Investor Relations and Regulation FD

(preliminary – please do note quote or cite)

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Version: November 23, 2011

ABSTRACT

We examine the differential impact of Regulation Fair Disclosure (Reg FD) on firms with an established professional investor relations (IR) presence at the time of the regulation. About 25% of publicly listed firms employ a professional IR member yet we know relatively little about the role of IR. We find IR firms more than double their level of public disclosure post-Reg FD consistent with Reg FD achieving its aim of reducing the selective disclosure of nonpublic information. Despite IR firms losing a potential competitive advantage, we find they do not suffer adversely in the post-Reg FD environment in terms of analysts, institutional investors, and information asymmetry. Indeed, IR firms show an increase in analyst following and institutional ownership, and a decrease in analyst uncertainty and information asymmetry relative to a control sample of similar non-IR firms. This implies that, while Reg FD may have reduced selective disclosure, IR firms may be relatively better positioned to navigate the more complicated regulatory environment.

Keywords: Investor relations, disclosure, regulation, earnings announcements, capital markets, financial analysts.

We thank the University of Florida for financial assistance.

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1. Introduction

This paper investigates the effect of Regulation Fair Disclosure (Reg FD) on firms with an established investor relations (IR) presence at the time of the regulation. The Securities and Exchange Commission (SEC) implemented Reg FD on October 23, 2000 with the goal of leveling the informational playing field by prohibiting selective disclosure of material nonpublic information to security analysts or favored investors. The regulation relates directly to IR activities within a firm as a major function of IR is to develop close personal relationships with analysts and institutional investors. Reg FD specifically highlights “investor relations professionals” in its definition of a “person acting on behalf of the issuer” (Reg FD, 2000).

IR has also grown to a substantial presence among publicly listed firms with 20 – 30% of publicly listed firms over the last decade employing a professional IR member. Yet the existing literature reveals little about this professionalized functional area despite its rapid growth within firms and its relevance to major topics of interest in the accounting and finance literature, such as disclosure, analyst following, shareholder composition, and stock price characteristics.\(^1\) We examine how an exogenous shock (Reg FD), which targeted the close relationships at the core of IR, affected a unique subset of firms with an established IR presence, and how these firms adapted to the new regulatory environment. This focused setting also provides cross-sectional evidence on the overall efficacy of Reg FD on a selective group of firms engaged in practices targeted by the regulation.

We refer to IR as the specialized function within a firm that integrates activities related to communications with investors and analysts. This role is staffed by professional IR employees, often senior managers or vice-presidents, who report directly to top management. To capture this

\(^1\) An exception is Bushee and Miller (2010) which investigates the role of IR consultants hired by small firms. Their study finds that smaller firms, after hiring an IR consultant, experience increases in press releases, media coverage, liquidity, analyst following, and institutional investor ownership.
professionalized IR role within firms, we use the membership directory of the National Investor Relations Institute (NIRI), the professional membership organization for IR in the United States.

We identify 182 publicly listed firms (IR firms) that employ at least one NIRI member every year over 1995 – 2005 and match these IR firms in the pre-Reg FD period (fourth quarter of 1999) with a control group of firms without a NIRI member (non-IR firms). We keep the match through the end of 2005 and analyze how the public disclosure environment, analysts, institutional ownership, and level of information asymmetry evolve over time in the post-Reg FD period [4Q2000, 4Q2005] relative to the pre-Reg FD period [4Q1999, 4Q2000]. In particular, we examine the difference-in-difference change in the IR firms relative to the control non-IR firms.

After propensity score matching, our IR and control non-IR firms do not significantly differ on size, age, book-to-market, R&D intensity, litigation, performance (loss and ROA), leverage, exchange listing, and industry.

We show that IR firms dramatically increased public earnings disclosures in the quarter when Reg FD was implemented and continued at this higher level into the following years. This increase in public disclosure is significantly greater than the control sample of similar firms. Specifically we find IR firms were both more likely to issue earnings guidance and produced a greater number of earnings forecasts. IR firms issued 0.35 more public management forecasts per quarter in the post-Reg FD period (a 152% increase) compared to 0.11 for non-IR firms. This suggests IR firms were selectively communicating privately prior to Reg FD and the regulation had a significant impact on the public disclosure policies of these firms.

We also provide evidence showing the differential effect of Reg FD on the level of analyst following, institutional ownership, and information asymmetry in IR firms. We find that IR firms, relative to the control group, gain analyst following in the post-Reg FD period and that
analysts’ dispersion decreases. Although post-Reg FD, IR firms are less likely to meet analyst forecasts, have lower recommendations, and lower analyst forecast accuracy, these changes are not significant relative to the control non-IR firms that experienced similar changes. IR firms show some evidence of an increase in institutional ownership relative to control firms over the period. The number of institutional owners increased in the post-Reg FD period while the percentage of institutional ownership increased but not relative to the control group. The results also show IR firms experienced a significant relative increase in share turnover and a decrease in investor uncertainty and information asymmetry in the post-Reg FD period. Bid-ask spread decreases over the period but not relative to the control group. Additionally, the results are strongest for the group of IR firms that had the largest change in public disclosure after Reg FD’s implementation.

Our results have implications for securities regulators, practitioners, and academics. We contribute to the disclosure, analyst and capital market literature by examining a widespread professionalized function within firms that has not been systematically examined before. In the pre-Reg FD environment and consistent with Bushee et al. (2010), our results show IR is related to disclosure, greater analyst following, greater institutional ownership, and less analyst uncertainty. We extend the prior literature on Reg FD by examining the cross-sectional effect on a unique and relevant subset of firms, allowing us to compare outcomes relative to a contemporaneous matched sample and control for the many other institutional changes occurring during the sample period. The study provides evidence that Reg FD altered the relationship structure IR nurtured with analysts and institutional investors with practices such as private earnings guidance. This is consistent with Reg FD achieving its goal of reducing private disclosure to select security market professionals. However, despite Reg FD leveling the playing
field, IR firms do not lose any advantage they had in terms of analysts, institutional ownership, and information asymmetry. On the contrary, they appear to expand that advantage in the post-Reg FD environment. This implies that an unintended consequence of Reg FD may have been to create a more complicated regulatory environment which favored firms with an established IR program, making them more adept at managing relationships in this new environment.

In the next section, we provide institutional background and related literature. Section 3 describes the sample and research design, section 4 presents the results, and section 5 offers concluding remarks.

2. Institutional Background and Related Literature

IR has grown from a peripheral component of the CFO’s responsibility in the 1980s to a demanding professionalized function staffed with full-time IR employees who directly report to the CEO and/or the CFO (Useem, 1993; Rosenbaum, 1994). Almost 90% of the respondents in a NIRI membership survey report directly to the CFO, CEO, president, or chairman (NIRI, 2005). Throughout the last decade, NIRI has averaged around 4,500 members with over a quarter of publicly listed firms employing a NIRI member. IR often directs the disclosure policy of the firm – 80% of NIRI’s members participate in the firm’s disclosure committee, which rises to 90% in firms with a market cap over $10 billion (Brennan and Tamarowski, 2000; NIRI, 2005). Despite the increasing importance of IR and the likely influence of the IR function over disclosure choice, there is little academic research that investigates the effects of IR.²

² The existing literature typically references “investor relations” in terms of the AIMR database introduced by Lang and Lundholm (1993) that contains evaluations of firm disclosure along three dimensions: “annual published information”, “quarterly and other published information”, and “investor relations and related aspects.” The “investor relations” category includes access to management, responsiveness to questions, and frequency and content of presentations to analysts. This definition is restrictive as a professionalized IR function within a firm influences many aspects of a firm’s communication including activities in the annual and quarterly information categories. Reflecting this broad scope, NIRI defines IR as: “…a strategic management responsibility that integrates
Building and maintaining close relationships with analysts and institutional shareholders is a major focus of IR – 83% of an IR department’s time is devoted to institutional investors and analysts, as opposed to individual shareholders (NIRI, 2004). Yet this intimate relationship and preferential treatment troubled the SEC. In 2000, the SEC was increasingly concerned that firms were selectively disclosing material nonpublic information to securities analysts and/or selected institutional investors. To explicitly outlaw this practice and create a “level playing field”, the SEC implemented Reg FD in October, 2000 (Reg FD, 2000).

This regulation takes aim at the heart of the IR process – the relationship and communication with analysts and institutional investors. IR professionals cite increases in the number of analysts, institutional investors (particularly longer term), and disclosure as measureable objectives of a successful IR program (Farragher et al., 1994; Mahoney and Lewis, 2004; Bushee and Miller, 2010). IR professionals build relationships with analysts and institutional investors through organizing webcasts, conference calls, one-on-one meetings, and presentations (Francis et al., 1997; Bushee et al., 2011). Virtually every surveyed company (99.5%) conducts meetings with analysts and institutional investors: 98% host one-on-one meetings, 95% hold conference calls, 92% have group meetings initiated by others, and 70% have on-site company/facility meetings or tours (NIRI, 2004). The selectivity of these meetings creates a high potential for nonpublic disclosures during conversations and when answering questions.

In particular, one high risk IR activity involves earnings guidance, including activities such as individually reviewing analysts’ earnings models and draft reports. In a NIRI survey,
most members believed Reg FD would have a dramatic effect on their disclosure practices specifically because of the guidance paragraph which states,

“One common situation that raises special concerns about selective disclosure has been the practice of securities analysts seeking "guidance" from issuers regarding earnings forecasts. When an issuer official engages in a private discussion with an analyst who is seeking guidance about earnings estimates, he or she takes on a high degree of risk under Regulation FD. If the issuer official communicates selectively to the analyst nonpublic information that the company's anticipated earnings will be higher than, lower than, or even the same as what analysts have been forecasting, the issuer likely will have violated Regulation FD. This is true whether the information about earnings is communicated expressly or through indirect "guidance," the meaning of which is apparent though implied. Similarly, an issuer cannot render material information immaterial simply by breaking it into ostensibly non-material pieces.” (Reg FD, 2000; Thompson, 2001)

Overall, we believe that firms engaging in professional IR activities were more likely to be engaged in the activities targeted by the regulation. This paper examines the response of these firms to Reg FD and how this change in the economic environment affected them in the years following the regulation relative to firms without a professional IR function.

Specifically, we focus our analysis on four broad areas suggested by the Reg FD and IR literature: disclosure, analyst following, institutional ownership, and information asymmetry. The prior literature largely documents average differences for all firms before and after Reg FD. Instead, we focus in the cross-section on a select group of firms engaged in practices specifically targeted by the regulation. We add to this literature by not only examining the effect of Reg FD on a unique subset of relevant firms but also on how firms with professional IR were affected in the post-Reg FD period.

The central theme of Reg FD is disclosure – the intention of the rule is to eliminate private disclosure of nonpublic information to select groups. After Reg FD, firms that had been engaging in private disclosure could either substitute public disclosure for private disclosure or
stop disclosing altogether. Critics argued that Reg FD would have in a chilling effect on communications as firms would prefer silence over publicly releasing information that could be exploited by competitors or misinterpreted by investors. The evidence tends to support the contrary, with several studies demonstrating that disclosure has increased in the post-Reg FD era. For example, Heflin et al. (2003) finds that public earnings disclosures more than doubled from pre- to post-Reg FD. Bushee et al. (2004) find that Reg FD had a dampening effect on manager’s decisions to host conference calls, however, the magnitude of the effect was not large. We expect that IR firms were likely to have been engaged in private guidance pre-Reg FD but that they will transition to public guidance after implementation of the rule.

The analyst community was vocal in its opposition to Reg FD. They argued that Reg FD would reduce the quantity and quality of disclosure, leading to a lower quality of analyst forecasts and a weakened information environment (SIA, 2001). IR professionals are also concerned about forecast quality and cite decreased standard deviation of analyst forecasts and increased analyst forecast accuracy as measures of IR performance (Mahoney and Lewis, 2004). Additionally, the SEC was concerned that analysts felt pressured to maintain an optimistic view of a company in order to have continued access to selectively disclosed information. In general, the evidence implies that Reg FD has reduced selective disclosures to analysts but with mixed evidence on accuracy and dispersion. Gintschel and Markov (2004) find the price impact of analyst reports is lower and that this decrease is related to proxies for the level of selective disclosure prior to Reg FD (e.g. brokerage size) . Mohanram and Sunder (2006) find that analysts are spending more effort in private information discovery post-Reg FD. They also find an increase in forecast dispersion and that analysts with preferential links (the proxy again is brokerage size) have greater accuracy in the prior period but that this advantage is negated post-

3 A third (illegal) option would be to continue privately disclosing and disregard Reg FD.
Reg FD. However, Heflin et al. (2003) report no evidence of a change in analyst forecast accuracy or dispersion post-Reg FD. Overall, we investigate whether firms with professional IR held an advantage in terms of the number of analysts, ability to meet expectations, analyst forecast accuracy, forecast dispersion, and recommendation level in the pre-Reg FD period and the extent to which Reg FD affected this relationship.

The SEC believed that firms who gave institutional investors private disclosures were allowing institutional investors an unfair advantage that they used to trade at the expense of uninformed investors. If firms with professional IR were able to attract and retain institutional investors by using private disclosure, this advantage could be eroded once Reg FD severed the ability to selectively provide nonpublic information. Thus, we investigate the change in the institutional shareholder base for firms with professional IR after Reg FD.

A reduction in information asymmetry is the fundamental objective of Reg FD – leveling the playing field means that all investors have access to the same information at the same time. Theoretically, an improved information environment is related to a reduction in information asymmetry between investors and an increase in liquidity. Previous literature has used bid-ask spread, trading volume, and lack of consensus among analysts as proxies for information asymmetry (Leuz and Verrecchia, 2000; Barron et al. 2009). Complementing the theoretical literature, IR professionals cite decreased bid-ask spread and increased trading volume as measures of IR performance (Mahoney and Lewis, 2004). The evidence largely supports the view that Reg FD did not increase information asymmetry. Mohanram and Sunder (2006) find no change in the precision of common information in analysts’ forecasts post-Reg FD while Eleswarapu et al. (2004) find that information asymmetry (as reflected in the adverse selection
component of trading costs) has been reduced. We investigate the effect that Reg FD had on the level of information asymmetry for firms with professional IR.

It is likely that firms with professional IR were engaged in activities that the SEC believed conferred an unfair advantage to security analysts and institutional investors prior to adoption of Reg FD. To the extent that firms with professional IR selectively provided nonpublic information about future earnings, we expect there to be a spike in public earnings guidance after Reg FD. However, it’s unclear whether this initial spike in public earnings guidance will continue as firms re-evaluate their disclosure policy. How IR firms adapted in this new economic environment and the effect on analysts, institutional investors, and information asymmetry is more complex. Firms with an established IR presence at the time of the regulation have a unique trait that is targeted by the regulation. One possibility is the regulation was ineffective. A second possibility is that the advantage firms with professional IR held in the pre-Reg FD era could be negated by the regulation’s attempt to level the playing field. A final possibility is that an unintended consequence of the regulation may have been to confer an advantage on firms that are more adept at managing relationships and navigating in the new regulatory environment. As a result, we view the effect of Reg FD on firms with an established professional IR presence to be an open empirical question.

3. Data and Research Design

3.1 INVESTOR RELATIONS PROXY

We use employment of a NIRI member within a firm as a proxy for professional IR. NIRI is the association for IR professionals. It provides IR professionals with information on

Our construct of interest is a firm’s professional IR and our proxy is NIRI membership. The paper does not test or make claims about the additional value added by NIRI membership.
current practices, educational programs, networking opportunities, and conferences including the NIRI Annual Conference. Corporate Membership in NIRI currently costs $475 and requires that the individual be “actively engaged in the practice of IR and/or corporate communication at the time of the application as an employee of a corporation listed on a public stock exchange (or of a company that is planning to list).”  

To identify firms with members of NIRI on their staff, we gather the names and companies from NIRI’s *Who’s Who in Investor Relations* membership directory. This directory was published annually as a hard copy starting with a 1983/84 edition through a final 2004/05 edition. Subsequently, NIRI moved the directory on-line with the membership list updated daily and no historical record. We revisit this on-line version yearly beginning in 2007 to continue the time-series of annual NIRI members. We then hand-match company names with firm names in CRSP. Table 1, under “NIRI Membership”, shows the number of unique members, companies, and permcos (CRSP company codes) each year from 1983 – 2009. Membership showed a steady increase from 1,051 members in 1983 to 5,252 members in 2001 before decreasing to 3,407 in 2009.

We then adjust the membership data to fill in gap years as these gaps are more likely due to a lapse in filing membership than the absence of professional IR at that firm. We fill in a gap year as an IR year if (1) the company had a NIRI member in the year immediately before and after the gap year, (2) the gap year is 2004 but the company had a NIRI member in 2003 and 2007, (3) the gap year is 2007 but the company had a NIRI member in 2004 and 2008, (4) the gap years are 2005 and 2006 but the company had a NIRI member in 2004 and 2007, and (5) the

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5 NIRI offers four other membership categories: Counselor Member, Service Provider Member, Affiliation Profession Member and Academic Member. It’s unlikely that we mistakenly attribute one of these members to a CRSP firm as the organizations listed for these members are not listed in the CRSP population: small consulting firms, obvious news outlets (e.g. Newswire), small law firms, or universities.
gap years are 2005 and 2006 but the company had a NRI member in either 2003 and 2007 or 2004 and 2008. We then classify firms into categories based on the presence of a NRI member in that year: IR firms and non-IR firms. Table 1, under “Constructed Measure”, shows our CRSP/COMPSTAT sample. IR firms make up an increasingly large segment of the population growing from 10.0% in 1983 to 29.7% in 2001 and falling back to 22.8% in 2009.

3.2 RESEARCH DESIGN

The purpose of our analysis is to assess the impact of Reg FD on firms with a pre-existing IR program. We exploit the natural experiment setting created by the exogenous shock of Reg FD to the firms. We are interested in the evolution of these firms’ information environment over the ensuing years in response to this shock to their economic environment.

Reg FD was approved in August 2000 and became effective October 23, 2000. We follow firms from a year before Reg FD, fourth quarter of 1999, to five years after Reg FD, fourth quarter 2005. Comparing the firm in the post-Reg FD period with the pre-Reg FD period allows the company to act as its own control. Our choice of a longer observation period post-Reg FD is motivated by our desire to observe the evolution of these firms in the new regulatory environment. The limitation of a longer post-Reg FD sample period is that other economic events, such as SOX or the decimalization for NYSE/AMEX firms, also occur during this period.

A second econometric problem to consider is selection bias; managers choose to implement IR, meaning that IR firms will be non-randomly different from non-IR firms. We match the IR firms against a control sample to mitigate problems arising from selection bias and structural changes over time. For each IR firm we identify a similar non-IR firm in the pre-Reg
FD period and maintain this match from the pre- to post-Reg FD period. Our main tests involve a difference-in-difference analysis using this matched control sample.

We identify our IR firms and matched non-IR firms using the following steps. First, we require firms to have an established professional IR presence as of Reg FD implementation, and continuing through the following five years. Using our IR proxy, we identify our IR firms as those firms with a continuous IR presence in each year from 1995 through 2005. By construction, these firms must have survived over the entire period. Second, we define our non-IR firm population to be those firms which have never had an IR presence and were in existence for the entire 1995 – 2005 period (to enable a comparable match). Third, we match the IR firms with the control non-IR firm in the fourth quarter of 1999 and keep this match through 2005. This ensures that the match is constructed in the period prior to the enactment of Reg FD, but close enough to the implementation date so that the IR and non-IR firms are comparable during the economic shock. Lastly, instead of attempting to match dimension by dimension, we use propensity score matching (PSM) to collapse the dimensionality of the matching variables to one and simultaneously match on several characteristics.  

We use the nearest-neighbor algorithm to generate our sample of matched non-IR control firms using the following steps.

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6 The traditional matching procedure in the accounting literature is to match on a subset of the characteristics dimension by dimension (e.g. size, industry); however, the curse of dimensionality does not need many variables to quickly become a problem. For example, Lang et al. (2006) attempt to create a matched sample for firms that cross-list based on only three variables: past sales growth, industry, and year. They state: “ideally, we would like to match on size as well as growth because both could affect the characteristics of accounting data. However, it is quite difficult to get a good match on size and growth simultaneously” and that they are unable to “match on all factors that might affect the characteristics of accounting data.” Propensity score matching offers a solution to these problems. Propensity score matching methodology (PSM) is a nonparametric technique used in the economics (Dehejia and Wahba, 2002; Smith and Todd, 2001), finance (Lee and Wahal, 2004; Hillion and Vermaelen, 2004; Cooper et al., 2005, Kirk, 2011) and accounting literatures (Armstrong et al., 2010; Chen and Johnston, 2010).
Step 1: We estimate a firm’s propensity to have IR using a logit model that regresses the endogenous choice variable, IR, against a control vector, X, of firm and industry characteristics as of the fourth quarter 1999.

Step 2: The predicted probabilities from the model are the propensity scores: \( \Pr(\text{IR}=1 \mid X) = P(X) \). We match each IR firm without replacement to the non-IR firm with the closest propensity score to form a sample of IR and matched control firms.\(^7\)

We analyze how the IR firms’ disclosure, analyst, institutional investor, and information asymmetry variables evolve over time in the post-Reg FD period (fourth quarter of 2000 to fourth quarter of 2005) relative to the pre-Reg FD period (fourth quarter of 1999 to third quarter of 2000). Our main tests focus on the difference-in-difference analysis that compares the evolution of the IR firms versus the control non-IR firms.

The main limitation of the design is similar to other Reg FD studies – we have only one event date. The benefit that prior studies gain from a shorter post-Reg FD window is less chance for economy-wide events. However, major economic events already contaminate even a one year post-Reg FD window as the regulation was implemented as the same time as the stock market downturn from the tech-bubble bursting and decimalization came into effect for NYSE/AMEX firms in 2001. Shorter windows, however, only capture the immediate reaction to the event, although firm responses may evolve over a longer period. For example, it takes time for firms to re-evaluate and alter their disclosure policy, and for analysts and institutional investors to make decisions to modify their relationship with the firm in the new regulatory environment.

Compared to examining the entire population pre- and post-Reg FD, our matched sample design allows us to create a control sample that is simultaneously experiencing these economy-wide

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\(^7\) We impose the restriction that the propensity score of the matched firm has to be within 0.25 of the propensity score of the IR firm and on common support. IR firms without a non-IR match within the 0.25 caliper or not on the common support are not used.
changes. These economy-wide changes could still contaminate results in a matched design if they affect our IR and control non-IR firms differently. We mitigate this possibility, however, by matching on multiple variables through PSM so that our portfolios of IR and non-IR control firms are similar on multiple major dimensions.

3.3 OUTCOME VARIABLE DEFINITIONS

Our analyses require measures relating to the firm’s disclosure environment, analysts, institutional ownership, and information asymmetry. We use stock return data from CRSP, financial data from COMPUTSTAT, analyst data from I/B/E/S, institutional investor data from Thomson Financial 13-f filings, and management earnings guidance from the First Call Company Issued Guidelines database.

As private disclosure of earnings guidance becomes illegal under Reg FD, a firm has to increase its public guidance disclosure unless it stops providing guidance. We capture a firm’s public guidance using two variables. Number of MEF is the number of management earnings forecasts for any horizon issued during the fiscal quarter t. Any MEF is an indicator variable equal to one if the company issued at least one management earnings forecast for any horizon during the fiscal quarter t, and zero otherwise.

We examine multiple measures related to analyst forecasts and their characteristics. We use quarterly earnings forecasts in the I/B/E/S unadjusted detail file database.8 Number of Analysts is the number of analysts who issued an earnings forecast for quarter t in the period one day after quarter t-1’s earnings announcement to one day before quarter t’s earnings

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8 We use the unadjusted detail file as Payne and Thomas (2003) show rounding errors from the adjusted data can lead to misclassifications of whether a firm met earnings expectations or not. To ensure each individual analyst forecast and the actual reported earnings are based on the same number of outstanding shares, we follow Robinson and Glushkov (2006) and adjust each forecast to be comparable with the unadjusted actual earnings using the split-adjustment factor obtained from the CRSP daily file.
announcement. MEDEST is the median consensus forecast based on the latest forecast from analysts who issued forecasts in the 30 days prior to the earnings announcement for quarter t. MBE is an indicator variable equal to one if a firm’s reported earnings (EPS) meets or beats MEDEST, and 0 otherwise. Accuracy is the absolute value of the forecast error (EPS – MEDEST) multiplied by –100 and scaled by the price at the end of quarter t. We multiply by –100 for ease of exposition and to make our variable increasing in greater accuracy. Forecast Dispersion is the standard deviation of forecasts in MEDEST divided by the absolute value of the mean of those forecasts. Recommendation is the five-level (Strong-Sell to Strong Buy) recommendation level from I/B/E/S recoded so that five equals Strong Buy and one equals Strong Sell.\(^{10}\)

We measure institutional ownership using two variables. Number of Institutions (Percentage of Institutional Ownership) is the number of institutional owners (percentage of institutional holdings) as of the most recent institutional ownership report before the end of the fiscal quarter t.\(^{11}\)

The final measures are capital market and investor proxies that reflect information asymmetry. According to economic theory, reductions in information asymmetry decrease the adverse selection cost of trading in a stock and increase liquidity (Diamond and Verrecchia, 1991; and Brennan and Subrahmanyam, 1995). We follow prior literature and use two liquidity variables that are theoretically connected to information asymmetry (Leuz and Verrecchia, 2000). Bid-Ask Spread is the average daily quoted spread, \(\frac{\text{Ask} – \text{Bid}}{\text{Midpoint}}\), over the fiscal quarter. Turnover is the average daily number of shares traded divided by shares outstanding over the

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9 The number of analysts is set to zero for quarters where the firm is publicly traded but there is no analyst data in I/B/E/S.
10 This period also saw a shift by brokerages from the five-level recommendation structure to a three-level recommendation structure. The results are robust to defining Recommendation based on a three-level recommendation structure.
11 The number and percentage of institutional ownership is set to zero for quarters where the firm is publicly traded but there is no institutional ownership data in the Thomson 13-f filings.
fiscal quarter. We follow Barron et al. (2009) for our last two measures derived from the Barron et al. (1998) empirical proxies that separate analysts’ forecast dispersion into its theoretical components: *Uncertainty* and *Information Asymmetry*. We use analysts’ public forecasts as a proxy for the unobservable beliefs of investors prior to the earnings announcement. We define two variables based on the last individual analyst forecasts issued in the 30-days prior to the earnings announcement for quarter t: *Uncertainty (V)* and *Information Asymmetry (1−ρ)*.

\[
\text{Uncertainty} = V = \frac{\sum_{i=1}^{n} (FC_i - EPS)^2}{n} \tag{1}
\]

\[
\text{Information Asymmetry} = 1 - \rho = 1 - \frac{SE - D}{1 - \frac{1}{n} (D + SE)} \tag{2}
\]

\[
\text{Dispersion} = D = V (1 - \rho) = \frac{\sum_{i=1}^{n} (FC_i - FC)^2}{n - 1} \tag{3}
\]

where

- \(V\) = a measure of overall uncertainty defined as the mean of the squared differences between individual analysts’ forecasts (\(FC_i\)) and reported earnings per share (EPS);
- \((1−\rho)\) = a measure of lack of analysts’ consensus, our proxy for information asymmetry;
- \(D\) = a measure of forecast dispersion defined as the sample variance of the individual forecasts (\(FC_i\)) around the mean forecast (FC);
- \(SE\) = a measure of squared error in the mean forecast defined as the difference between earnings per share and the mean forecast (\(EPS - FC)^2\); and
- \(n\) = the number of individual forecasts.

Dispersion is the product of *Uncertainty* and *Information Asymmetry*. Our proxy for *Information Asymmetry* (lack of consensus) captures the ratio of private information precision to total information precision. A greater level of *Information Asymmetry* reflects greater information asymmetry among analysts – individual analysts possess more unique private
information. A greater level of Uncertainty reflects a greater overall level of uncertainty among all analysts. See Barron et al. (2009) for intuitive examples of the variables and evidence of their validity. We scale Uncertainty by stock price measured at the end of fiscal quarter t and take the natural log of these variables to reduce skewness in the distribution.

4. Empirical Results

4.1 DESCRIPTIVE STATISTICS AND MATCHING

In this section, we choose several control variables in order to create a comparable match between the IR firms and non-IR firms. Table 2 shows the descriptive statistics for these variables used in the propensity score estimate in the fourth quarter of 1999. Columns 2-4 show the variables for the IR firms and columns 5-7 show the variables for the unmatched non-IR firms. Columns 8-9 show the coefficients and p-values from estimating the logit model with IR as the dependent variable and all the control variables as regressors. The goal is not to model the optimal determinants of IR but to create a more sophisticated match than the traditional dimension-by-dimension match on industry and size.

We use the log market value of equity, LOG MVE, to control for size effects. Staffing a professional IR department may represent a relatively fixed cost that is subject to economies of scale; while size is also related to many of the outcome variables of interest such as public earnings guidance, analyst following, and institutional ownership.

We include the Book-to-Market ratio and R&D Intensity as proxies for growth opportunities and the firm’s uncertain operating environment. R&D Intensity is measured by dividing research and development expenditures by total assets.\textsuperscript{12} We include a litigation indicator variable, Litigation, as firms in highly litigious industries may have a greater need to

\textsuperscript{12} We code observations in Compustat in which the R&D expenses is missing as zero.
manage communications with investors and analysts. Following Ali and Kallapur (2001), \textit{Litigation} is equal to one if the firm is from the following Standard Industrial Classification (SIC) codes: 2833–2836 and 8731–8734 (pharmaceuticals/biotechnology), 3570–3577 and 7370–7374 (computers and programming), 3600–3674 (electronics), and 5200–5961 (retailing). We include return on assets, \textit{ROA}, and an indicator variable \textit{LOSS} as proxies for the performance of the firm. We control for leverage, \textit{Leverage}, defined as total debt outstanding divided by total assets. Finally, we include exchange and 2-digit SIC industry dummies to control for liquidity and visibility variation and structural differences across major exchanges and industries.

Table 2 shows the differences between \textit{IR} and unmatched \textit{non-IR} firms as of the fourth quarter, 1999. On average, \textit{IR} firms are larger, older, growth firms with higher levels of performance. The mean (median) market value of equity for the \textit{IR} firms is $17,385 million ($3,112 million) contrasted with $975 million ($82 million) for the \textit{non-IR} firms. \textit{IR} firms are also more likely to have higher leverage and be listed on the NYSE versus the NASDAQ exchange. Overall, \textit{IR} and unmatched \textit{non-IR} firms differ statistically and economically along almost every dimension in the univariate setting confirming the need to explicitly control for these variables when matching.

Table 2, columns 8-9, present the results from the multivariable logit model used for the propensity score match. In the multivariate setting, size, age, R&D intensity, leverage and NYSE listing remain positively associated with the presence of professional IR. Overall, the model has good in-sample predictive power of establishing professional IR. The McFadden’s pseudo R-squared is 0.53, and 88.5% of the observations are correctly classified compared to a base rate of 74.0%.

Table 3 presents the characteristics, as of the fourth quarter 1999, of the \textit{IR} and matched \textit{non-IR} control firms before and after using nearest neighbor matching without replacement.
After the matching requirements, the sample contains 182 IR firms matched with 182 non-IR firms. Column 2 shows the means of the IR firms. Columns 3 and 4 report the means of the non-IR firms after matching and the p-values of the difference compared with the IR firms based on matched-pair t-tests. After matching, all the variables are insignificantly different between the IR and non-IR control firms. Intuitively, the IR and non-IR control firms have similar size, age, profitability, growth opportunities, R&D intensity, litigious industry exposure, leverage, exchange listing, and industry grouping. Overall, the propensity score matching has worked successfully in terms of balancing the control variables.

4.2 PRIVATE TO PUBLIC COMMUNICATION

The close relationship IR develops with analysts along with the one-on-one meetings and practice of reviewing earnings models and draft reports suggests IR firms were likely engaging in selective disclosure prior to Reg FD. After the implementation of Reg FD, this private guidance explicitly became illegal. Figure 1 tracks the change in the number of public management earnings forecasts, panel A, and likelihood a firm issues any public earnings forecast, panel B, from the fourth quarter of 1999 to the end of 2005. The figure plots the variables for the IR firms and control firms. In the pre-Reg FD period, IR firms tend to issue more public guidance and are more likely to issue public guidance than the control firms.\(^\text{13}\) This is expected as one of the core activities of the IR functions is to promote high quality and quantity of disclosure. Although IR

\(^\text{13}\) It is important to note that, because of the matching procedure, the IR firms and non-IR control firms differ insignificantly on many of the important variables (such as size and performance) that would be related to the issuance of guidance and the other outcome variables. Empirically, other variables not explicitly used in the match will also be partly balanced between the IR and matched non-IR firms because of their correlation with the other conditioning variables such as industry and size. Characteristics related to the outcome variables but not related to the IR decision will be randomly distributed between the IR and non-IR firms. For example, while gross margin is not included in the balancing variables, the difference in means for gross margin between the IR and matched non-IR control sample is insignificant with a p-value of 0.57.
firms may be privately disclosing more information, they also appear to be publicly disclosing more information in the pre-Reg FD period.

However, in the fourth quarter of 2000 when Reg FD came into effect, the number of management earnings forecasts and percentage of firms issuing forecasts spikes upwards sharply for IR firms. This implies IR firms were actively evaluating their disclosure policy prior to Reg FD and preparing to comply with it upon implementation. Both variables continue to trend upwards over the quarters following Reg FD and settle into a higher range. This suggests that IR firms were selectively communicating privately with analysts and institutional investors prior to Reg FD and the regulation had a significant impact on the public disclosure policies of these firms.

Compared to IR firms, the control firms exhibit a delayed reaction to the implementation of Reg FD. Following implementation, the number of management forecasts and percentage of firms issuing forecasts spiked upwards (similar to the IR firms) but there appears to be no reaction in the quarter Reg FD became effective (Q42000). This suggests these firms also were communicating privately with analysts and institutional investors prior to Reg FD but were less prepared for the new regulation and may have been non-compliant as of the fourth quarter of 2000. The control firms also do not appear to increase the quantity of disclosure in the quarters following this spike. Instead, the number of management forecasts and percentage of firms issuing public guidance drop in the subsequent quarters and settle into a lower range.

Figure 1 also shows visually that the difference between the two groups in terms of public guidance became larger in the post-Reg FD environment. Table 4 shows this difference is statistically and economically significant as well. In the pre-Reg FD period, IR firms issued an average of 0.23 public management earnings forecasts per quarter compared to 0.10 for the control firms ($p = 0.00$). The number of quarterly management earnings forecasts in the IR firm
sample increased by an average of 0.35 per quarter, up 152% from 0.23 to 0.58. While the control firms increased by 0.11 per quarter, up 110% to 0.21. The economically large increase in both types of firms is consistent with the concern regulators had that firms were selectively disclosing information privately and that Reg FD encouraged firms to make this private disclosure public. The difference between the post-Reg FD levels for the IR and control firms is also significant (0.37, \( p=0.00 \)). More importantly, the difference-in-difference increase between the firms over time is an economically and statistically significant 0.24 per quarter (\( p = 0.00 \)), representing a 104% increase over IR firms pre-Reg FD level.

The evidence is generally consistent with Heflin et al. (2003) who find public earnings disclosures and the likelihood that a firm issues an earnings disclosure increases in the year post-Reg FD compared to pre-Reg FD. By focusing on the difference between IR firms and non-IR firms and extending the post-Reg FD sample period, our results suggest additional insights. First, the increase in public earnings guidance varies across firms. IR firms reacted quicker to Reg FD than control firms with a larger increase in public disclosure. Second, this increase in public disclosure tended to continue and settle at a higher level for IR firms versus similar non-IR control firms where the public disclosure did not increase following an initial spike after implementation. Overall, this provides evidence that Reg FD achieved the aim of regulators to reduce the level of selective disclosure.

4.3 ANALYSTS

Table 5, Panel A, presents evidence on how IR firms’ relationship with analysts evolved over the post-Reg FD period. In the pre-Reg FD period, IR firms had more analysts (4.67 versus 3.11, \( p=0.00 \)) with lower forecast dispersion (1.28 versus 1.38, \( p=0.04 \)) than the control firms.
These are consistent with the objective claimed by IR practitioners. However, IR firms show no significant difference in the likelihood of meeting analyst expectations in the pre-Reg FD period. Contrary to expectations that IR firms’ private disclosures aid analysts’ accuracy, analysts’ forecasts are less accurate for IR firms than the control firms in the pre-Reg FD period. Finally, there is no evidence that analysts provided more optimistic recommendations for IR firms relative to control firms, although analysts’ recommendations were optimistic for both groups.

During the post-Reg FD period, both IR and control firms increased their analyst following, consistent with the view that brokerage firms shifted their coverage to larger firms over this period. However, IR firms increased their analyst following relative to the control group by an average of 0.78 (p=0.01) per quarter. This suggests that despite eliminating private communication channels, Reg FD did not hinder an IR firm’s ability to maintain a higher level of analyst coverage.

Similarly, we find that the dispersion in analysts’ forecasts for IR firms declined in the post Reg FD period relative to the control firms. The difference-in-difference results are driven by a decline in the forecast dispersion of the IR firms as the control firms had no change from pre- to post-Reg FD.

MBE, Accuracy and Recommendation show no relative difference for IR firms over the post-Reg FD period. This suggests that despite Reg FD eliminating the private communication channel between firms and analysts, there was no decrease in the ability of analysts of IR firms to forecast earnings. Potentially this could be because IR firms did not alter their communication with analysts in the post-Reg FD period but it made that information public. This shift to public information may not have helped analysts predict earnings better on average but it appears to have decreased the dispersion in beliefs. Recommendation levels for both IR and control firms decreased in the post-Reg FD period, consistent with a structural shift as analysts in general felt
less need to be optimistic to maintain a private information advantage. Also, the Global Settlement occurred during the post-Reg FD period, which reduced analysts’ optimism in general. MBE and Accuracy for both IR and control firms also decreased in the post-Reg FD period.

Overall, the evidence reveals some noteworthy effects of the consequences of Reg FD on a group of firms whose practices prior to Reg FD were a target of the regulation. Despite Reg FD potentially dampening an IR firm’s close relationship with analysts, IR firms have not lost analysts but have gained analyst following in the post-Reg FD environment relative to a control sample. This suggests that even though Reg FD targeted some IR activities, the inbuilt ability of an established professional IR function at the time of Reg FD conferred an advantage on IR firms in the post-Reg FD environment. IR firms may be better able to navigate the regulations to continue communicating with analysts relative to the non-IR control sample. This post-Reg FD relative advantage can also be seen in the lack of a relative decline in the likelihood of meeting expectations and analyst forecast accuracy. The decrease in forecast dispersion of analysts following IR firms with no significant decrease in accuracy suggests a reduction in analysts’ private information and a convergence toward a consensus, though the consensus itself does not improve. The insignificant differences between IR and control non-IR firms in the pre- and post Reg FD period and the difference-in-difference results imply that analysts felt no more pressure to be optimistic about IR firms relative to control firms and Reg FD had no effect on the relative recommendation level.

4.4 INSTITUTIONAL OWNERSHIP

Table 5, Panel B, shows that in the pre-Reg FD period, IR firms had a significantly greater number of institutional investors and a larger percentage of their shares outstanding held
by institutional investors. In the pre-Reg FD period, \textit{IR} firms have 142 institutional investors and 53.8\% of their stock held by institutional investors compared to 106 institutional investors and 39.2\% for the control \textit{non-IR} firms.

Both the \textit{IR} and control firms show a significant increase in institutional investor ownership from the pre-Reg FD period to the post-Reg FD period. However, \textit{IR firms} continue to have a greater amount of institutional ownership in terms of number of owners and percentage of shares held than the control firms during the post-Reg FD period. Despite Reg FD eliminating the ability of \textit{IR} firms to offer selective one-on-one’s with institutional investors where nonpublic information is discussed, the gap between the \textit{IR} firms and control firms grew over the period by an average of 16 institutional investors (\(p=0.00\)). The percentage of institutional ownership, however, showed no difference-in-difference change.

Overall, the results suggest that Reg FD did not reduce \textit{IR} firms’ institutional shareholder base despite Reg FD outwardly eliminating an \textit{IR} firm’s ability to selectively disclose information with institutional investors. On the contrary, there is some evidence that \textit{IR} firms increased their institutional shareholder base relative to similar firms. Similar to the analyst result, \textit{IR} firms may be better prepared to build and maintain relationships with institutional investors relative to similar \textit{non-IR} firms in the stricter post-Reg FD environment.

4.5 INFORMATION ASYMMETRY

Table 5, Panel C, shows that in the pre-Reg FD period, the \textit{IR} and control firms did not differ significantly in terms of \textit{Bid-Ask Spread} or \textit{Turnover}. In the post-Reg FD period, however, the \textit{IR} firms’ \textit{Bid-Ask Spread} dramatically reduced, as did the spreads of the control firms.\(^{14}\) The difference-in-difference result shows no evidence that \textit{IR} firms’ \textit{Bid-Ask Spread} changed relative

\(^{14}\) One explanation for this decrease is the decimalization of the NYSE/AMEX firms in 2001.
to the control firms. Turning to Turnvoer, the IR firms increased from 0.56% to 0.69% (p = 0.00) in the post-Reg FD while the control firms did not differ from the pre-Reg FD period resulting in a difference-in-difference increase for the IR firms of 0.12% (p = 0.03).

Lastly, we examine the information asymmetry and uncertainty variables prior to the earnings announcements. In terms of Information Asymmetry, the IR and control firms are statistically similar in the pre-Reg FD period (p = 0.45). In the post-Reg FD period, the IR firms showed a significant decrease in Information Asymmetry while the control firms showed no significant change, resulting in a difference-in-difference decrease in Information Asymmetry for the IR firms of –0.19 (p = 0.01), approximately 56% from pre-Reg FD levels. IR firms showed a decline in Uncertainty in the post Reg FD period, with the difference-in-difference result driven by a decline in the Uncertainty of the IR firms as the control firms have no significant change from pre- to post-Reg FD. In both the pre- and post-Reg FD period, the IR firms have significantly less uncertainty prior to the earnings announcement than the control firms.

Overall, the results are consistent with IR firms substituting public disclosure for private disclosure after Reg FD. This shift to public disclosure decreased information asymmetry among investors and analysts relative to similar non-IR control firms.

4.6 PARTITION BY CHANGE IN PUBLIC DISCLOSURES

Although Figure 1 and Table 4 show a dramatic increase in public earnings disclosures on average, there is cross-sectional variation among IR firms. Firms that show a small (large) change in public disclosure from the pre- to post-Reg FD period are less (more) likely to have been directly affected by the regulation. We calculate the median change in Number of MEF for IR firms from the pre-to post-Reg FD period. In this section, we partition the IR firms into two
equally sized groups (Low Change and High Change) based on whether they fell below or above the median change in Number of MEF.

Table 6 presents the difference-in-differences results for the Low Change and High Change IR firms. Consistent with the main results from Table 5, the High Change IR firms show a significant increase in Number of Analysts and Number of Institutions, and a decrease in the Forecast Dispersion, Information Asymmetry, and Uncertainty. While the Low Change IR firms show only a significant increase in Turnover. However, only the difference-in-difference change in Number of Institutions is statistically different between the two groups. A caveat is that the reduction in power from the small sample size may hinder the ability to find statistical differences between the two groups.

Overall, this suggests that the changes in analyst, institutional ownership, and information asymmetry are associated with the implementation of Reg FD. The IR firms whose disclosure policy showed little change after Reg FD also showed little change in the outcome variables. The IR firms whose disclosure policy had the largest change after Reg FD had significant increases in analysts and institutional investors, and a decrease in information asymmetry. This implies that IR firms who were more likely to be engaged in private disclosure in the pre-Reg FD period did not adversely suffer (and may have prospered) in the post-Reg FD environment where the SEC aimed to level the playing field.

5. Conclusion

We provide evidence of the effect of Reg FD on firms with an established IR presence at the time of Reg FD. This subset of firms represents a unique setting to examine the impact of Reg FD and explore the role of IR in the new regulatory environment. First, IR has become an increasingly important functional area, with about 25% of publicly listed firms employing a
professional IR member. And second, the close relationship with analysts and institutional investors that is central to IR also is one of the intended targets of the regulation. We examine the changes in disclosure, analysts, institutional investors and information asymmetry pre- and post-Reg FD for IR firms relative to control non-IR firms matched on multiple characteristics.

We find evidence consistent with Reg FD achieving its goal of reducing private disclosure to select security market professionals. IR firms show a dramatic increase in public earnings disclosures immediately in the quarter when Reg FD was implemented. This increase continues to grow in the following quarters before remaining in a steady channel through the end of our sample period. This increase in public disclosure is economically and significantly greater than the increase in the control sample.

However, despite Reg FD leveling the playing field by eliminating an IR firm’s ability to privately communicate with analysts and institutional investors, we find that IR firms do not suffer adversely in terms of analyst, institutional investor and information asymmetry variables relative to a control group of similar non-IR firms. On the contrary, an unintended consequence of Reg FD may have been to confer an advantage on IR firms. The change in the regulatory environment created by the economic shock of Reg FD created a selection pressure that favored firms with an established IR program as they had an enhanced ability to manage relationships and navigate the new environment.
REFERENCES


The sample consists of 400 IR and 400 matched non-IR firm-quarter observations from the fourth quarter 1999 to the fourth quarter 2005. Reg FD was implemented October 23, 2000. An IR firm has a professional IR presence continuously from 1995 to 2005. A non-IR firm never has a professional IR presence. The firms were matched in the fourth quarter 1999 with the match held through 2005. Number of MEF is the number of management earnings forecasts for any horizon issued during the fiscal quarter t. Any MEF is an indicator variable equal to one if the company issued at least one management earnings forecast for any horizon during the fiscal quarter t, and zero otherwise.
# TABLE 1

*NIRI Membership and IR proxy*

<table>
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<th>Year</th>
<th>NIRI Membership</th>
<th>Constructed Measure</th>
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<td>1986</td>
<td>1,565</td>
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</tr>
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<td>1988</td>
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<td>1,564</td>
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</tr>
<tr>
<td>1990</td>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
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<td>2002</td>
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<td>2003</td>
<td>4,656</td>
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<td>2004</td>
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<td>3,063</td>
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<tr>
<td>2005</td>
<td>-</td>
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<tr>
<td>2007</td>
<td>4,375</td>
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<td>2008</td>
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<tr>
<td>2009</td>
<td>3,407</td>
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This table shows the membership of NIRI (National Investor Relations Institute) over time from 1983 to 2009. The years 1983 to 2004 are from NIRI’s *Who’s Who in Investor Relations* membership directory published annually as a hard copy. The years 2007 to 2009 are from the online version of this directory visited at the beginning of the year. “NIRI Membership” is the raw data from the membership directory. “Constructed Measure” is the raw data with gap years filled in. We fill in a gap year as an IR year if (1) the company has a NIRI member in the year immediately before and after the gap year, (2) the gap year is 2004 but the company has a NIRI member in 2003 and 2007, (3) the gap year is 2007 but the company has a NIRI member in 2004 and 2008, (4) the gap years are 2005 and 2006 but the company has a NIRI member in 2004 and 2007, and (5) the gap years are 2005 and 2006 but the company has a NIRI member in either 2003 and 2007 or 2004 and 2008. We then classify firms into categories based on the presence of a NIRI member in that year: *IR* firms and *non-IR* firms. “NIRI Membership” shows the number of unique members, companies, and permcos (CRSP company codes) each year. “Constructed Measure” shows the number of firms classified as *IR* and *non-IR* in our CRSP/COMPUSTAT sample.
TABLE 2
Descriptive Statistics and Logistic Propensity Score Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>IR firms (N=418)</th>
<th>Unmatched Non-IR firms (N=1,190)</th>
<th>Logistic Pscore Regression</th>
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<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>SD</td>
<td>Median</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td></td>
<td>SD</td>
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<tr>
<td>Log MVE</td>
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<td>8.04</td>
<td>4.57***</td>
</tr>
<tr>
<td></td>
<td>1.89</td>
<td></td>
<td>4.40****</td>
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<tr>
<td>Log Age</td>
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<td>3.33</td>
<td>2.50***</td>
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<tr>
<td>Book-to-Market</td>
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<td>0.40</td>
<td>0.79***</td>
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<td>Loss</td>
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<tr>
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<tr>
<td>ROA (%)</td>
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<td>1.19</td>
<td>0.06***</td>
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<td>5.37</td>
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<td>Leverage</td>
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<td></td>
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<td>1.00###</td>
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<td></td>
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<td>0.48</td>
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2–digit SIC Industry dummies

<table>
<thead>
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<th>N</th>
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</thead>
<tbody>
<tr>
<td>McFadden’s Pseudo R²</td>
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</tr>
<tr>
<td>% Classified correctly</td>
<td>88.5%</td>
</tr>
<tr>
<td>Base rate</td>
<td>74.0%</td>
</tr>
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This table shows (1) Descriptive Stats – the characteristics variables included in the logistic regression model to create a matched non-IR control firm; (2) Regression Results – the results of the logistic regression with IR as the independent variable. The sample consists of IR and non-IR firms in the fourth quarter of 1999. IR firms have an established IR presence from 1995 to 2005. Non-IR firms never have an IR presence and were alive for the entire 1995 to 2005 period. Log MVE is the log of market value of equity. Log Age is the number of years since first listed on CRSP. Book-to-market is the book value of equity divided by the market value of equity. R&D Intensity is research and development expense divided by total assets in the fiscal quarter. Litigation is an indicator variable equal to one if a firm is in the following industries pharmaceuticals/biotechnology (SIC codes 2833–2836, 8731–8734), computers (3570–3577, 7370–7374), electronics (3600–3674), or retail (5200–5961), and zero otherwise. Loss is an indicator variable equal to one if the net income before extraordinary items (NIBE) is negative and zero otherwise. ROA (%) is NIBE divided by total assets. Leverage is (long-term debt + short-term debt) divided by total assets. NYSE (NASDAQ) are indicator variables equal to one if a firm is listed on NYSE (NASDAQ), and zero otherwise. 2-digit SIC Industry dummies represent industry fixed effects at the 2-digit SIC industry level. *** , **, and * (###, ##, and #) denote a significant difference in means (medians based on Wilcoxon ranked-sum test) between the samples at the 0.01, 0.05 and 0.10 levels, respectively. p-values are based on heteroskedasticity-consistent standard errors.
### TABLE 3

**IR and Matched Non-IR Control Firm Descriptive Statistics After Matching**

<table>
<thead>
<tr>
<th>Variable</th>
<th>IR Mean</th>
<th>Non-IR Mean</th>
<th>p</th>
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</thead>
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<td><strong>Characteristic Variables</strong></td>
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<tr>
<td>Log MVE</td>
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</tr>
<tr>
<td>R&amp;D Intensity (%)</td>
<td>0.78</td>
<td>0.88</td>
<td>0.62</td>
</tr>
<tr>
<td>Litigation</td>
<td>0.18</td>
<td>0.15</td>
<td>0.49</td>
</tr>
<tr>
<td>Loss</td>
<td>0.14</td>
<td>0.14</td>
<td>0.99</td>
</tr>
<tr>
<td>ROA (%)</td>
<td>1.09</td>
<td>1.27</td>
<td>0.66</td>
</tr>
<tr>
<td>Leverage</td>
<td>0.29</td>
<td>0.27</td>
<td>0.49</td>
</tr>
<tr>
<td><strong>Stock Exchange</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NYSE</td>
<td>62.64%</td>
<td>63.19%</td>
<td>0.90</td>
</tr>
<tr>
<td>AMEX</td>
<td>3.30</td>
<td>1.10</td>
<td>0.16</td>
</tr>
<tr>
<td>NASDAQ</td>
<td>34.06</td>
<td>35.71</td>
<td>0.71</td>
</tr>
<tr>
<td><strong>Major Industry</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>0.00%</td>
<td>0.00%</td>
<td>1.00</td>
</tr>
<tr>
<td>Mining</td>
<td>6.04</td>
<td>4.94</td>
<td>0.64</td>
</tr>
<tr>
<td>Construction</td>
<td>2.20</td>
<td>2.20</td>
<td>1.00</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>45.05</td>
<td>41.76</td>
<td>0.49</td>
</tr>
<tr>
<td>Transportation/ Comm. / Utilities</td>
<td>8.24</td>
<td>7.69</td>
<td>0.84</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>1.65</td>
<td>2.20</td>
<td>0.71</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>6.59</td>
<td>7.69</td>
<td>0.68</td>
</tr>
<tr>
<td>Finance, Ins. &amp; Real Estate</td>
<td>23.63</td>
<td>25.27</td>
<td>0.72</td>
</tr>
<tr>
<td>Services</td>
<td>6.59</td>
<td>8.24</td>
<td>0.57</td>
</tr>
</tbody>
</table>

This table shows the descriptive statistics for the IR firms and matched non-IR control firms in the fourth quarter of 1999. Non-IR control firms were matched on a one-to-one basic with the IR firms using nearest-neighbor matching in the fourth quarter of 1999. The major industry groupings are based on the following SIC codes: Agriculture (700–999), Mining (1000–1499), Construction (1500–1999), Manufacturing (2000–3999), Transportation/Communication/Utilities (4000–4999), Wholesale Trade (5000–5199), Retail Trade (5200–5999), Financial/Insurance/Real Estate (6000–6999), Services (7000–9998). Other variables are defined in Table 2. Column 4 presents matched-pair p values.
### TABLE 4

*Changes in Public Disclosures*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-Reg FD</th>
<th>Post-Reg FD</th>
<th>Diff (p)</th>
<th>Diff-in-Diff (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of MEF</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>0.23</td>
<td>0.58</td>
<td>0.35 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>0.10</td>
<td>0.21</td>
<td>0.11 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Diff (p)</td>
<td>0.13 (0.00)</td>
<td>0.37 (0.00)</td>
<td></td>
<td>0.24 (0.00)</td>
</tr>
<tr>
<td><strong>Any MEF</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>0.20</td>
<td>0.41</td>
<td>0.21 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>0.08</td>
<td>0.17</td>
<td>0.09 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Diff (p)</td>
<td>0.12 (0.00)</td>
<td>0.24 (0.00)</td>
<td></td>
<td>0.12 (0.00)</td>
</tr>
</tbody>
</table>

The sample consists of 182 IR and 182 matched non-IR control firms that were matched on a one-to-one basis by propensity score based on a “nearest neighbor” without replacement algorithm and a 0.25 caliper. An IR firm has a professional IR presence continuously from 1995 to 2005. The non-IR control firm never has a professional IR presence but was alive from 1995 to 2005 at least. The firms were matched in the fourth quarter 1999 with the match held through 2005. Regulation FD was implemented October 23, 2000. Pre-Reg FD is the mean level of the variable per fiscal quarter for the period [Q41999, Q32000]. Post-Reg FD is the mean level of the variable per fiscal quarter for the period [Q42000, Q42005]. Diff-in-Diff (p) is the difference between pre- and post-Reg FD for the IR firm after the mean level of the quarterly variables have been adjusted relative to the matched non-IR control firm. *Number of MEF* is the number of management earnings forecasts for any horizon issued during the fiscal quarter t. *Any MEF* is an indicator variable equal to one if the company issued at least one management earnings forecast for any horizon during the fiscal quarter t, and zero otherwise. The p-values are based on robust standard errors clustered by firm.


**TABLE 5**

Changes in Analysts, Institutional Ownership, and Information Asymmetry

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-Reg FD</th>
<th>Post-Reg FD</th>
<th>Diff (p)</th>
<th>Diff-in-Diff (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Analysts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Number of Analysts</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>4.67</td>
<td>6.16</td>
<td>1.49 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>3.11</td>
<td>3.82</td>
<td>0.71 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Diff (p)</td>
<td>1.56 (0.00)</td>
<td>2.34 (0.00)</td>
<td>0.78 (0.01)</td>
<td></td>
</tr>
<tr>
<td><strong>MBE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>0.86</td>
<td>0.76</td>
<td>–0.10 (0.01)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>0.87</td>
<td>0.75</td>
<td>–0.12 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Diff (p)</td>
<td>–0.01 (0.83)</td>
<td>0.01 (0.54)</td>
<td>0.02 (0.55)</td>
<td></td>
</tr>
<tr>
<td><strong>Forecast Dispersion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>1.28</td>
<td>1.15</td>
<td>–0.13 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>1.38</td>
<td>1.35</td>
<td>–0.03 (0.27)</td>
<td></td>
</tr>
<tr>
<td>Diff (p)</td>
<td>–0.10 (0.04)</td>
<td>–0.20 (0.00)</td>
<td>–0.10 (0.01)</td>
<td></td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>–0.08</td>
<td>–0.11</td>
<td>–0.03 (0.06)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>–0.05</td>
<td>–0.08</td>
<td>–0.05 (0.04)</td>
<td></td>
</tr>
<tr>
<td>Diff (p)</td>
<td>–0.03 (0.03)</td>
<td>–0.03 (0.07)</td>
<td>–0.00 (0.92)</td>
<td></td>
</tr>
<tr>
<td><strong>Recommendation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>4.07</td>
<td>3.61</td>
<td>–0.46 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>4.05</td>
<td>3.58</td>
<td>–0.47 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Diff (p)</td>
<td>0.02 (0.82)</td>
<td>0.03 (0.57)</td>
<td>0.01 (0.86)</td>
<td></td>
</tr>
<tr>
<td><strong>Panel B: Institutional Ownership</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Number of Institutions</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>142.27</td>
<td>181.12</td>
<td>38.85 (0.00)</td>
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</tr>
<tr>
<td>Control</td>
<td>106.01</td>
<td>128.80</td>
<td>22.79 (0.00)</td>
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</tr>
<tr>
<td>Diff (p)</td>
<td>36.26 (0.00)</td>
<td>52.32 (0.00)</td>
<td>16.06 (0.00)</td>
<td></td>
</tr>
<tr>
<td><em>Percentage of Institutional Ownership (%)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>53.78</td>
<td>61.61</td>
<td>7.83 (0.00)</td>
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</tr>
<tr>
<td>Control</td>
<td>39.19</td>
<td>46.04</td>
<td>6.85 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Diff (p)</td>
<td>14.59 (0.00)</td>
<td>15.57 (0.00)</td>
<td>0.98 (0.45)</td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
TABLE 5 (cont.)
Changes in Analysts, Institutional Ownership, and Information Asymmetry

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-Reg FD</th>
<th>Post-Reg FD</th>
<th>Diff (p)</th>
<th>Diff-in-Diff (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel C: Information Asymmetry</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bid-Ask Spread (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>2.00</td>
<td>0.89</td>
<td>-1.11 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>2.30</td>
<td>1.10</td>
<td>-1.20 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Diff (p)</td>
<td>-0.30 (0.15)</td>
<td>-0.21 (0.07)</td>
<td>0.10 (0.46)</td>
<td></td>
</tr>
<tr>
<td><strong>Turnover (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>0.56</td>
<td>0.69</td>
<td>0.13 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>0.53</td>
<td>0.54</td>
<td>0.01 (0.69)</td>
<td></td>
</tr>
<tr>
<td>Diff (p)</td>
<td>0.03 (0.54)</td>
<td>0.15 (0.01)</td>
<td>0.12 (0.03)</td>
<td></td>
</tr>
<tr>
<td><strong>Log Information Asymmetry</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>0.34</td>
<td>0.13</td>
<td>-0.21 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>0.40</td>
<td>0.38</td>
<td>-0.02 (0.66)</td>
<td></td>
</tr>
<tr>
<td>Diff (p)</td>
<td>-0.06 (0.45)</td>
<td>-0.25 (0.00)</td>
<td>-0.19 (0.01)</td>
<td></td>
</tr>
<tr>
<td><strong>Log Uncertainty</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>-5.89</td>
<td>-6.34</td>
<td>-0.45 (0.00)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>-5.61</td>
<td>-5.67</td>
<td>-0.06 (0.49)</td>
<td></td>
</tr>
<tr>
<td>Diff (p)</td>
<td>-0.28 (0.09)</td>
<td>-0.67 (0.00)</td>
<td>-0.37 (0.01)</td>
<td></td>
</tr>
</tbody>
</table>

The sample consists of 182 IR and 182 matched non-IR control firms that were matched on a one-to-one basis by propensity score based on a “nearest neighbor” without replacement algorithm and a 0.25 caliper. An IR firm has a professional IR presence continuously from 1995 to 2005. The non-IR control firm never has a professional IR presence but was alive from 1995 to 2005 at least. The firms were matched in the fourth quarter 1999 with the match held through 2005. Regulation FD was implemented October 23, 2000. Pre-Reg FD is the mean level of the variable per fiscal quarter for the period [Q41999, Q32000]. Post-Reg FD is the mean level of the variable per fiscal quarter for the period [Q42000, Q42005]. Diff-in-Diff (p) is the difference between pre- and post-Reg FD for the IR firm after the mean level of the quarterly variables have been adjusted relative to the matched non-IR control firm. Number of Analysts is the number of analysts who issued an earnings forecast for quarter t in the period one day after quarter t-1’s earnings announcement to one day before quarter t’s earnings announcement. MEDEST is the median consensus forecast based on the latest forecast from analysts who issued forecasts in the 30 days prior to the earnings announcement for quarter t. MBE is an indicator variable equal to one if a firm’s actual earnings are greater than or equal to MEDEST, and zero otherwise. Forecast Dispersion is the standard deviation of the forecasts in MEDEST divided by the absolute value of the mean of those forecasts. Accuracy is −100 * | Actual EPS – MEDEST | divided by end of quarter price. Recommendation is the five-level (Strong-Sell to Strong Buy) recommendation level from I/B/E/S recoded so that five equals Strong Buy and one equals Strong Sell. Number of Institutions (Percentage of Institutional Ownership) are the number and percentage of institutional holdings based on the most recent report issued prior to the end of the fiscal quarter. We assume that management forecasts, analyst coverage, institutional holdings and institutional percentage of ownership are zero for any period when the company is listed on an exchange but no data are available on management forecasts, analyst coverage and institutional holdings. Bid-Ask Spread is the average daily quoted spread, (Ask−Bid/Midpoint), over the fiscal quarter. Turnover is the average daily number of shares traded divided by shares outstanding over the fiscal quarter. Log Information Asymmetry is a measure of lack of analysts’ consensus (1 − ρ) in (2). Log Uncertainty is a measure of overall uncertainty (V) in (1). A greater level of Information Asymmetry reflects greater information asymmetry among analysts. Information Asymmetry and Uncertainty are based on the last forecast of an individual analysts issued in the period 30-days prior to the earnings announcement for quarter t. Uncertainty is scaled by end-of-quarter price. The p-values are based on robust standard errors clustered by firm.
<table>
<thead>
<tr>
<th>Variable</th>
<th>IR Low Change</th>
<th>IR High Change</th>
<th>Diff (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Analysts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Analysts</td>
<td>0.41 (0.28)</td>
<td>1.17 (0.01)</td>
<td>0.76 (0.20)</td>
</tr>
<tr>
<td>MBE</td>
<td>0.02 (0.74)</td>
<td>0.02 (0.79)</td>
<td>−0.00 (0.98)</td>
</tr>
<tr>
<td>Forecast Dispersion</td>
<td>−0.08 (0.11)</td>
<td>−0.12 (0.02)</td>
<td>−0.04 (0.58)</td>
</tr>
<tr>
<td>Accuracy</td>
<td>−0.01 (0.68)</td>
<td>0.01 (0.75)</td>
<td>0.02 (0.60)</td>
</tr>
<tr>
<td>Recommendation</td>
<td>0.03 (0.79)</td>
<td>−0.02 (0.82)</td>
<td>−0.05 (0.72)</td>
</tr>
<tr>
<td><strong>Panel B: Institutional Ownership</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Institutions</td>
<td>2.63 (0.70)</td>
<td>29.56 (0.00)</td>
<td>26.93 (0.01)</td>
</tr>
<tr>
<td>Percentage of Institutional Ownership (%)</td>
<td>−0.28 (0.89)</td>
<td>2.43 (0.13)</td>
<td>2.71 (0.29)</td>
</tr>
<tr>
<td><strong>Panel C: Information Asymmetry</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bid-Ask Spread (%)</td>
<td>−0.04 (0.87)</td>
<td>0.22 (0.17)</td>
<td>0.26 (0.34)</td>
</tr>
<tr>
<td>Turnover (%)</td>
<td>0.15 (0.01)</td>
<td>0.08 (0.34)</td>
<td>−0.07 (0.49)</td>
</tr>
<tr>
<td>Log Information Asymmetry</td>
<td>−0.11 (0.32)</td>
<td>−0.27 (0.00)</td>
<td>−0.16 (0.25)</td>
</tr>
<tr>
<td>Log Uncertainty</td>
<td>−0.21 (0.29)</td>
<td>−0.55 (0.01)</td>
<td>−0.34 (0.22)</td>
</tr>
</tbody>
</table>

The sample consists of 182 IR firms that were matched on a one-to-one basis with non-IR control firms by propensity score based on a “nearest neighbor” without replacement algorithm and a 0.25 caliper. The IR firms are split into two even groups based on the change in the Number of MEFs from the pre-Reg FD period to the post-Reg FD period. Low Change is the IR firms with a pre-to-post change below the median. High Change is the IR firms with a pre-to-post change above the median. An IR firm has a professional IR presence continuously from 1995 to 2005. The non-IR control firm never has a professional IR presence but was alive from 1995 to 2005 at least. The firms were matched in the fourth quarter 1999 with the match held through 2005. Regulation FD was implemented October 23, 2000. The pre-Reg FD period is [Q41999, Q32000]. The post-Reg FD period is [Q42000, Q42005]. Diff-in-Diff (p) is the difference between pre- and post-Reg FD for the Low and High Change IR firms after the mean level of the quarterly variables have been adjusted relative to the matched non-IR control firm. Diff (p) is the difference between the Low and High Change difference-in-difference result. All other variables are defined in Table 5. The p-values are based on robust standard errors clustered by firm.