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The Effect of Disclosures by Management, Analysts, and Business Press on Cost of Capital, Return Volatility, and Analyst Forecasts: A Study Using Content Analysis

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ABSTRACT: We document systematic evidence of risk effects of disclosures culled from a virtually exhaustive set of sources from the print medium. We content analyze more than 100,000 disclosure reports by management, analysts, and news reporters (i.e., business press) in constructing firm-specific disclosure measures that are quantitative and amenable to replication. We expect credibility and timeliness differences in the disclosures by source, which would translate into differential cost of capital effects. We find that when content analysis indicates favorable disclosures, the firm's risk, as proxied by the cost of capital, stock return volatility, and analyst forecast dispersion, declines significantly. In contrast, unfavorable disclosures are accompanied by significant increases in risk measures. Analysis of disclosures by source—corporations, analysts, and the business press—reveals that negative disclosures from business press sources result in increased cost of capital and return volatility, and favorable reports from business press reduce the cost of capital and return volatility.

Keywords: *disclosure; cost of capital; content analysis.*

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I. INTRODUCTION

Demand for financial reporting and disclosure arises from information asymmetry and agency conflicts between managers, outside investors, and intermediaries. Disclosures and institutions facilitating credible disclosure between managers and investors play important roles in mitigating these problems.[1] Corporate disclosures, reports in the business press, and analysts' reports and discussion of corporate performance all enhance the information reflected in stock prices. That is, they reduce information asymmetry between the average investor and informed market participants, e.g., company management. The consensus among financial economists is that a rich disclosure environment and low information asymmetry have many desirable consequences. These include the efficient allocation of resources in an economy, capital market development, liquidity in the market, decreased cost of capital, lower return volatility, and high analyst forecast accuracy.[2] In this research, we study the consequences of disseminating financial information to the investment community through three sources, corporations, analysts, and business press, on the firm's capital market environment, i.e., the cost of capital, return variability, and analyst forecast error dispersion.

Evidence of the effect of disclosure on the firm's capital market environment, in particular, the cost of capital, is sparse (see Healy and Palepu [2001] for a review of the literature). Evidence is mixed in the few studies that examine the issue (e.g., Botosan 1997; Botosan and Plumlee 2002; Francis et al. 2006; Core et al. 2008). Conclusions from previous research on the effect of disclosures in the annual report (e.g., Botosan 1997) on the cost of capital are tenuous because disclosures analyzed in previous research are far from comprehensive and the measurement of disclosure proxies is generally subjective, not objective. With respect to studies that use objective measures (e.g., Francis et al. 2006), critics contend the proxies might not capture disclosure quality (see Liu and Wysocki 2006) and/or the accruals quality is not priced as a distinct factor beyond the Fama-French three factors (see Core et al. 2008).

We believe an important reason for the mixed evidence on a relation between disclosure and measures of a firm's capital market environment is that disclosure is assumed to have a unidirectional effect on the cost of capital or return volatility, or on other measures of a firm's capital market environment. While a unidirectional relation is expected using the *quality* of disclosure as the construct for disclosure, empirical measures of disclosure quality are likely influenced also by disclosure *content*. Thus, empirical measures may not be unambiguous proxies for disclosure quality. In this study, we move the literature forward by testing a directional link—whether disclosures containing favorable and uncertainty-reducing content result in lower cost of capital, and conversely disclosures containing unfavorable and uncertainty-increasing information or content cause the cost of capital to rise. We make similar predictions with respect to return volatility and analyst forecast error dispersion.

Ours is the first study to document systematic evidence of the capital market environment effects of disclosures culled from a virtually exhaustive set of sources from the print

[1] See Healy and Palepu (2001), and Lambert et al. (2007).

[2] See Diamond and Verrecchia (1991), Verrecchia (2001), Healy and Palepu (2001), Easley et al. (2002), Easley and O'Hara (2004), Leuz and Wysocki (2008), Liu and Wysocki (2006), Bushman and Smith (2001), Core (2001), and Lambert et al. (2007).

medium. Our analysis of disclosures is not only comprehensive, but also the construction of disclosure measures is quantitative and amenable to replication. Our study is also distinct from previous studies on the relation between disclosures and cost of capital in that (1) we test for the effects of favorable and unfavorable disclosures, i.e., content, whereas past research has typically focused on the cross-sectional association between the level of disclosure quality and the cost of capital; and (2) we predict and test a directional relation between disclosure content and cost of capital, return volatility, and analyst forecast dispersion. Specifically, we examine whether favorable and unfavorable disclosures in a quarter affect firms' cost of capital, return volatility, and forecast dispersion.

In addition to analyzing the impact of all disclosures on the capital market environment as proxied for by the cost of capital, return volatility, and analyst forecast error dispersion, we study the impact of disclosures segregated by source—management, analysts, and news stories in business press. There are economic reasons to study how the source of disclosures affects the firm's capital market environment. Disclosures by management, analysts, and news reporters differ on at least two dimensions. First, incentives facing management, analysts, and news reporters might differentially shade the contents of their disclosures or reports. In particular, management and investment analysts can have strong incentives to optimistically skew disclosures, whereas news reporters' incentives to be optimistic in their reports are muted. The capital market is likely to weight disclosures according to the credibility of the source of the disclosure. That is, on average, in pricing stocks we expect the market to filter out the bias and deemphasize noisy disclosures by the management, analysts, and news reporters.

Second, news stories in the business press are likely to be timelier than analysts' reports. Analysts frequently repackage and re-transmit available information from corporate disclosures and business press news stories in presenting in-depth analysis in their own reports (see Lang and Lundholm 1996; Frankel et al. 2006). While such reports might be valuable to the market participants in their investment decisions, they may also have limited price impact or limited implications for the cost of capital or return volatility or analysts' forecasts.

Our empirical analysis tests for the impact of disclosure content on (1) cost of capital, where the cost of capital is estimated using the Fama-French three-factor model (see Fama and French 1993), (2) firms' stock return volatility, and (3) dispersion in analysts' forecasts, where the latter two measures are likely to be correlated with the firms' cost of capital. Our findings are based on a large content database of disclosure text constructed from disclosure content published on four electronically available information sources: Dow Jones Industrial, Investext, Factiva, and SEC EDGAR.

The content analysis classifies disclosures as favorable or unfavorable, with quantitative measures that indicate the intensity or degree of favorableness. The measures are based on an analysis of the content in each ''story'' (e.g., an analyst report).[3] We find that when content analysis indicates favorable disclosures, the firm's cost of capital, stock return volatility, and dispersion in analysts' earnings forecasts decline significantly. In contrast, unfavorable disclosures are accompanied by significant increases in the cost of capital, stock return volatility, and analysts' earnings forecast dispersion.

We next analyze disclosures by source: corporations, analysts, and the business press. First, we find that the market discounts the impact of management's statements. Positive

[3] Content assessment measures would be favorable, for example, when disclosures contain references to earnings, cash flow, and sales increases or growth, favorable product reviews, enhanced management credibility, reduced uncertainty about the firm's products and markets, etc.

news statements by management do not materially affect the firm's cost of capital, suggesting that management's favorable disclosures may not be credible. When management offers negative news disclosures, return volatility rises, and analyst forecast dispersion widens, but we do not find a cost of capital effect as predicted. This is consistent with bad news from management's mandatory disclosures not being timely or that the measures of cost of capital are not accurate.

Second, both positive and negative news disclosures from analysts appear to be heavily discounted. Analysts on the whole are slightly less positive in their disclosures on firms, and similarly less negative (more favorable) in negative disclosure. The impact of their disclosure on cost of capital is insignificant. Intuitively, analysts have source credibility problems. They are seen as responding to market changes after they have taken place, discounting their impact.

Finally, we consider the impact of positive and negative news in business press. Here the evidence shows that both positive and negative news disclosures in the business press impact the cost of capital, return volatility, and analyst forecast dispersion. Positive news disclosure decreases all three, negative news disclosure increases it. Intuitively, the credibility and timeliness of news disclosure by the press are higher than that for management or analysts. The press is less affected by incentive concerns (agency), and this is reflected in the consistency of evidence.[4]

Section II presents the background and key arguments for our main hypothesis that the credibility and timeliness of the source of disclosures and the content of the disclosures affect the firm's cost of equity capital as well as volatility of returns and earnings (forecasts). Section III discusses our data and content analysis methodology. We detail our building of the disclosure text data set, our content analysis methodology, and our financial risk measures and firm characteristics. In Section IV we present our results. Our concluding section discusses the management implications of our findings and opportunities for future research.

II. BACKGROUND AND HYPOTHESIS DEVELOPMENT

In this section we provide the background for our main hypothesis that the credibility and timeliness of the source of disclosures affect their impact on firm's cost of equity capital, return volatility, and analyst forecasts, i.e., the firm's capital market environment. Economic rationale for the hypotheses predicting the directional effects of disclosure content is developed. The analysis is extended to motivate hypotheses about the differential effects of disclosures by corporations, analysts, and business press. We assume that disclosures in general can affect the firm's capital market environment, including the cost of capital and return volatility, which is extensively researched in the literature (see references in footnote 2 and discussion below).

Credibility and Timeliness of Various Sources of Disclosure

Credibility and Timeliness of Management Disclosures

We analyze SEC-mandated corporate disclosures, i.e., 10-K and 10-Q filings, which include the annual report. These disclosures contain a combination of (1) disclosures through the Management's Discussion and Analysis (MD&A) of the firm's performance

[4] Bushee et al. (2008) find that press coverage around earnings announcements increases absolute returns and lowers information asymmetry (as inferred from bid-ask spreads). An increase in absolute returns suggests an increase in return variability associated with the arrival of information, whereas decreased spreads indicate press reports reducing the asymmetry of information among investors. Their results complement our work, although they do not content analyze the press reports to classify them as carrying favorable or unfavorable news.

that are designed to bring the market's expectations in line with the management's superior information; and (2) mandated other disclosures such as financial footnotes that are largely an affirmation of the information already available to the market participants, but could occasionally include qualitative and forward-looking information, e.g., discussion of loss contingencies and litigation risk.

In utilizing corporate disclosures, market participants are likely to recognize that management has an incentive to portray a self-serving assessment of past corporate performance and future outlook. Management's incentive to favorably skew disclosures might stem from the use of accounting information by current and potential creditors in debt contract negotiation, by boards of directors in determining management compensation, by the labor market for executives in assessing the quality of the management, by labor unions in wage and labor contract renegotiations, and by capital market participants in setting stock prices and in determining the cost of capital.[5] In light of these incentives, management's favorable disclosures may not be credible to market participants. Of course, in making any favorable, optimistic disclosures, the management runs the risk of being accused of making misleading and fraudulent disclosures, i.e., face litigation risk. Litigation risk thus serves to discipline managers from making overly optimistic disclosures. However, the disciplining forces might be less operative when disclosures are qualitative and long-term in nature (e.g., discussion in the MD&A section) rather than quantitative (e.g., point estimate for an EPS forecast) and short-term (e.g., next quarter's sales).

In contrast to good news disclosures, management has an aversion to disclose bad news. So, when it volunteers such information, it is believable. That is, management's unfavorable voluntary disclosures are more credible regardless of whether they are qualitative or quantitative.

While managements' bad news disclosures are likely to be credible, there are conflicting forces affecting the timeliness of management's unfavorable disclosures. Litigation risk facing the firm under the Securities and Exchange Commission's Rule 10b-5 (Skinner 1994, 1997) is likely to motivate the manager to disclose bad news early. The Rule together with other securities laws state that management has a duty to disclose material information as and when it becomes known to the management. The rationale is that new information might render the management's previous disclosures misleading. Alternatively, in light of the new information, the stock would be misvalued in the absence of disclosures to correct the mispricing. However, the securities laws are likely to have an asymmetric impact on corporate disclosure practices with respect to good and bad news disclosures. Litigation against a firm is more successful if the management is accused of withholding bad news such that the stock price remained above its fundamental value. Consistent with this rationale, Kellogg (1984) finds that buyers' claims of losses are 13 times as likely as sellers' claims of forgone profits, i.e., an opportunity loss. Therefore, management has an incentive to volunteer bad news on a timelier basis than good news (see Kasznik and Lev 1995; Skinner 1994, 1997).

However, management's career concerns might motivate managers to delay the release of bad news (see Kothari et al. 2009). Career concerns include management's concern about the effect of reporting adverse financial performance on promotion, outside employment opportunities, termination, and post-retirement opportunities. The manager might attempt to mitigate these concerns by delaying the release of bad news.

[5] See Watts and Zimmerman (1986) and Fields et al. (2001) for various motivations for management optimism in disclosures and for summaries of related evidence.

In light of the conflicting incentives to accelerate and delay the release of bad news, actual practice becomes an empirical issue. Kothari et al. (2009) find that managers successfully withhold bad news before making voluntary disclosures. As a result, when managers do disclose the bad news in voluntary management forecasts, it is, on average, of a substantial magnitude, i.e., generates a large, negative price response. In contrast, managers disclose or leak good news early. We do not examine management's voluntary forecasts, but limit our analysis to mandated, periodic management's discussion of firm performance and outlook for the future in the annual 10-Ks and quarterly 10-Qs. Preceding arguments and evidence suggest that management disclosures in these reports is likely to be more credible if it communicates bad news, but the timeliness of good and bad news is difficult to predict.

Credibility and Timeliness of Analyst Reports

Analysts are important information intermediaries in capital markets. They expend real resources on gathering information and producing research reports. These activities are typically assumed to enhance the ability of prices to reflect available information. However, several forces influence the credibility and timeliness of analyst research, which shape their price impact and effect on cost of capital.

Strong economic incentives stemming from brokerage commissions and investment-banking revenues potentially taint the quality of analyst research. United States Senator Joseph Lieberman claims that the millions of dollars analysts earn from investment-banking services ''compromise analysts' objectivity'' and therefore ''the average investor should take their bottom line recommendations with at least a grain of salt, if not a whole bucket,'' (see Hamburger and Burns 2002). Academic evidence is mixed in suggesting that analysts compromise their objectivity and issue optimistic forecasts and stock recommendations as a result of their economic incentives arising from brokerage revenues and investment-banking relationships.[6] Questions surrounding the objectivity and bias in research together weaken the credibility of analyst research, which, in turn, would diminish its influence on the pricing or on the cost of capital.

With respect to the timeliness of information in analyst reports, previous research offers compelling evidence that analyst reports do convey new information that affects security prices (see Lys and Sohn 1990; Frankel et al. 2006). However, the magnitude of price impact is typically small. This might be because considerable analyst research is simply a retrospective analysis of past events, which repackages and retransmits publicly available information in corporate disclosures and news stories (Lang and Lundholm 1996; Beaver 1998, 10; Frankel et al. 2006). If this activity dominates the contents of analyst research, it might not be particularly timely in providing much new information to the market. Worse, evidence in Lys and Sohn (1990) and Guay et al. (2006) suggests that analyst forecasts are sluggish in that they fail to fully incorporate the information available as reflected in stock prices at the time of their forecasts.

In summary, questionable credibility and the absence of timely forecasts and research all make it less likely that analysts' research reports would contain much information.

[6] See Lin and McNichols (1998), Michaely and Womack (1999), Dechow et al. (2000), Bradshaw et al. (2003), O'Brien et al. (2005), Kolasinski and Kothari (2008), Clarke et al. (2007), and Ljungqvist et al. (2007).

Credibility and Timeliness of Business Press News Stories

We expect news stories in the business press to be quite timely with an emphasis on factual reporting. News reporters and the business press typically do not have strong economic ties and relationships with individual firms. Moreover, each reporter reports on a large number of corporations as new developments take place with individual firms. Therefore, we expect news stories to have both credibility and timeliness and, hence, the contents of news stories are likely to be informative about the cost of capital.

Hypothesis Development: Effects of Disclosure Content on the Cost of Capital, Volatility, and Earnings Forecasts

We begin this section by summarizing the effects of disclosure on a firm's capital market environment. This discussion focuses on disclosure per se, not the content, i.e., good or bad news. We then develop a directional link between the content of disclosures and the capital market environment. Specifically, we explain why good (bad) news might presage a decline (an increase) in the cost of capital, return volatility, and analyst forecast dispersion.

Longstanding theoretical literature suggests a link between disclosure and the equity cost of capital. Disclosure's impact on the cost of capital is hypothesized in at least three ways in the literature. First, disclosure about a firm is likely to enhance the liquidity of a security because disclosures tend to reduce the degree of information asymmetry between insiders and outsiders of a firm and also among various groups of current and potential investors of a firm (e.g., Diamond and Verrecchia 1991; Amihud and Mendelson 1986; Easley and O'Hara 2004). Information asymmetry widens the adverse-selection component of the bid-ask spread demanded by the market makers and thus increases the cost of trading in a security. In equilibrium, security prices settle at levels that yield investors equal rates of risk-adjusted return, net of the transaction cost, on each security.

Second, investors do not know the true values of the parameters of expected rates of return on securities. Literature on estimation risk demonstrates that errors in estimating the parameter values represent a source of non-diversifiable risk and, therefore, constitutes a component of the cost of capital (e.g., Klein and Bawa 1976; Barry and Brown 1984). Disclosures (i.e., information) enable investors to reduce the degree of error in estimating the parameters, which lowers a firm's cost of capital.

Third, Lambert et al. (2007) theorize that the covariance of a firm's cash flows with other firms' cash flows decreases in the precision of disclosures. This reduces the cost of capital of the firm making more precise disclosures. An additional reason for the effect of disclosures on a firm's cost of capital and volatility stems from the improvement in the investment decisions, which results from the enhanced quality of information available to managers. The improvement is in part a result of lesser uncertainty about cash flows as a consequence of more precise information.

For all of the above reasons, *ceteris paribus* disclosure levels are expected to be negatively associated with the cost of capital and volatility. In this study we assume all of the reasons as contributing to the negative relation without attempting to disentangle the relative importance of each. However, preceding discussion suggests a unidirectional link between disclosure and cost of capital and volatility. That is, the greater the amount of disclosure, the lower the cost of capital and volatility. We move the literature forward by testing a directional link—whether disclosures containing favorable and uncertainty-reducing content lower a firm's cost of capital and return volatility, and conversely disclosures containing unfavorable and uncertainty-increasing information or content cause the cost of capital and

volatility to rise. Similar predictions apply with respect to the dispersion in earnings forecasts. Our empirical predictions are grounded in prior theoretical work and survey data discussed below.

In an efficient market, price change associated with news is either the effect of news about expected future cash flows or news about the risk of the cash flows, i.e., discount rates. Thus, even if information about cash flows is assumed to be unrelated to information about the risk of those cash flows, on average, unfavorable information would be associated with an increase in cash flow risk and, conversely, favorable information would be associated with a decline in the risk of expected future cash flows. French et al. (1987) develop and test this hypothesis over short horizons and Chan (1988) and Ball and Kothari (1989) test it over long horizons. Chan (1988) and Ball and Kothari (1989) conduct their analysis within the CAPM framework. Ball and Kothari (1989) find that both changes in the CAPM cost of capital and return volatility are negatively related to news content and therefore price changes.

A second reason for predicting a negative relation between disclosure content and the cost of capital as well as return volatility is the effect of news on the firm's leverage (Christie 1982; Galai and Masulis 1976; Ball and Kothari 1989). Price changes (or news) are negatively related to discount rates via the leverage effect. In a CAPM framework, *ceteris paribus*, price changes correlate negatively with leverage, and leverage and expected returns are positively related (see Galai and Masulis 1976). To the extent firms do not dynamically and immediately adjust financial leverage following news affecting the firm's equity value, we expect a negative relation between news content and leverage. This, in turn, predicts a negative link between news content and cost of capital changes and volatility changes.

A further stream of literature posits a negative relation between disclosure content and cost of capital as a result of the effect of disclosure content on the degree of information asymmetry between the firm (management) and the investment community. The literature has origins in Glosten and Milgrom (1985), Diamond and Verrecchia (1991), Verrecchia (2001), Easley et al. (2002), Easley and O'Hara (2004), and the literature on limited information risk, parameter uncertainty, and liquidity risk.[7] While much of the literature focuses on the consequences of the precision of information, i.e., the variance effect, recent studies, including Ng et al. (2009), develop a link between disclosure content and changes in cost of capital and return volatility within the framework of information asymmetry between the managers of a firm and the investment community. They argue that because news content is likely to have a directional effect on the uncertainty with which investors can forecast a firm's future cash flows, the effect of disclosure content on the adverse-selection component of the bid-ask spread is likely to be directional. That is, good news is likely to reduce the adverse-selection component of the bid-ask spread, whereas bad news is expected to increase it. Specifically, they argue that performance reports, i.e., disclosure content, predict volatility in future earnings: measures of good performance are associated with lower volatility in future earnings, while measures of poor performance are associated with higher volatility in future earnings. Market makers use performance reports in assessing both the expected value of the firm and uncertainty about that value. Therefore, performance reports affect adverse selection costs through market makers' assessments of uncertainty. The effects ultimately are predicted to be manifested in the firm's cost of capital, return volatility, and variability of the analysts' earnings forecasts.

[7] See Klein and Bawa (1976), Barry and Brown (1984), Chordia et al. (2001), and Pastor and Stambaugh (2003).

Since we content-analyze a large number of textual disclosures, unlike previous research, we are in a position to quantify the favorable or unfavorable nature of disclosure, not simply the amount of disclosure. The ability of content analysis to distinguish favorable, risk-reducing disclosures from unfavorable, risk-increasing disclosures permits us to hypothesize that the former would improve the firm's capital market environment, i.e., lower the cost of capital, return volatility, and earnings forecast dispersion, whereas the latter would worsen the capital market environment.

Business executives corroborate the predicted directional link between disclosure content and risk effects. Survey evidence in Graham et al. (2005) finds that ''executives believe that less predictable earnings—as reflected in a missed earnings target or volatile earnings—command a risk premium in the market.'' Such a belief among corporate executives indicates that disclosure of unfavorable news would prompt investors to demand a higher return on the company's stock to compensate for the increased risk, i.e., cost of capital, return volatility, and earnings volatility.

III. DATA AND CONTENT ANALYSIS METHODOLOGY

In this section we discuss disclosure data obtained from electronic information sources, which we used in conducting content analysis, and then describe data on financial risk measures and firm characteristics.

Disclosure Text Data

The most widely available source of corporate disclosure is financial statements. These are SEC-mandated disclosures for all U.S. publicly traded corporations. In addition to financial statements, managers also provide other information to investors. Some, such as footnotes and MD&A, are disclosed within the financial report. Other disclosures are provided voluntarily through other information channels, including analyst presentations and conference calls, press releases, and Internet sites. Through these disclosures, managers provide information that facilitates external users of financial reports to better understand the true economic picture of the business.

Disclosures are accompanied by third-party certification to help assure credibility. That is, in the absence of third-party certification, there would be questions in investors' minds about the credibility of the information contained in the disclosures. For disclosure in financial statements, credibility is typically enhanced in two ways. First, statements are prepared using generally accepted accounting standards and conventions. Standards can potentially reduce processing costs for outsiders and curb opportunistic reporting by managers. Second, independent audit firms certify whether managers' financial reporting decisions are consistent with accounting standards and conventions.

Importantly, management disclosures made outside of financial statements are not directly certified by independent parties. Rather, their source credibility is enhanced through their use and evaluation by outside parties, including financial analysts and business journalists. These ''information intermediaries'' provide a measure of implicit certification of management's financial statements and nonfinancial disclosures. However, this certification is not in any way formal nor can it be argued to be necessarily complete. Our analysis is designed to empirically assess whether the credibility issues with respect to disclosures from various sources, as discussed above, are manifested in their impact on the firms' cost of capital.

We obtain data for our study from four electronic data information sources: Dow Jones Interactive (Dow Jones, Inc.), Investext Plus (Infotrac), Factiva (Dow Jones & Reuters), and EDGAR (Securities and Exchange Commission, U.S. Government). Text-retrieval software

was developed and utilized to efficiently download disclosure texts in their entirety for a company research sample frame of 889 firms over the time period 1996–2001 (Riloff and Hollaar 1996).

We downloaded all disclosure texts available, by company by year, from three sources: (1) corporate reports (EDGAR), (2) analyst disclosure and briefings (Investext and Factiva), and (3) disclosures made by the general business press (more than 400 content sources available in Dow Jones Interactive and Factiva). All disclosure texts were coded by company ID, date and source of publication, and, when available, by author. The resulting content data set is very large. For the 889 companies over the six-year period, 326,357 texts were downloaded, representing over a million pages of source material. The 889-company sample was drawn from four industry sectors: Financial Services (225 companies), Technology (197 companies), Pharmaceutical (72 companies), and Telecommunications (395 companies), and the data was coded to enable industry sector analysis. These are all the companies in these four industries that also had machine-readable financial statement and stock return data on Compustat and CRSP.

Finally, source material was organized into business quarters, corresponding to the quarterly financial reporting cycle. Each company in the data set therefore had 72 observations: disclosure content aggregated into 24 time periods (6 years $\times$ 4 quarters per year), by three sources of disclosure (corporate, analyst, business press). The list of companies in the data set and the business publications included in the Dow Jones and Factiva electronic data services are available upon request.

Classification of Text into Content Categories

Our first step in preparing the data for content analysis was to classify each disclosure text using a business word classification scheme that we developed. Words associated with six-categories of the business environment, strategy, operations, human resources, and others were defined and used to build a classification scheme using Riloff (1993) as a guide. The six categories identified words and word phrases associated with:

1. market risk, industry structure, and competitive forces, and the external market and/or external environment of the firm;
2. firm risk, the development, and execution of firm strategy and strategic intent;
3. organizational risk, the building of organizational capital, and human resource management;
4. reputational risk, the image, brand, and reputation of the company;
5. performance risk, the investment, and financial performance of the firm; and
6. regulatory risk, the announcement, and impact of governmental regulation on the company.

A classification scheme and the words and word phrases making up each category are available upon request.

All disclosure text was filtered through the classification scheme, producing six subsample data sets containing words and word phrases matching the words and word phrases defined in the six categories. Our subsequent analysis focused on content analyzing within and across the subsample data sets and the (original) master text data set.

Content Analysis

The underlying principle in content analysis is that the many words of a text can be classified into many fewer content categories, where each category consists of one or many similar words or word phrases, and that each word or phrase occurrence can be counted

and the counts compared analytically. Word and phrase similarities are based on the precise meanings of the words themselves (for example, grouping synonyms together), or may be based on word groupings sharing similar connotations (for example, grouping together several words associated with a concept such as market share, revenue growth, or forecasted earnings). Content analysis therefore, can be useful in analyzing different types or ''levels'' of communication, as defined by the meaning of the words themselves.

A flowchart of the typical process of content analysis research is presented in Figure 1. The study is first specified theoretically and then conceptually in terms of an information model, content (data samples), and the hypotheses to be addressed. The study is then operationalized with respect to the variables (content categories) and coding schema to be used for classification of words and word groups for analysis. Third, the content texts are analyzed using content analysis procedures and the results interpreted.

Analysis Procedures and Measurement in Content Analysis

Figure 2 illustrates the specific sequence of steps used in our content analysis. We first passed the complete, 889-company disclosure content data set through a business dictionary of terms we defined to cluster disclosure texts with similar words and word meanings together. The clustering was not exclusive, that is, a disclosure text could be clustered in one category, in more than one, or in no category. But within each business category, all disclosure texts were matched with words and word meanings we defined in the category.

FIGURE 1
Flow of Content Analysis

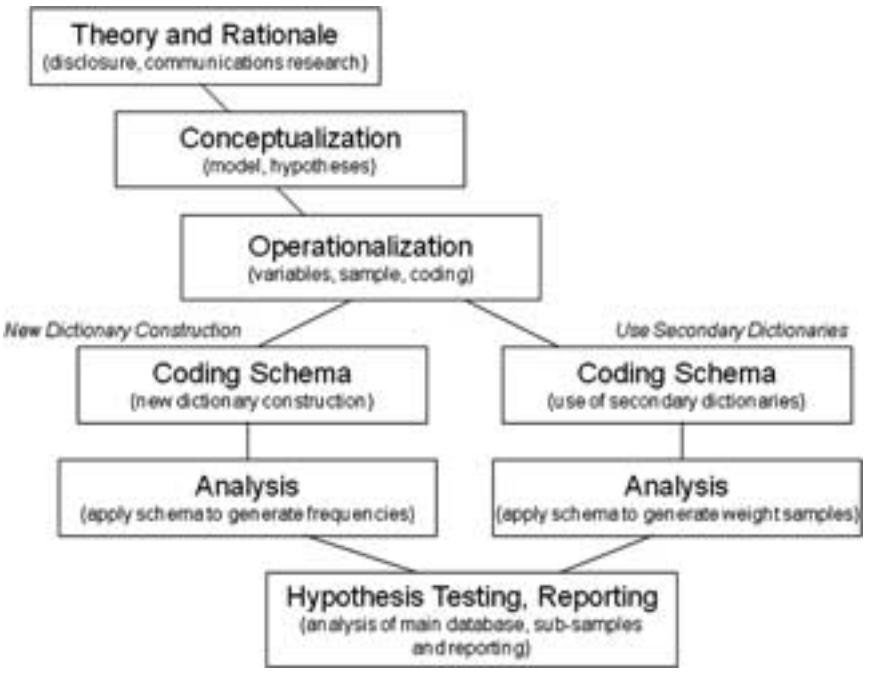
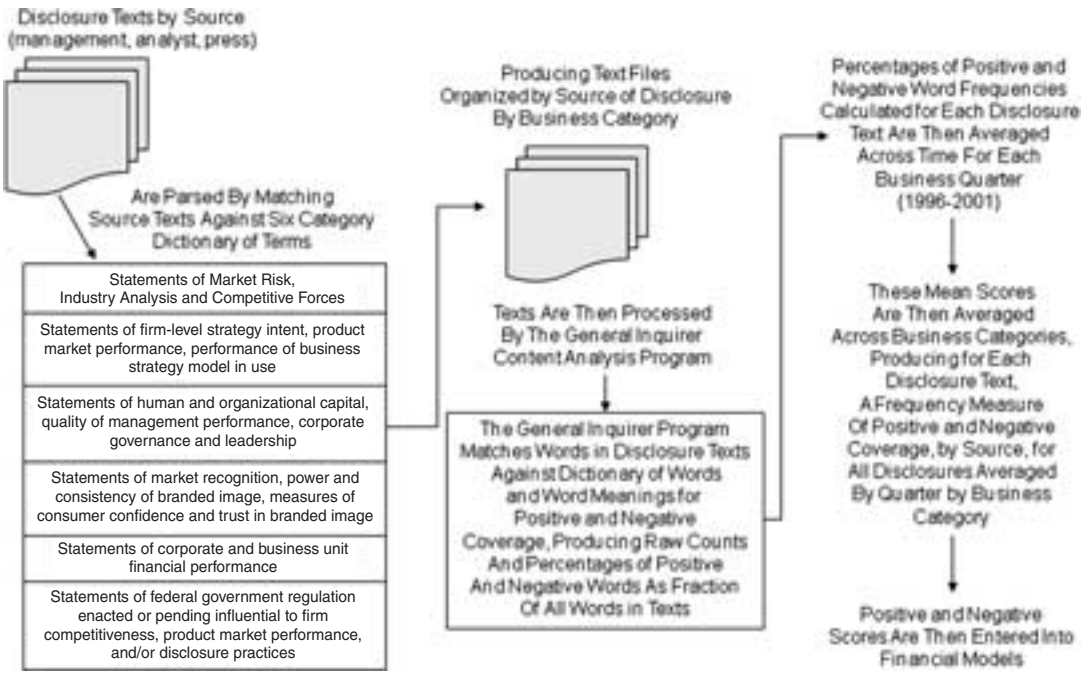


FIGURE 2
Analysis Steps in Constructing Measures of Positive and Negative Coverage of Each Company by Source of Disclosure



We then submitted each clustered subset of disclosure texts, and the original (complete) content data set, to the General Inquirer (GI) content-analysis software. The GI is a text-mapping tool. Its software algorithm counts words and word meanings present in submitted texts against an exhaustive set of dictionary-supplied categories. As we were especially concerned with the degree and strength of positive and negative statements in disclosure texts, we utilized two GI dictionary categories, ''Positive'' and ''Negative,'' which are categories of several thousand words and word meanings associated with positive and negative outlook. Using GI to accurately gauge the frequency and strength of positives and negatives in the disclosure texts submitted would therefore tell us much about the consistency of views about the firm and its risks and promise in the marketplace.

Once the GI software returned for each disclosure text the raw counts and word frequencies (percentage of matched words against the number of all words in the text), we then calculated the average score by quarter for each quarter in the sample time period of 1996–2001. Finally, for each calculated mean score, we then calculated the mean score for the six business categories we defined. The net result was that for each disclosure text in the sample, we calculated a mean score for strength of positive and negative news coverage, by source, by business quarter, and used that score for input into financial analysis.

To illustrate a specific example of how our content procedures worked in practice, and the form of the output matrix calculated, we briefly describe the analysis of two example

disclosure texts published in the *Wall Street Journal* on Amgen Corporation. The two texts (both business news stories), published in February and April 1996, report positive and negative news on Amgen. On February 1, 1996, the *Journal* published a story reporting that clinical research undertaken on the effects of Leptin, the company's experimental obesity drug, showed that the drug did not have the hoped-for benefits in a controlled patient study. The second story, published on April 18, 1996, reported the company's 32 percent increase in net quarterly income and the filing of an application for testing a new drug designed to combat Hepatitis C. The text of both stories is available upon request.

We submitted the two texts to the General Inquirer (GI) content-analysis package. Developed and written by Professor Philip Stone and colleagues at Harvard University, and later extended by Vanja Buvac and colleagues, the General Inquirer (GI) software program is essentially a tool for mapping content.[8] The GI software ''maps'' (matches) words in each text file with words and word senses in dictionary-supplied categories. That is, the software algorithm identifies and counts word frequencies in the submitted text files, matching them against words and/or word meanings present in one or more dictionary of categories. The currently distributed version of GI combines the ''Harvard IV-4'' dictionary content-analysis categories, the dictionary content-analysis categories defined by Lasswell, and five categories based on the social cognition work of Semin and Fiedler.[9] Each category contains a list of words and word senses. For example, the category ''negative'' is the largest, with 2,291 entries of words or word phrases denoting ''negative.''[10] When text is submitted for processing, the GI matches words and word phrases with those in its dictionaries, and separates inflected word forms. For example, the root word ''sell'' would match ''selling'' if selling was not a separate category entry, and the word sense ''sell cycle,'' for example, would be correctly identified by software routines designed to disambiguate word senses. That is, ''cycle'' would be correctly identified as specifying the time periodicity of selling, and not a word short for bicycle or motorcycle. These English-stemming procedures, integrated with English dictionaries and routines for separating English word senses, comprise the software's extensive dictionaries and disambiguation routines. The complexity of the dictionary and disambiguation routines limits the current GI software to English text applications.[11]

The results of our simple, two-disclosure text submission to the software appear in a 4×6 matrix. In interpreting the output, for each text, there are two rows of data. The first corresponds to the raw frequency count of matched words (''r''), and the second gives the percentage of matched words over the total number of words in the text. The February 2, 1996 *Wall Street Journal* article, for example, contains 635 words, of which 20 are positive and 21 negative. Positives comprised 3.1 percent of the total number of words in the text, and negatives slightly higher, 3.3 percent. There are 116 words that do not match any of the words supplied in the GI dictionary categories, or 18.3 percent. In the case of the April 18th *Wall Street Journal* article, the corresponding numbers are the text contains 423 words, 19 positives and 8 negatives, or 4.4 percent of the words in the disclosure are positive and 1.8 percent are negative. Seventy-seven words, or 18.2 percent, are leftovers (unmatched with GI dictionary categories).

[8] The General Inquirer's home page is at http://www.wjh.harvard.edu/~inquirer/.
[9] See Semin and Fiedler (1992, 1996). Categories are described on the GI home page, http://www.wjh.harvard.edu/~inquirer/.
[10] Example entries for the positive and negative categories are available upon request.
[11] The GI package is designed to pick up negative qualifiers of positive sounding terms like growth as in ''sales are not expected to grow'' and characterize such text as negative, not positive.

Interpreting results in content analysis is always a question of comparing word counts and word frequencies across texts and categories. In this example, the first article is much more negative than the second article, and, as well, less positive. Conversely, the second article is much more strongly positive and significantly less negative in its word usage and meaning.

In analyzing the large number of disclosure texts in the database, our procedure calculates the number of positives and negatives in each disclosure text, for each of the six business categories defined (market, firm strategy, etc.), by business quarter, by source. The resulting matrix of counts and percentages calculated for each disclosure text is then used as input into our econometric analysis.

Financial Risk Measures and Firm Characteristics

We use three measures of risk to assess the impact of disclosures on firm risk: cost of equity capital, standard deviation of stock returns, and standard deviation of the analyst forecast errors. We describe each measure below.

We estimate the equity cost of capital using the Fama and French (1993) three-factor model, where the size factor is defined as small minus large firm returns (SML), the book-to-market factor is defined as high minus low book-to-market firm returns (HML), and the market factor is defined as the excess return on the CRSP value weight portfolio ($R_m - R_f$).[12] We obtain monthly time-series returns on the three factors, SML, HML, $R_m - R_f$, from Kenneth French's website. The loadings on the factors, b, s, and h, are slope coefficients estimated from the following regression model for firm i:

$$R_i - R_f = a_i + b_i [R_m - R_f] + s_i \, SML + h_i \, HML + e_i. \quad (1)$$

We reestimate the three-factor model each quarter for each firm using a rolling window of five years of monthly returns ending in the quarter under examination. Firm i's estimated loadings, i.e., estimated b, s, and h coefficients, multiplied by the average returns for the three factors from 1963–2000 gives the cost of capital for firm i (see Fama and French 1993). We then annualize the number, which is our cost-of-capital measure.[13]

Standard deviation of stock returns is a commonly used risk measure. The greater the uncertainty of cash flows generated by a firm, i.e., the risk of equity, the greater is the standard deviation of returns. This measure is also an indication of the infrequency of information reaching the market and the degree of information asymmetry among market participants. If some individuals are informed and others are less informed, then the trading

[12] While there is no debate about what should be the measure of return volatility, conversely there is no agreement among researchers about the measure of cost of capital. Our tests for the impact of disclosures on the firms' capital market environment assume that the cost of capital effect is manifested in the firms' sensitivity to the Fama-French three factors. This is consistent with the analysis in Lambert et al. (2007). That is, the cost of capital effects associated with disclosures do not stem from a distinct ''information risk'' factor (see Francis et al. 2005; Core et al. 2008; Liu and Wysocki 2006, for a debate on whether accounting quality is a distinct information risk factor). To the extent that the disclosures' effect on cost of capital is not only subsumed by the Fama-French three factors, but also produces a distinct information risk effect, our estimated cost of capital effects are likely to be understated.

[13] An alternative to using the Fama-French three-factor model to estimating the cost of capital is an implied cost of capital estimate (e.g., Claus and Thomas 2001; Gebhardt et al. 2001; Easton 2004; Ohlson and Juettner-Nauroth 2005; Guay et al. 2006). Such an approach is straightforward to implement, but in our opinion it is not the most appropriate. Specifically, we do not follow this approach because our goal is to estimate a change in the cost of capital estimate associated with the disclosure news, favorable or unfavorable. Unless analysts' long-term earnings growth forecasts change over the quarterly horizon, we will not be able to estimate a change in the cost of capital estimate. However, analysts' long-term growth forecasts are relatively sticky and change only in response to fairly extreme news (see Guay et al. 2006).

in the stock is less frequent and stock prices do not reflect a rich body of information. Under these circumstances, disclosures by a corporation or analysts or disclosures in business press can all influence the degree of uncertainty. Favorable disclosures can inform the market of higher levels of cash flows than previously expected and/or reduce the uncertainty in the market. We measure the standard deviation of returns using daily return data for each firm every quarter.

Standard deviation of analyst forecast errors indicates the extent to which the market is surprised by earnings announcements. Favorable disclosures are expected to reduce uncertainty and enable analysts to better forecast earnings, which would, in turn, reduce the magnitude of their forecast errors, i.e., the standard deviation of forecast errors.

While our goal in the research is to test for the effect of disclosures on the firm's cost of capital, we control for the effect of other determinants of the cost of capital to avoid drawing erroneous inferences. We consider three firm characteristics that previous research shows as significant determinants of the cost of capital, standard deviation of returns, and analyst forecast errors: firm size, book-to-market ratio, and leverage. Small firms are more risky than large firms in part because small firms typically are a single-project firm, i.e., a firm with undiversified portfolio of assets and projects. We measure firm size as the market capitalization of a firm's equity capital, i.e., number of shares outstanding times the share price, at the beginning of each quarter.

Book-to-market ratio increases in risk in part because the market valuation of equity is in the denominator of the ratio. Successful firms with expectations of a steady stream of high levels of future cash flows are highly valued in the market, which drives their book-to-market ratio down. These are typically considered to be low-risk firms. In contrast, if the market has little confidence in a firm and thus perceives the cash flow stream to be uncertain and not too high, then the market capitalization of such a firm would be low. This drives up the book-to-market ratio, so high book-to-market ratio proxies for high-risk firms. Book-to-market ratio is calculated as a ratio of the book equity of a firm divided by its firm size, i.e., the market capitalization of equity.

Finally, risk increases in the firm's financial leverage, measured as leverage as the ratio of long-term debt to the total assets of the firm.

IV. RESULTS

This section summarizes the empirical effects of disclosure on the three measures of risk: cost of capital, return volatility, and dispersion of analyst forecast errors. We begin with descriptive statistics and correlations among the variables. The main results describe regressions of various risk measures on content-analysis-based measures of disclosure by source.

Descriptive Statistics

Tables 1 and 2 provide univariate descriptive statistics and simple bivariate correlations for our dependent and independent variables, by industry sector and by all sectors. The number of observations reported in each panel represents the number of firms times the number of quarters for which sufficient data are available to compute the variables. Some firm-quarters are excluded from analysis based on insufficient data. The average cost of capital for the sample firms is 14.8 percent, with inter-quartile range of 9.7 percent to 18.3 percent. The two rows corresponding to index variables *Favorable* and *Unfavorable* are constructed as the mean of the content-analysis based Positive and Negative measures for disclosures across all six business categories and disclosure source. The disclosure content on average is dominated by favorable rather than unfavorable news. The mean score

TABLE 1
Descriptive Statistics for Variables: Quarterly Data for 889 Firms from 1996 to 2001[a]

Panel A: All Industries, 5,350 Observations

	Mean	Std. Dev.	Min.	Q1	Median	Q3	Max.
Cost of Cap.	0.148	0.076	0.001	0.097	0.138	0.183	0.499
σ*(R)*	0.027	0.016	0.001	0.016	0.023	0.033	0.218
σ*(FE)*	0.948	1.938	0.000	0.065	0.206	0.780	12.943
Favorable	4.676	1.748	0.000	3.434	4.970	5.991	10.159
Unfavorable	1.674	0.712	0.000	1.188	1.629	2.146	5.139
Size	6.762	2.524	0.189	4.835	6.489	8.533	13.230
B/M	0.742	0.958	0.001	0.256	0.510	0.850	9.893
Leverage	0.163	0.176	0.000	0.017	0.101	0.256	0.837

Panel B: Pharmaceutical Firms, 962 Observations

	Mean	Std. Dev.	Min.	Q1	Median	Q3	Max.
Cost of Cap.	0.146	0.110	0.002	0.064	0.116	0.204	0.499
σ*(R)*	0.036	0.021	0.009	0.021	0.030	0.045	0.218
σ*(FE)*	0.842	1.369	0.029	0.049	0.169	1.212	6.130
Favorable	4.634	1.515	0.000	3.816	4.763	5.823	8.444
Unfavorable	1.907	0.746	0.000	1.421	1.953	2.456	4.322
Size	7.100	2.678	2.046	4.800	7.055	8.949	12.578
B/M	0.371	0.778	0.001	0.098	0.196	0.345	9.416
Leverage	0.107	0.142	0.000	0.000	0.049	0.172	0.729

Panel C: Telecom Firms, 987 Observations

	Mean	Std. Dev.	Min.	Q1	Median	Q3	Max.
Cost of Cap.	0.140	0.073	0.012	0.091	0.129	0.169	0.472
σ*(R)*	0.031	0.014	0.005	0.020	0.028	0.038	0.086
σ*(FE)*	2.364	3.299	0.000	0.206	0.911	4.107	12.943
Favorable	3.643	1.541	0.000	2.270	3.744	4.763	7.409
Unfavorable	1.544	0.720	0.000	0.933	1.540	2.039	3.633
Size	8.211	2.146	2.263	6.923	8.224	9.875	13.134
B/M	1.203	1.702	0.007	0.238	0.505	1.422	9.893
Leverage	0.216	0.183	0.000	0.071	0.200	0.300	0.837

Panel D: Financial Firms, 3,007 Observations

	Mean	Std. Dev.	Min.	Q1	Median	Q3	Max.
Cost of Cap.	0.152	0.063	0.001	0.109	0.144	0.183	0.426
σ*(R)*	0.022	0.012	0.001	0.014	0.020	0.027	0.175
σ*(FE)*	0.371	0.804	0.000	0.048	0.119	0.340	5.589
Favorable	4.983	1.800	0.000	3.696	5.356	6.320	10.159
Unfavorable	1.589	0.658	0.000	1.154	1.553	1.961	3.881
Size	6.135	2.300	1.683	4.429	5.906	7.281	12.467
B/M	0.716	0.567	0.045	0.411	0.608	0.873	8.673
Leverage	0.169	0.182	0.000	0.022	0.103	0.265	0.776

(*continued on next page*)

TABLE 1 (continued)

Panel E: Tech Firms, 394 Observations

	Mean	Std. Dev.	Min.	Q1	Median	Q3	Max.
Cost of Cap.	0.141	0.077	0.003	0.085	0.130	0.187	0.370
$\sigma(R)$	0.032	0.018	0.004	0.019	0.027	0.042	0.099
$\sigma(FE)$	1.560	1.819	0.110	0.164	0.970	1.654	6.233
Favorable	5.021	1.303	0.000	4.139	5.381	6.035	7.915
Unfavorable	2.077	0.727	0.000	1.530	2.077	2.583	5.139
Size	7.090	2.905	0.189	5.065	7.099	9.555	13.230
B/M	0.689	0.642	0.030	0.174	0.492	1.008	3.980
Leverage	0.121	0.136	0.000	0.002	0.084	0.203	0.723

[a] This table provides descriptive statistics for variables used in subsequent tests. To be included in the sample, each firm has sufficient data to compute the variables below. The time period is from 1996 to 2001.

Variable Definitions:

Cost of Cap. = expected annual cost of capital calculated based on Fama-French three-factor model over the past five years' return data;
$\sigma(R)$ = standard deviation of daily stock return over the contemporaneous quarter;
$\sigma(FE)$ = standard deviation of all available quarterly analyst forecast errors from 1996 to 2001;
Favorable = favorable assessment index, constructed as mean of the content-analysis-based scaled favorable content measures for six categories of disclosures across three sources, i.e., corporations, analysts, and business press;
Unfavorable = unfavorable assessment index, constructed as mean of the content-analysis-based scaled unfavorable content measures for six categories of disclosures across three sources, i.e., corporations, analysts, and business press;
Size = natural logarithm of a firm's market capitalization of equity at the beginning of the quarter;
B/M = book equity divided by market equity at the beginning of the quarter; and
Leverage = long-term debt divided by total assets.

for *Favorable* variable is 4.676 compared to 1.674 for *Unfavorable*. Since the period 1996 to 2001 was largely characterized by expansion in the U.S., dominance of favorable news is not surprising.

In Table 2, with the exception of the lack of a significant correlation between *Cost of Capital* and *Unfavorable*, all correlations are significant at the 0.01 or 0.05 level for all variables—that is, *Favorable* and *Unfavorable* assessments are strongly correlated with all financial measures studied, cost of capital, standard deviation of daily stock return, the firm's market capitalization of equity at the beginning of the quarter (natural logarithm), book equity divided by market equity at the beginning of the quarter, and leverage (long-term debt divided by the total asset). That all cross-correlations (minus one) are significant between content measures and financial measures suggests a strong and persistent association between the two.

Regression Results

Tables 3 and 4 report the results from multivariate regression models on composite news measures and source of news. These are Fama-MacBeth regressions estimated cross-sectionally in each quarter from Q1 1996 to Q4 2001. We report mean values of the time-series of estimated slope coefficients with Newey-West corrected time-series t-statistics. In addition, across all of the panels we report the average adjusted R^2. The panels report regression results separately on three dependent variables: cost of capital, the standard deviation of daily stock return over the contemporaneous quarter, and the standard deviation of all available quarterly analyst forecast errors from 1996–2001. We use five independent

TABLE 2
Cross-Correlation Matrix[a]

	Cost of Cap.	*σ(R)*	*σ(FE)*	*Favorable*	*Unfavorable*	*Size*	*B/M*	*Leverage*
Cost of Cap.	1.000	0.161***	0.178***	0.031**	0.006	−0.122***	0.138***	0.050***
σ(R)	0.178***	1.000	0.284***	−0.058***	0.077***	−0.069***	−0.152***	−0.184***
σ(FE)	0.122***	0.228***	1.000	−0.079***	0.094**	0.021	−0.056***	−0.089***
Favorable	−0.012	−0.044***	−0.103***	1.000	0.710***	0.061***	−0.076***	0.021
Unfavorable	−0.012	0.068***	0.042**	0.720***	1.000	0.226***	−0.167***	−0.005
Size	−0.149***	−0.127***	0.099***	0.047***	0.203***	1.000	−0.499***	0.137***
B/M	0.038***	−0.019	−0.050***	−0.180***	−0.144***	−0.242***	1.000	0.174***
Leverage	0.022	−0.167***	−0.091***	0.032**	−0.028**	0.035**	0.087***	1.000

[a] This table provides correlations among the variables used in subsequent tests. Spearman (Pearson) correlations are above (below) the diagonal. To be included in the sample, each firm has sufficient data to compute the variables below. The time period is from 1996 to 2001.
***, **, * Indicate two-tailed significance at the 0.01, 0.05, and 0.1 levels, respectively.

Variable Definitions:
Cost of Cap. = expected annual cost of capital calculated based on Fama-French three-factor model over the past five years' return data;
σ(R) = standard deviation of daily stock return over the contemporaneous quarter;
σ(FE) = standard deviation of all available quarterly analyst forecast errors from 1996 to 2001;
Favorable = favorable assessment index, constructed as mean of the content-analysis-based scaled favorable content measures for six categories of disclosures across three sources, i.e., corporations, analysts, and business press;
Unfavorable = unfavorable assessment index, constructed as mean of the content-analysis-based scaled unfavorable content measures for six categories of disclosures across three sources, i.e., corporations, analysts, and business press;
Size = natural logarithm of a firm's market capitalization of equity at the beginning of the quarter;
B/M = book equity divided by market equity at the beginning of the quarter; and
Leverage = long-term debt divided by total assets.

variables: *Favorable*, *Unfavorable*, *Size* (natural logarithm of a firm's market capitalization of equity at the beginning of the quarter), *B/M* (book equity divided by market equity at the beginning of the quarter), and *Leverage* (long-term debt divided by total asset). It is significant for all of the models at the 1 percent level. The pattern of results intuitively suggests that the regression models are analyzing a systematic effect.

Our first set of results in Table 3 consider the impact of positive and negative news disclosure by combining all three sources of disclosures, i.e., corporations, analysts, and business press, for the entire sample (Panel A) and by industry sector (Panels B–E). In interpreting the coefficients for *Favorable* and *Unfavorable* for all industries, we find highly significant effects on return volatility and analyst forecast error dispersion, but weak effect on the cost of capital. As we turn our attention to the cost of capital effects for individual industries, we find that when disclosures contain positive statements, the market anticipates this and discounts the impact of the strength of these statements. Positive news statements do not materially affect cost of capital (coefficients are weakly negative or not significant except for the pharmaceutical industry). However, when disclosures contain negative news, the market responds and the cost of capital goes up significantly in financial and technology industries, and almost significantly in the pharmaceutical industry. Return volatility and forecast dispersion effects generally hold up at the industry level of analysis.

The average cost of capital effect of unfavorable news in Panel A of Table 3 is 31 basis points, but the t-statistic is only 0.99. The reduction is the cost of capital associated with favorable news is 12 basis points with a t-statistic of −1.36. Average cost of capital effects of the magnitudes observed here are within the realm of possibility. However, when we analyze subsamples of data, the point estimates of the cost of capital effects are sometimes large, which is not surprising. Occasionally, the point estimates suggest a 200-basis-point increase or decrease, which seems unreasonably large, but these are point estimates with fair bit of standard error associated with them. Overall, the cost of capital effects appear to be modest, as expected from favorable and unfavorable news sampled across a large number of firms over a five-year period. Similar remarks apply to the estimated effects on the firms' return volatility and forecast error dispersion.

Our second set of results in Table 4, Panel A consider the impact of positive and negative news disclosure by the company's management. For both positive and negative news disclosure, information from company seems to be discounted when judged by their effect on the cost of capital. The coefficients reported are not significant for cost of capital, but the coefficients are highly significant for stock return volatility and analyst forecast errors. For positive news disclosure not reducing cost of capital, the discounting indicates a lack of credibility of management stating good news. For negative news disclosure not increasing cost of capital, the discounting suggests that bad news revealed in corporate mandatory disclosures may not be timely.

Our third set of results in Table 4, Panel B considers the impact of positive and negative news disclosure by analysts. For both positive and negative news disclosure, information from analysts appears to be discounted. Analysts on the whole are slightly less positive in their disclosures on firms, and similarly less negative (more favorable) in negative disclosure. The coefficients reported are not significant for cost of capital, but the coefficients are significant for stock return volatility and analyst forecast errors (favorable news only). Intuitively the results suggest that analysts have source credibility and/or timeliness problems. Our interpretation is that they are seen as responding to market changes after they have taken place, thus discounting their impact.

Our fourth set of results in Table 4, Panel C considers the impact of positive and negative news disclosure by the business press. Here the evidence is quite consistent. We

TABLE 3
Fama-MacBeth Regressions on the Composite News Measures[a]

Panel A: All Industries, 5,350 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.1768	28.75	0.0410	19.92	1.4121	7.90
Favorable	−0.0012	−1.36	−0.0027	−10.48	−0.3319	−8.70
Unfavorable	0.0031	0.99	0.0061	5.15	0.6514	9.00
Size	−0.0047	−7.09	−0.0015	−5.08	0.0164	1.21
B/M	0.0007	0.58	−0.0030	−3.19	−0.1658	−5.09
Leverage	0.0181	1.64				
Adjusted R^2	0.0159	3.32	0.1161	6.68	0.0224	2.89

Panel B: Pharmaceutical Firms, 962 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.3102	36.49	0.0724	23.41	3.6188	5.69
Favorable	−0.0064	−2.45	−0.0005	−1.10	−0.0145	−0.12
Unfavorable	0.0114	1.52	0.0022	1.52	0.3875	1.83
Size	−0.0221	−24.13	−0.0051	−16.91	−0.3809	−11.34
B/M	−0.0390	−2.96	−0.0106	−2.91	−0.6167	−2.49
Leverage	0.0724	2.57				
Adjusted R^2	0.2220	8.92	0.4668	15.38	0.3461	13.57

Panel C: Telecom Firms, 987 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.2010	3.97	0.0383	11.87	2.0324	2.81
Favorable	0.0035	0.56	0.0008	1.69	−0.1732	−0.94
Unfavorable	−0.0221	−2.80	0.0001	0.08	−0.1599	−0.42
Size	−0.0059	−1.70	−0.0013	−2.64	0.2095	3.08
B/M	0.0061	1.94	−0.0021	−3.84	−0.5358	−5.85
Leverage	0.0147	0.36				
Adjusted R^2	0.1094	2.76	0.1316	4.63	−0.0885	−5.24

Panel D: Financial Firms, 3,007 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.1011	9.91	0.0259	12.90	0.2671	5.46
Favorable	−0.0024	−1.80	−0.0005	−2.33	−0.0685	−3.95
Unfavorable	0.0093	3.66	0.0004	0.64	0.2944	7.15

(*continued on next page*)

TABLE 3 (continued)

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	*σ(R)* Coefficient	*σ(R)* t-stat	*σ(FE)* Coefficient	*σ(FE)* t-stat
Size	0.0064	8.50	−0.0006	−1.77	−0.0113	−1.97
B/M	0.0158	1.65	0.0029	3.04	0.0674	0.89
Leverage	−0.0083	−0.62				
Adjusted R^2	0.0489	3.73	0.0618	2.34	−0.0290	−2.34

Panel E: Tech Firms, 394 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	*σ(R)* Coefficient	*σ(R)* t-stat	*σ(FE)* Coefficient	*σ(FE)* t-stat
Intercept	0.1203	2.73	0.0469	7.28	6.5686	6.17
Favorable	0.0006	0.23	−0.0004	−0.41	−0.2533	−1.11
Unfavorable	0.0324	4.25	0.0073	5.29	1.4355	2.98
Size	−0.0091	−3.03	−0.0027	−5.20	−0.6057	−9.35
B/M	0.0186	0.72	−0.0150	−7.37	−3.5801	−7.35
Leverage	0.0753	2.65				
Adjusted R^2	0.1386	1.81	0.1097	3.36	0.2031	2.50

[a] This table provides summary statistics for the coefficients from 24 quarterly cross-sectional Fama-MacBeth regressions using the composite *Favorable* and *Unfavorable* content measures across the six categories and three sources of disclosures, i.e., corporations, analysts, and business press. Newey-West corrected time-series t-statistics are reported in the table. The time period is from 1996 to 2001.

Variable Definitions:

Cost of Cap. = expected annual cost of capital calculated based on Fama-French three-factor model over the past five years' return data;
σ(R) = standard deviation of daily stock return over the contemporaneous quarter;
σ(FE) = standard deviation of all available quarterly analyst forecast errors from 1996 to 2001;
Favorable = favorable assessment index, constructed as mean of the content-analysis-based scaled favorable content measures for six categories of disclosures across three sources, i.e., corporations, analysts, and business press;
Unfavorable = unfavorable assessment index, constructed as mean of the content-analysis-based scaled unfavorable content measures for six categories of disclosures across three sources, i.e., corporations, analysts, and business press;
Size = natural logarithm of a firm's market capitalization of equity at the beginning of the quarter;
B/M = book equity divided by market equity at the beginning of the quarter; and
Leverage = long-term debt divided by total assets.

find that when the business press offers both positive and negative news disclosures, there are impacts on cost of capital, return volatility, and analyst forecast error dispersion. Positive news disclosure decreases cost of capital, negative news disclosure increases it. The return volatility and forecast dispersion effects are also highly significant in the predicted direction. Intuitively, the strength of this finding suggests that the credibility of news disclosure by the press is higher than that for companies or for analysts, and in the case of analysts, press disclosure is seen as more timely. The press is seen as less affected by incentive concerns (agency), and this is reflected in the consistency of evidence.

The lack of effect on the firm's cost of capital using disclosures from corporations, and the findings of the effect on the firm's cost of capital using disclosures from the business press are also consistent with evidence presented in Li (2008), who concludes that the

TABLE 4
Fama-MacBeth Regressions by the Source of News[a]

Panel A: Disclosure Source is Corporate Disclosures

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.1825	26.94	0.0422	19.89	1.6587	6.62
Favorable	0.0003	0.39	−0.0015	−6.08	−0.2123	−6.57
Unfavorable	−0.0036	−1.59	0.0025	3.06	0.3429	9.44
Size	−0.0047	−7.17	−0.0014	−4.09	0.0010	0.06
B/M	0.0017	0.60	−0.0033	−3.31	−0.2583	−4.21
Leverage	0.0113	1.17				
Adjusted R^2	0.0161	3.13	0.1008	5.44	0.0391	3.46

Panel B: Disclosure Source is Analyst Reports from Investext

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.1771	30.98	0.0398	21.99	0.9812	7.81
Favorable	0.0000	0.00	−0.0017	−7.98	−0.0758	−2.17
Unfavorable	0.0022	0.27	0.0051	6.07	0.0175	0.17
Size	−0.0051	−9.15	−0.0015	−4.23	0.0548	6.30
B/M	0.0003	0.22	−0.0029	−3.31	−0.1128	−3.09
Leverage	0.0159	1.60				
Adjusted R^2	0.0234	3.54	0.0965	5.19	−0.0029	−0.71

Panel C: Disclosure Source is Business Press

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.1757	36.42	0.0367	19.5	0.5192	6.82
Favorable	−0.0013	−2.82	−0.0004	−2.80	−0.0823	−3.52
Unfavorable	0.0026	1.85	0.0017	6.07	0.2635	8.38
Size	−0.0045	−5.53	−0.0014	−4.26	0.0448	2.49
B/M	0.0011	0.77	−0.0026	−3.09	−0.0766	−2.69
Leverage	0.0167	1.46				
Adjusted R^2	0.0166	4.25	0.0779	3.92	−0.0018	−0.41

[a] This table provides summary statistics for the coefficients from 24 quarterly cross-sectional Fama-MacBeth regressions using the *Favorable* and *Unfavorable* content measures for each source of disclosure, i.e., corporations, analysts, and business press. The content measures are summed across the six categories of disclosures. Newey-West corrected time-series t-statistics are reported in the table. The time period is from 1996 to 2001.

Variable Definitions:
Cost of Cap. = expected annual cost of capital calculated based on Fama-French three-factor model over the past five years' return data;
$\sigma(R)$ = standard deviation of daily stock return over the contemporaneous quarter;

(*continued on next page*)

TABLE 4 (continued)

$\sigma(FE)$ = standard deviation of all available quarterly analyst forecast errors from 1996 to 2001;
Favorable = favorable assessment index, constructed as mean of the content-analysis-based scaled favorable content measures for six categories of disclosures across three sources, i.e., corporations, analysts, and business press;
Unfavorable = unfavorable assessment index, constructed as mean of the content-analysis-based scaled unfavorable content measures for six categories of disclosures across three sources, i.e., corporations, analysts, and business press;
Size = natural logarithm of a firm's market capitalization of equity at the beginning of the quarter;
B/M = book equity divided by market equity at the beginning of the quarter; and
Leverage = long-term debt divided by total assets.

General Inquirer does not accurately analyze the tone of MD&As in corporate filings. Conversely, the GI accurately analyzes documents from the general news media and business press. Li's (2008) findings suggest that the measures derived from content analysis for corporate disclosures are more likely to be noisy than those from the business press. However, our result showing an effect of the content in corporate disclosures and business press on return volatility and analyst forecast dispersion suggests that the informativeness of corporate disclosures is not entirely lost due to the noise and bias in disclosures stemming from management incentives.

We next examine whether the effect of disclosures by the management, analysts, and business press have differential impact on the firms' cost of capital, volatility, and analyst forecast error dispersion when it relates to small versus large market capitalization stocks. Table 5 reports separate analysis for small and large firms. To designate a firm as small or large, we sort the sample firms by their equity market capitalization. One-half of the sample is defined as small firms and the other half is labeled large firms.

Findings for small firms are based on 2,682 firm-year observations. The analysis is portrayed in three panels. Panel A examines the relation between management disclosures and the cost of capital as well as return volatility and forecast error variability. Panels B and C contain analysis similar to that in Panel A except that the source of disclosures is analyst reports in Panel B and business press in Panel C.

Results in Table 5 show that regardless of the source, favorable disclosures reduce the cost of capital, whereas unfavorable disclosures are associated with higher cost of capital. For small firms, information is relatively scarce, and disclosures, favorable or unfavorable, enable the market participants to learn more about the risks facing the firm, which are reflected in the firm's cost of capital. The results lead us to similar conclusions with respect to return volatility and analyst forecast errors.

Results in Panel A suggest, somewhat paradoxically, that the market deems all three sources of information as credible enough to influence the expected cost of equity capital of the firms experiencing favorable and unfavorable coverage. The result is due likely to the fact that small firms have considerable amount of uncertainty swirling around their prospects. Therefore, new disclosures influence investors' assessment regardless of the source, which results in disclosures being associated with the three measures of risk.

In Panels D, E, and F of Table 5, results for large cap stocks reveal a different picture for cost of capital effects, but the other two measures of risk, volatility and analyst forecast dispersion, show results consistent with the hypothesis. Here, cost of capital is less systematically associated with disclosure content. In the presence of considerable amount of information already available for large cap stocks, new disclosures are not particularly helpful in updating investor beliefs. As a result, there is less consistent indication of an impact of disclosures on large firms' cost of capital. In fact, in the case of management disclosures,

TABLE 5
Fama-MacBeth Regressions by the Source of News: Small versus Large[a]

Panel A: Disclosure Source is Corporate Disclosures: Small Firms, 2,682 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.1579	11.99	0.0581	12.90	0.4090	1.74
Favorable	−0.0048	−4.51	−0.0011	−1.85	−0.2327	−3.34
Unfavorable	0.0063	2.93	0.0010	0.65	0.6716	2.87
Size	0.0054	3.28	−0.0045	−5.06	0.1086	3.15
B/M	−0.0098	−3.03	−0.0050	−2.55	−0.2893	−3.75
Leverage	0.0090	0.52				
Adjusted R^2	0.0197	1.31	0.1350	5.06	0.0676	1.59

Panel B: Disclosure Source is Analyst Reports from Investext: Small Firms, 2,682 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.1410	10.64	0.0550	11.47	0.2036	1.94
Favorable	−0.0040	−2.37	−0.0016	−8.75	−0.0376	−2.56
Unfavorable	0.0169	2.68	0.0055	6.32	0.1480	2.85
Size	0.0047	2.92	−0.0045	−6.14	0.1121	4.08
B/M	−0.0100	−2.79	−0.0056	−2.30	−0.2716	−2.38
Leverage	0.0069	0.47				
Adjusted R^2	0.0220	1.83	0.1423	5.35	−0.0194	−3.68

Panel C: Disclosure Source is Business Press: Small Firms, 2,682 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.1395	11.69	0.0533	10.49	0.2948	1.83
Favorable	−0.0029	−2.57	−0.0002	−0.71	−0.0771	−3.21
Unfavorable	0.0093	3.33	0.0018	4.56	0.3783	7.01
Size	0.0048	2.40	−0.0048	−5.69	0.0629	1.97
B/M	−0.0091	−2.76	−0.0052	−2.30	−0.2673	−2.16
Leverage	0.0084	0.51				
Adjusted R^2	0.0204	1.82	0.1263	4.10	0.0736	3.49

Panel D: Disclosure Source is Corporate Disclosures: Large Firms, 2,668 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.1938	12.92	0.0316	22.94	4.4315	15.02
Favorable	0.0039	4.02	−0.0013	−11.77	−0.2558	−10.90

(*continued on next page*)

TABLE 5 (continued)

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	*σ(R)* Coefficient	*σ(R)* t-stat	*σ(FE)* Coefficient	*σ(FE)* t-stat
Unfavorable	−0.0083	−2.86	0.0024	5.10	0.2766	7.31
Size	−0.0077	−7.33	−0.0003	−1.56	−0.2357	−12.55
B/M	0.0135	2.35	−0.0024	−3.46	−0.3444	−7.02
Leverage	−0.0041	−0.41				
Adjusted R^2	0.0554	4.14	0.0659	6.15	0.0192	3.09

Panel E: Disclosure Source is Analyst Reports from Investext: Large Firms, 2,668 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	*σ(R)* Coefficient	*σ(R)* t-stat	*σ(FE)* Coefficient	*σ(FE)* t-stat
Intercept	0.2060	21.41	0.0290	18.16	4.4686	12.77
Favorable	0.0017	1.68	−0.0009	−2.80	−0.2223	−6.78
Unfavorable	−0.0038	−0.68	0.0028	4.54	0.1372	2.09
Size	−0.0087	−10.77	−0.0003	−1.48	−0.2357	−9.58
B/M	0.0080	3.98	−0.0017	−3.61	−0.2793	−5.47
Leverage	−0.0006	−0.07				
Adjusted R^2	0.0422	3.42	0.0386	7.59	0.0007	0.07

Panel F: Disclosure Source is Business Press: Large Firms, 2,668 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	*σ(R)* Coefficient	*σ(R)* t-stat	*σ(FE)* Coefficient	*σ(FE)* t-stat
Intercept	0.2256	32.11	0.0245	20.22	3.4893	9.69
Favorable	−0.0006	−0.53	−0.0003	−2.48	−0.1671	−3.91
Unfavorable	−0.0030	−1.59	0.0016	7.25	0.1983	4.76
Size	−0.0095	−20.33	−0.0001	−0.34	−0.2236	−10.05
B/M	0.0077	3.48	−0.0014	−2.60	−0.1218	−3.58
Leverage	−0.0056	−0.58				
Adjusted R^2	0.0386	3.03	0.0391	4.96	−0.0241	−6.38

[a] This table provides summary statistics for the coefficients from 24 quarterly cross-sectional Fama-MacBeth regressions using the *Favorable* and *Unfavorable* content measures for each source of disclosure, i.e., corporations, analysts, and business press. Observations are sorted into two groups by firms' market capitalization. The content measures are summed across the six categories of disclosures. Newey-West corrected time-series t-statistics are reported in the table. The time period is from 1996 to 2001.

Variable Definitions:

Cost of Cap. = expected annual cost of capital calculated based on Fama-French three-factor model over the past five years' return data;
σ(R) = standard deviation of daily stock return over the contemporaneous quarter;
σ(FE) = standard deviation of all available quarterly analyst forecast errors from 1996 to 2001;
Favorable = favorable assessment index, constructed as mean of the content-analysis-based scaled favorable content measures for six categories of disclosures across three sources, i.e., corporations, analysts, and business press;

(*continued on next page*)

TABLE 5 (continued)

Unfavorable = unfavorable assessment index, constructed as mean of the content-analysis-based scaled unfavorable content measures for six categories of disclosures across three sources, i.e., corporations, analysts, and business press;
Size = natural logarithm of a firm's market capitalization of equity at the beginning of the quarter;
B/M = book equity divided by market equity at the beginning of the quarter; and
Leverage = long-term debt divided by total assets.

favorable disclosures are associated with significantly higher, not lower, cost of capital. However, favorable assessment in analyst reports and business press is not associated with a significant change in the cost of capital. Similarly, unfavorable disclosures are not consistently associated with higher cost of capital. Overall, the cost of capital effect of disclosures is not observed consistently for large stocks. In contrast to the cost of capital effect, disclosures' effect on return volatility and analyst forecast error dispersion continues to be significant and as predicted for the large firms. Thus, only the cost of capital effect is puzzling.

Table 6 reports results of analyzing the impact of disclosures by source the cost of capital of firms with low and high institutional ownership. Like with size of the firm, we define high and low institutional ownership as firms in the top and bottom half when the sample firms are ranked on institutional ownership.

The results are similar to those we obtain for small and large cap stocks. This is not surprising because one expects a positive correspondence between institutional ownership and firm size and we just discussed findings for firms partitioned on the basis of firm size.

V. IMPLICATIONS FOR MANAGEMENT AND FUTURE RESEARCH

Regulation of disclosure and the materiality of information that a reasonable investor would want to consider in making an investment decision are subjects of intense scrutiny. The materiality of information relates to the importance and impact of corporate information and disclosures having on the earnings of the company, and to how disclosure should reach the market and investors (Brown 1998). As the disclosure system has grown in size with the importance of evaluation of disclosure by other information intermediaries, analysts, business press, and the investors themselves, information asymmetries and agency conflicts between participants creates greater demand for reporting and assurance of disclosure.

The research reported here is the first to document systematic evidence of the effect of disclosure on various risk measures, including the cost of capital. Our analysis of disclosure is based on a virtually exhaustive set of sources from the print medium, segregated by disclosure source—corporate, analysts, and news stories published in the business press. We find support that the market weighs disclosures according to the credibility of source, and that, on average, the market filters out and deemphasizes noisy disclosures by all participants. Our results find that negative news disclosure is strongly weighted by the market, and positive news is discounted as firms and investment analysts have incentives to skew disclosure. Our results suggest that corporations' and analysts' communications with the investment community are not credible. Specifically, analysts' reports are heavily discounted, suggesting that either they are not credible or that they are seen as responding to market changes after they have taken place, discounting their impact.

Problems of agency and the incentives for the business press to skew disclosure are more diffuse for journalists than for companies or analysts, and our results reflect this more

TABLE 6
Fama-MacBeth Regressions by the Source of News: Low Institutional Ownership versus High Institutional Ownership[a]

Panel A: Disclosure Source is Corporate Disclosures: Low Institutional Ownership Firms, 2,501 Observations

	Dependent Variable					
Independent	***Cost of Cap.***		**σ*(R)***		**σ*(FE)***	
Variables	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
Intercept	0.1741	15.60	0.0390	23.26	1.2304	4.20
Favorable	−0.0020	−0.86	−0.0014	−3.41	−0.1754	−2.16
Unfavorable	0.0011	0.21	0.0029	2.74	0.1611	0.91
Size	−0.0040	−2.41	−0.0015	−4.88	0.0918	3.28
B/M	−0.0023	−1.31	−0.0009	−1.64	−0.2536	−4.56
Leverage	0.0816	3.16				
Adjusted R^2	0.0286	2.13	0.0651	6.97	0.1010	2.97

Panel B: Disclosure Source is Analyst Reports from Investext: Low Institutional Ownership Firms, 2,501 Observations

	Dependent Variable					
Independent	***Cost of Cap.***		**σ*(R)***		**σ*(FE)***	
Variables	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
Intercept	0.1613	20.12	0.0382	28.35	−0.2043	−1.56
Favorable	−0.0038	−2.53	−0.0013	−3.50	−0.1192	−7.06
Unfavorable	0.0145	2.77	0.0044	3.15	0.5022	8.82
Size	−0.0035	−3.40	−0.0017	−5.70	0.1554	9.18
B/M	0.0014	0.76	−0.0007	−1.48	−0.0452	−1.52
Leverage	0.0726	3.55				
Adjusted R^2	0.0338	1.94	0.0803	9.45	0.0475	3.58

Panel C: Disclosure Source is Business Press: Low Institutional Ownership Firms, 2,501 Observations

	Dependent Variable					
Independent	***Cost of Cap.***		**σ*(R)***		**σ*(FE)***	
Variables	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
Intercept	0.1550	24.64	0.0353	37.71	−0.2364	−2.95
Favorable	−0.0026	−3.41	0.0000	−0.13	−0.0034	−0.12
Unfavorable	0.0078	2.86	0.0013	4.88	0.2331	5.18
Size	−0.0029	−2.12	−0.0016	−5.40	0.1379	9.48
B/M	0.0015	0.82	−0.0006	−1.12	−0.0407	−1.53
Leverage	0.0710	3.42				
Adjusted R^2	0.0272	5.07	0.0565	3.88	0.0588	3.43

(*continued on next page*)

TABLE 6 (continued)

Panel D: Disclosure Source is Corporate Disclosures: High Institutional Ownership Firms, 2,489 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.1884	15.18	0.0377	11.88	2.7244	7.95
Favorable	0.0037	3.88	−0.0015	−9.39	−0.2106	−8.82
Unfavorable	−0.0101	−4.87	0.0023	4.07	0.3652	7.58
Size	−0.0064	−5.35	−0.0007	−1.83	−0.1149	−4.35
B/M	0.0176	2.38	−0.0082	−4.28	−0.3886	−1.61
Leverage	−0.0292	−2.85				
Adjusted R^2	0.0558	2.97	0.1406	5.44	−0.0002	−0.04

Panel E: Disclosure Source is Analyst Reports from Investext: High Institutional Ownership Firms, 2,489 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.1860	10.89	0.0352	12.40	3.6303	9.08
Favorable	0.0043	3.49	−0.0011	−5.70	−0.1911	−5.55
Unfavorable	−0.0071	−1.66	0.0039	6.21	−0.0670	−0.85
Size	−0.0074	−4.31	−0.0008	−1.93	−0.1295	−3.62
B/M	0.0117	2.35	−0.0093	−4.03	−0.6093	−1.81
Leverage	−0.0233	−2.49				
Adjusted R^2	0.0601	2.84	0.1054	4.55	0.0051	0.43

Panel F: Disclosure Source is Business Press: High Institutional Ownership Firms, 2,489 Observations

Independent Variables	Dependent Variable: *Cost of Cap.* Coefficient	*Cost of Cap.* t-stat	$\sigma(R)$ Coefficient	$\sigma(R)$ t-stat	$\sigma(FE)$ Coefficient	$\sigma(FE)$ t-stat
Intercept	0.2064	16.88	0.0329	9.55	2.4989	5.34
Favorable	0.0018	1.47	−0.0004	−3.34	−0.2040	−3.95
Unfavorable	−0.0054	−2.30	0.0017	6.68	0.3165	6.60
Size	−0.0077	−4.94	−0.0008	−1.78	−0.1249	−5.60
B/M	0.0126	2.39	−0.0087	−3.85	−0.5894	−2.03
Leverage	−0.0232	−2.32				
Adjusted R^2	0.0529	2.46	0.1092	6.11	−0.0253	−3.53

[a] This table provides summary statistics for the coefficients from quarterly cross-sectional Fama-MacBeth regressions using the *Favorable* and *Unfavorable* content measures for each source of disclosure, i.e., corporations, analysts, and business press. Observations are sorted into two groups by firms' institutional ownership. The content measures are summed across the six categories of disclosures. Newey-West corrected time-series t-statistics are reported in the table. The time period is from 1996 to 2001.

Variable Definitions:

Cost of Cap. = expected annual cost of capital calculated based on Fama-French three-factor model over the past five years' return data;

(*continued on next page*)

TABLE 6 (continued)

$\sigma(R)$ = standard deviation of daily stock return over the contemporaneous quarter;
$\sigma(FE)$ = standard deviation of all available quarterly analyst forecast errors from 1996 to 2001;
Favorable = favorable assessment index, constructed as mean of the content-analysis-based scaled favorable content measures for six categories of disclosures across three sources, i.e., corporations, analysts, and business press;
Unfavorable = unfavorable assessment index, constructed as mean of the content-analysis-based scaled unfavorable content measures for six categories of disclosures across three sources, i.e., corporations, analysts, and business press;
Size = natural logarithm of a firm's market capitalization of equity at the beginning of the quarter;
B/M = book equity divided by market equity at the beginning of the quarter; and
Leverage = long-term debt divided by total assets.

independent intermediary role—positive news disclosure decreases cost of capital, and negative news disclosure increases it. Intuitively this finding suggests the credibility of news disclosure by the press is higher than that for companies or analysts.

The strength and pattern of our results suggest that there are important economic reasons for companies to understand more precisely how disclosure affects the firm's cost of capital and other measures of risk. Pursuant to securities regulation and business norms, companies have a duty to disclose corporate information and developments through timely and accurate disclosure. That we have found evidence showing that the market discounts disclosure by source credibility suggests that companies should give high priority to developing appropriate and complete communications policies. Skewing disclosure of critical corporate information or development has economic risks. Asking whether consistent, accurate, and complete disclosure is best accomplished through centralizing the corporate communication process, or decentralizing it with strong behavioral norms and safeguards, is a key senior-management question. An implication of our results is that companies cannot depend on analysts to enhance source credibility or timeliness of disclosure. Analysts have their own credibility and timeliness problems, and are subjects of increased scrutiny in disclosure reform.

We conclude by noting that financial reporting and disclosure will continue to be an important field of empirical inquiry. There are numerous factors with the potential to alter disclosure practices and financial reporting—technological innovation, changes in the business economics of audit firms and analysts, globalization of capital markets, and changes in disclosure channels and the number and type of information intermediaries—that continue to reshape disclosure and financial reporting practices. They create new and exciting opportunities for research.

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