Doubled PAs	886	1451		317	633		303	543		266	275	
Fraction with at least one PA	0.088	0.127	<.0001	0.101	0.181	<.0001	0.096	0.146	<.0001	0.075	0.073	0.5009
Fraction with more than one PA	0.003	0.005	0.0004	0.005	0.009	0.0019	0.004	0.006	0.0607	0.002	0.002	0.6456
Total number of firm-quarters	32450	30656		8495	8257		10598	10639		13357	11760	

Table 4. Panel Data Regression (Conditional Logit) to Explain the Use of Pre-announcements

This table presents results of conditional (fixed effects) logit regressions of the presence of a pre-announcement. The dependent variable $PREANN_{i,q}$ is a dummy set to 1 when there is at least one pre-announcement issued by the firm from the period between 15 days before the end of the quarter *q* (henceforth referred as date τ) and 2 days before the actual release of that quarter's earnings announcement. $SIZE_{i,q}$ is the log of market value of the firm at the last day of the month in which the earnings announcement is released, scaled by the market index at the same day the market value is measured. $LOSS_{i,q}$ is a dummy variable set to 1 when the actual earnings are negative. The variable $SURPRISE_{i,q}$ is measured as the absolute value of the difference between the actual earnings and the consensus mean forecast at date τ, scaled by the end of the quarter book equity per share. $NEG\_SURPRISE_{i,q}$ is a dummy variable set to 1 when the actual earnings is below the consensus forecast available at date τ. $ABSCAR_{i,q}$ is the absolute value of the cumulative abnormal return for firm *i* up to date τ. $SIGNCAR_{i,q}$ is a dummy set to 1 when this cumulative abnormal return negative. The cumulative abnormal return for firm *i* up to date τ is the summation of market model's residuals from 3 days after the previous quarter's earnings announcement day up to date τ. $POSTFD\_Big_{i,q}$, $POSTFD\_Mid_{i,q}$ and $POSTFD\_Small_{i,q}$ are the interactions of $POSTFD_{i,q}$ with dummies identifying whether the firm belongs, respectively, to the portfolio of big, mid-size or small firms. Details on the construction of portfolios of big, mid-size and small firms are described in the Appendix. The p-values are shown below each coefficient estimate. The sample comprises observations in the periods Q4:1997-Q3:1999 (pre-FD sample) and Q4:2000-Q3:2002 (post-FD sample), except that observations with actual earnings announcements between 12/20/1999 and 10/23/2000 are excluded. The first 2 columns of Panel A report results using all observations from the original sample, and the last 2 columns report results using only observations that have at least one earnings forecast not older than 90 days available for quarter *q* at date τ.

Panel A: Aggregating all data together

	I	II	III	IV
POSTFD	0.5226	-	0.5664	-
	<.0001	-	<.0001	-
POSTFD_Big	-	0.7582	-	0.7548
	-	<.0001	-	<.0001
POSTFD_Mid	-	0.6057	-	0.5890
	-	<.0001	-	<.0001
POSTFD_Small	-	0.0561	-	0.1260
	-	0.3780	-	0.1500
SIZE	0.0989	0.0723	0.1598	0.1412
	0.0010	0.0150	<.0001	<.0001
LOSS	0.4012	0.4012	-	-
	<.0001	<.0001	-	-
NEG_SURPRISE	-	-	1.3556	1.3500
	-	-	<.0001	<.0001
SURPRISE	-	-	6.5455	6.6500
	-	-	<.0001	<.0001
ABSCAR	0.6745	0.6835	0.5209	0.5246
	<.0001	<.0001	<.0001	<.0001
SIGNCAR	0.2603	0.2618	0.1595	0.1605
	<.0001	<.0001	<.0001	<.0001
# Observations	34799	34799	31155	31155
Pseudo R^2	0.019	0.023	0.098	0.100

Panel B: Running regressions in each group

	Big firms	Mid-size firms	Small firms
POSTFD	0.7697	0.5874	0.1572
	<.0001	<.0001	0.0800
SIZE	-0.0022	0.1449	0.2764
	0.9710	0.0030	<.0001
NEG SURPRISE	1.2030	1.4544	1.3010
	<.0001	<.0001	<.0001
SURPRISE	34.0600	7.8479	4.4843
	<.0001	<.0001	0.2760
ABSCAR	0.2168	0.7414	0.3881
	0.3740	<.0001	0.0350
SIGNCAR	0.1586	0.1499	0.1605
	0.0040	0.0060	0.0170
# Observations	11703	12135	7327
Pseudo R^2	0.100	0.117	0.857

Table 5. Panel Data Fixed Effects Regression to Explain Forecast Error

This table presents results of panel data fixed effects regression to explain forecast error at quarterly earnings announcements. The dependent variable, $EA\_SURPRISE_{i,q}$, is the absolute value of the difference between actual earnings per share for firm *i* at quarter *q* and the consensus (mean) forecast as of 2 days before the actual earnings announcement day for firm *i*'s quarter *q*, divided by either firm *i* market value of equity at the end of the quarter (specifications I and II) or firm *i* book equity per share computed at the end of quarter *q* (specifications III and IV). The explanatory variables are defined as follows. $SIZE_{i,q}$ is the log of market value of the firm at the last day of the month in which the earnings announcement is released, scaled by the market index. $LOSS_{i,q}$ is a dummy variable set to 1 when the actual earnings are negative. $ABSCAR_{i,q}$ is the absolute value of the cumulative abnormal return for firm *i* along quarter *q*. $SIGNCAR_{i,q}$ is a dummy set to 1 when the cumulative abnormal return for quarter *q* is negative. The cumulative abnormal return for firm *i* during quarter *q* is the summation of market model's residuals from 3 days after the previous quarter's earnings announcement day up to 2 days before quarter *q*'s earnings announcement day. $POSTFD_{i,q}$ is a dummy set to 1 for a quarterly earnings release after the adoption of Reg FD, and 0 otherwise. $POSTFD\_Big_{i,q}$, $POSTFD\_Mid_{i,q}$ and $POSTFD\_Small_{i,q}$ are the interactions of $POSTFD_{i,q}$ with dummies identifying whether the firm belongs, respectively, to the portfolio of big, mid-size or small firms. Details on the construction of portfolios of big, mid-size and small firms are described in The Appendix. The p-values are shown below each coefficient estimate. The sample comprises observations in the periods Q4:1997-Q3:1999 (pre-FD sample) and Q4:2000-Q3:2002 (post-FD sample), except that observations with actual earnings announcements between 12/20/1999 and 10/23/2000 are excluded.

Panel A: Aggregating all data together

	Earning surprise scaled by share price		Earning surprise scaled by book equity per share	
	I	II	III	IV
POSTFD	0.0019	-	-0.0001	-
	<.0001	-	0.4223	-
POSTFD_Big	-	0.0006	-	-0.0002
	-	<.0001	-	0.0387
POSTFD_Mid	-	0.0019	-	-0.0001
	-	<.0001	-	0.5107
POSTFD_Small	-	0.0031	-	0.0008
	-	<.0001	-	<.0001
SIZE	-0.0038	-0.0037	-0.0010	-0.0010
	<.0001	<.0001	<.0001	<.0001
LOSS	0.0048	0.0048	0.0046	0.0045
	<.0001	<.0001	<.0001	<.0001
ABSCAR	0.0014	0.0014	0.0018	0.0018
	<.0001	<.0001	<.0001	<.0001
SIGNCAR	0.0002	0.0002	-0.0005	-0.0005
	<.0001	0.0005	<.0001	<.0001
# Observations	45715	45715	45715	45715
R^2	0.138	0.137	0.029	0.029

Panel B: Running regressions in each group

	Earning surprise scaled by book equity per share		
	Big firms	Mid-size firms	Small firms
POSTFD	-0.0004	0.0000	0.0006
	0.0011	0.8936	0.0258
SIZE	-0.0008	-0.0012	-0.0007
	<.0001	<.0001	0.0013
LOSS	0.0020	0.0041	0.0069
	<.0001	<.0001	<.0001
ABSCAR	0.0012	0.0022	0.0016
	0.0007	<.0001	0.0007
SIGNCAR	-0.0004	-0.0005	-0.0006
	<.0001	<.0001	0.0029
# Observations	15786	17942	11987
R^2	0.011	0.031	0.044

Table 6. Panel Data Fixed Effects Regression to Explain Volatility (Market Response) at Earnings Announcements

This table presents results of panel data fixed effects regression to explain volatility (market response) at earnings announcements. The dependent variable, volatility, is defined as the cumulative absolute abnormal return during the 3 days (window [-1,+1]) around the earnings announcement day, where the abnormal return is obtained as the residual from the market model. The explanatory variables are defined as follows. $SIZE_{i,q}$ is the log of market value of the firm at the last day of the month in which the earnings announcement is released, scaled by the market index. $LOSS_{i,q}$ is a dummy variable set to 1 when the actual earnings are negative. $SURPRISE_{i,q}$ is measured as the absolute value of the difference between the actual earnings and the consensus mean forecast two days before the earnings announcement, scaled by the end of the quarter book equity per share. $NEG\_SURPRISE_{i,q}$ is a dummy variable set to 1 when the actual earnings is below the consensus forecast. $ABSCAR_{i,q}$ is the absolute value of the cumulative abnormal return for firm *i* along quarter *q*. $SIGNCAR_{i,q}$ is a dummy set to 1 when the cumulative abnormal return for quarter *q* is negative. The cumulative abnormal return for firm *i* during quarter *q* is the summation of market model's residuals from 3 days after the previous quarter's earnings announcement day up to 2 days before quarter *q*'s earnings announcement day. VIX is the value of the volatility index for the Chicago Board Options Exchange at the earnings announcement day. $POSTFD_{i,q}$ is a dummy set to 1 for a quarterly earnings release after the adoption of Reg FD, and 0 otherwise. $POSTFD\_Big_{i,q}$, $POSTFD\_Mid_{i,q}$ and $POSTFD\_Small_{i,q}$ are the interactions of $POSTFD_{i,q}$ with dummies identifying whether the firm belongs, respectively, to the portfolio of big, mid-size or small firms. Details on the construction of portfolios of big, mid-size and small firms are described in the Appendix. The p-values are shown below each coefficient estimate. The sample comprises observations in the periods Q4:1997-Q3:1999 (pre-FD sample) and Q4:2000-Q3:2002 (post-FD sample), except that observations with actual earnings announcements between 12/20/1999 and 10/23/2000 are excluded.

Panel A: Aggregating all data together

	I	II	III	IV
POSTFD	0.0091	-	0.0021	-
	<.0001	-	0.0023	-
POSTFD_Big	-	0.0081	-	0.0009
	-	<.0001	-	0.4052
POSTFD_Mid	-	0.0093	-	0.0024
	-	<.0001	-	0.0251
POSTFD_Small	-	0.0109	-	0.0042
	-	<.0001	-	0.0045
SIZE	-0.0114	-0.0113	-0.0113	-0.0113
	<.0001	<.0001	<.0001	<.0001
LOSS	-0.0043	-0.0043	-0.0039	-0.0039
	0.0002	0.0002	0.0005	0.0005
NEG_SURPRISE	0.0047	0.0047	0.0048	0.0048
	<.0001	<.0001	<.0001	<.0001
SURPRISE	0.5589	0.5577	0.5641	0.5626
	<.0001	<.0001	<.0001	<.0001
ABSCAR	0.0424	0.0425	0.0393	0.0393
	<.0001	<.0001	<.0001	<.0001
SIGNCAR	0.0094	0.0094	0.0060	0.0060
	<.0001	<.0001	<.0001	<.0001
VIX	-	-	0.0015	0.0015
	-	-	<.0001	<.0001
# Observations	48630	48630	48630	48630
R^2	0.035	0.035	0.055	0.055

Panel B: Running regressions in each group

	Big firms	Mid firms	Small firms
POSTFD	0.0005	0.0014	0.0046
	0.6230	0.2165	0.0077
SIZE	-0.0078	-0.0091	-0.0176
	<.0001	<.0001	<.0001
LOSS	0.0012	-0.0048	-0.0063
	0.5236	0.0080	0.0027
NEG_SURPRISE	0.0050	0.0067	0.0021
	<.0001	<.0001	0.1715
SURPRISE	0.6917	0.6118	0.5159
	<.0001	<.0001	<.0001
ABSCAR	0.0554	0.0371	0.0325
	<.0001	<.0001	<.0001
SIGNCAR	0.0084	0.0053	0.0033
	<.0001	<.0001	0.0165
VIX	0.0015	0.0016	0.0015
	<.0001	<.0001	<.0001
# Observations	16366	18960	13304
R^2	0.076	0.054	0.045

Table 7. Fama-French Regression on Size-Based Portfolios

This table presents results of regressions motivated by the Fama and French (1993) 3-factor model for the portfolios of firms created based on the division by size. The dependent variable is the value-weighted monthly return of each size-based portfolio in excess of the T-bill. The explanatory variables RMRF, SMB and HML are defined in Fama and French (1993). POSTFD is a dummy set to 1 for the months after Oct 2000, and 0 otherwise; POSTFD_SMB is the interaction of POSTFD and SMB. The sample period is Jan 1997 to December 2002.

	Big firms				Mid-size firms				Small firms			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
Intercept	0.0016	0.0017	0.0018	0.0018	-0.0060	-0.0073	-0.0064	-0.0071	-0.0172	-0.0191	-0.0225	-0.0235
	0.013	0.0085	0.0251	0.0211	0.2343	0.1408	0.3207	0.2628	0.0160	0.0066	0.0139	0.0088
RMRF	0.9789	0.9824	0.9779	0.9815	1.2653	1.2202	1.2672	1.2193	1.0489	0.9828	1.0712	1.0032
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
SMB	-0.0834	-0.0736	-0.0815	-0.0723	0.5982	0.4725	0.5946	0.4738	0.6470	0.4627	0.6048	0.4334
	<.0001	<.0001	<.0001	<.0001	<.0001	0.0003	<.0001	0.0005	0.0001	0.0101	0.0005	0.0181
HML	-0.0311	-0.0270	-0.0295	-0.0259	0.1342	0.0821	0.1314	0.0833	-0.0606	-0.1370	-0.0941	-0.1623
	0.087	0.1401	0.1107	0.1646	0.3631	0.5734	0.3836	0.5754	0.7683	0.5008	0.6524	0.4318
POSTFD	-	-	-0.0007	-0.0005	-	-	0.0012	-0.0006	-	-	0.0145	0.0120
	-	-	0.6169	0.6904	-	-	0.9096	0.9585	-	-	0.3396	0.4202
POSTFD_SMB	-	-0.0381	-	-0.0372	-	0.4874	-	0.4884	-	0.7146	-	0.6932
	-	0.1911	-	0.2065	-	0.0393	-	0.0410	-	0.0304	-	0.0367
# Observations	72	72	72	72	72	72	72	72	72	72	72	72
Adj R^2	0.992	0.992	0.991	0.992	0.766	0.778	0.763	0.774	0.606	0.627	0.605	0.625

Table 8. Summary Results of Breaking Small Firms According to Analyst Following

This table presents results involving the break-up of small firms according to analyst following characteristics. The first subgroup includes firms present in both pre-FD and post-FD periods and that have no analyst following in any of the firm-quarters of the sample. The second subgroup includes firms that had some analyst following in at least one of the pre-FD quarters but no analyst following in any of the post-FD quarters. The third subgroup includes all the remaining small firms. Panel A present univariate statistics based on these subgroups. Panel B presents results of running Fama-French regressions (as in Table 7) for all the small firms taken together as a group as well as for each subgroup of small firms defined above.

.

Panel A: Univariate statistics

	All small firms		Small firms with no analyst following pre-FD		Small firms with some analyst following pre-FD but none post-FD		All other small firms	
# firms	3166		364		339		2463	
	Pre-FD	Post-FD	Pre-FD	Post-FD	Pre-FD	Post-FD	Pre-FD	Post-FD
Size ($MM)	72	68	46	54	76	46	77	76
Number of forecasts	1.40	1.00	0.00	0.35	1.27	0.00	1.72	1.34
Pre-announcement	0.08	0.07	0.01	0.02	0.09	0.05	0.08	0.08

Panel B: Fama-French regressions

	All small firms		Small firms with no analyst following pre-FD or post-FD		Small firms with some analyst following pre-FD but none post-FD		All other small firms	
	I	II	I	II	I	II	I	II
Intercept	-0.0172	-0.0191	-0.0014	-0.0024	-0.0178	-0.0194	-0.0184	-0.0205
	0.0160	0.0066	0.8163	0.6833	0.0054	0.0023	0.0123	0.0046
RMRF	1.0489	0.9828	0.8075	0.7716	1.0146	0.9610	1.0965	1.0251
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
SMB	0.6470	0.4627	0.4933	0.3932	0.7216	0.5720	0.6675	0.4685
	0.0001	0.0101	0.0005	0.0122	<.0001	0.0005	0.0001	0.0111
HML	-0.0606	-0.1370	0.1811	0.1397	0.3167	0.2547	-0.1366	-0.2190
	0.7683	0.5008	0.3051	0.4321	0.0873	0.1647	0.5201	0.2957
POSTFD_SMB	-	0.7146	-	0.3878	-	0.5804	-	0.7715
	-	0.0304	-	0.1741	-	0.0491	-	0.0231
# Observations	72	72	72	72	72	72	72	72
Adj R^2	0.606	0.627	0.475	0.481	0.575	0.593	0.628	0.650

Table 9. Summary Results of Breaking Firms in Groups based on Size and on Intangibles

This table presents results involving the break-up of sample in groups based on size (big, mid-size and small firms) and intangibles (low and high). Panel A presents results on panel data regressions. The first column under each variable presents the estimates of post-FD dummies corresponding to each group definition in multivariate panel data regressions (other coefficients' estimates are omitted) as done before for the break-up on size alone, with the exception that now we also include book-to-market and intangibles as control variables; for the analyst following regression we start from specification VI in Table 2, for the pre-announcement regression we start from specification V in Table 4, for the forecast error regression we start from specification IV in Table 5 and for volatility regression we start from specification IV in Table 6; and then we add book-to-market and intangibles as regressors. The second column under each variable is computed by dividing the post-FD dummy by the pre-FD average of that variable (except for pre-announcement, when we show simply the pre-FD average). The intra-group differential impact shows p-values of tests of differences in intra-group coefficients on high and low intangibles. Panel B presents results of running Fama-French regressions for each group of firms; each row presents the coefficients estimates of SMB and POSTFD_SMB regressors from running specification type II in Table 7 (other coefficients' estimates are omitted).

	Panel A: Panel data regressions								Panel B: Fama-French Regressions	
	Analyst Following		Pre-announcement		Forecast error		Volatility			
	POSTFD dummy from multivariate regression	% change from pre-FD average	Odds ratio	Pre-FD average	POSTFD dummy from multivariate regression	% change from pre-FD average	POSTFD dummy from multivariate regression	% change from pre-FD average	SMB	POSTFD_SMB
Big size, low intangible	3.65E-05 <.0001	0.0660	2.32 (<.0001)	0.0917	-8.34E-05 0.5268	-0.0215	1.70E-03 0.2744	0.0214	-0.1201 0.0001	0.0387 0.4927
Big size, high intangible	3.13E-05 <.0001	0.0581	1.79 (<.0001)	0.1123	7.65E-05 0.7244	0.0211	-1.42E-03 0.3796	-0.0175	-0.0203 0.6134	-0.1121 0.1339
Mid-size, low intangible	-1.13E-05 <.0001	-0.0545	1.83 (<.0001)	0.0836	5.58E-04 0.0075	0.0908	-5.44E-04 0.7269	-0.0058	0.4514 0.0028	0.5467 0.0435
Mid-size, high intangible	-2.12E-05 <.0001	-0.0902	1.71 (<.0001)	0.1109	2.38E-04 0.2733	0.0426	3.59E-03 0.0232	0.0352	0.5366 <.0001	0.5065 0.0367
Small size, low intangible	-7.63E-06 0.0006	-0.1111	1.08 0.1020	0.0609	1.57E-03 <.0001	0.1596	-5.40E-03 0.0219	-0.0461	0.4175 0.0228	0.6534 0.0528
Small size, high intangible	-1.89E-05 <.0001	-0.2182	1.01 0.6721	0.0871	1.24E-03 <.0001	0.1623	8.70E-03 <.0001	0.0769	0.5248 0.0029	0.7520 0.0195
# Observations	56634		31155		41399		43927			
R^2	0.152		0.096		0.031		0.056			
	Intra-group differencial impact in High vs Low (p-value)									
Big size	0.1011		0.1620		0.5853		0.1515			
Mid-size	0.0009		0.8870		0.2764		0.0541			
Small Size	<.0001		0.0610		0.4609		<.0001			

Figure 1. Quarterly Average Volatility (Market Response) at Earnings Announcements

This figure presents the quarterly average volatility for each group of firms. Volatility is the cumulative absolute abnormal return over the window [-1,+1] around the earnings announcement day. The vertical lines indicate the period when Reg FD was being proposed and discussed; the pre-FD period thus finishes before the first vertical line and the post-FD period starts after the second vertical line. The break-up of companies on the groups based on size (big, mid and small companies) is described in the Appendix.

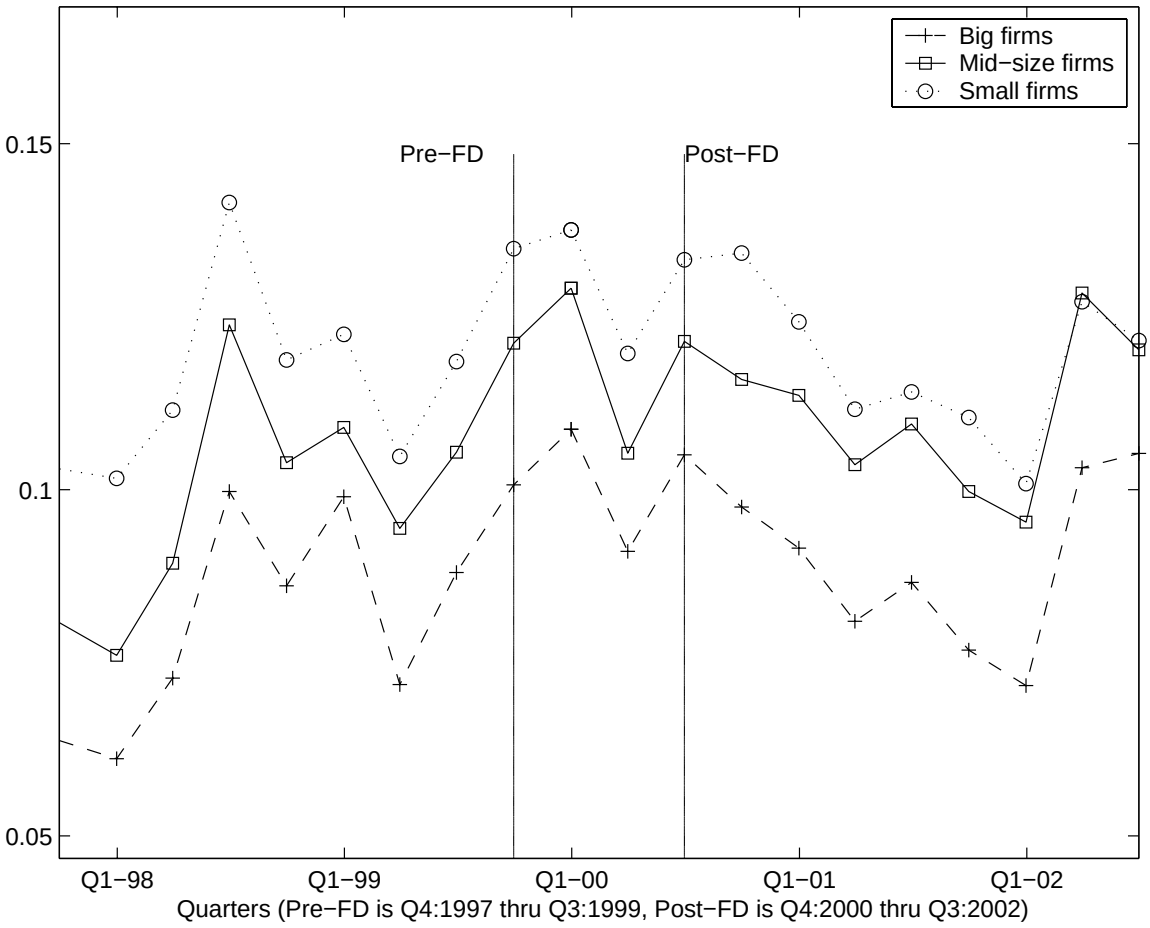

Figure 2. Quarterly Fraction of Firms Using Conference Calls around Earnings Announcements

This figure presents the fraction of firms in each group that uses conference calls (from FirstCall) at the window [-1,+1] around the current quarter's earnings announcement day. The vertical lines indicate the period when Reg FD was being proposed and discussed; the pre-FD period thus finishes before the first vertical line and the post-FD period starts after the second vertical line. The break-up of companies on the groups based on size (big, mid and small companies) is described in the Appendix.