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Article *in* Journal of Accounting Research · March 2008

Impact Factor: 2.38 · DOI: 10.1111/j.1475-679X.2008.00267.x · Source: RePEc

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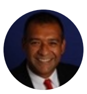

Dhananjay Nanda
University of Miami

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Jennifer Francis*
(Duke University)

Dhananjay Nanda
(Duke University)

Per Olsson
(Duke University)

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Draft: May 2007

* Corresponding author: Fuqua School of Business, Duke University, Durham, NC 27708. Email addresses: jfrancis@duke.edu. djnanda@duke.edu, and pol@duke.edu. We appreciate comments from workshop participants at Duke University, London Business School, Seoul National University, University of Technology, Sydney, and Stockholm School of Economics, and from Campbell Harvey, Will Mitchell, and Mohan Venkatachalam. Financial support was provided by the Fuqua School of Business and the Global Capital Markets Center at the Fuqua School of Business. Analyst forecast data are from Value Line. We are grateful for the excellent research assistance of Mark Evans and Kevin Ow Yong.

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Draft: May 2007

1. Introduction

We investigate the relation between voluntary disclosure and earnings quality, and the pricing effects of voluntary disclosure unconditionally and conditional on earnings quality. Our proxy for voluntary disclosure is a coded index of financial information from firms' annual reports and 10-K filings. By earnings quality, we mean the precision of the earnings signal emanating from the firm's financial reporting system. Such imprecision affects the capital market's demand for, as well as a firm's motive to supply, disclosures that are useful to current shareholders and prospective investors in assessing firm value. Our main proxy for a firm's earnings quality is the common factor identified by factor analysis performed on three measures of earnings quality commonly used in the literature: accruals quality, earnings variability, and the absolute value of abnormal accruals.

Analytical research provides conflicting predictions about how earnings quality influences firms' disclosure decisions.[1] One strand argues that the information asymmetry between firm insiders and shareholders creates a demand for disclosure and provides an incentive for firms to disclose because the value of additional information is greater in these settings (Grossman and Hart, 1980; Milgrom, 1981; Verrecchia, 1983). An implication is that firms with poor (good) earnings quality will issue more (less) expansive disclosures because information asymmetry between the firm and investors is higher (lower) in such firms; we interpret this as a substitutive relation. Another strand shows that as information quality increases (such that the quality of the manager's information increases) managers have incentives to disclose more (Verrecchia, 1990). Under this view, firms with poor (good) earnings quality will issue less (more) expansive disclosures, because investors will treat such disclosures as less (more) credible; we interpret this as a complementary relation. As discussed in section 2.1, the differing implications from this literature stem from the modeling of earnings quality.

A separate but related issue is whether voluntary disclosures result in a lower, or higher, overall cost of capital to the firm. Most prior studies suggest that greater voluntary disclosure should lower information

[1] As described in greater detail in our hypotheses development section, we view our earnings quality variable as a proxy for the information quality of the firm's financial information system.

asymmetry and, therefore, reduce the cost of capital (Diamond and Verrecchia, 1991). Other research argues, however, that increasing cost of capital effects may occur if the disclosures themselves lead to a more asymmetric information environment than would exist in their absence (Kim and Verrecchia, 1994; Zhang, 2001). This body of work motivates our second hypothesis concerning the relation between disclosure and cost of capital (section 2.2).[2]

How disclosure relates to earnings quality affects the link between disclosure and the cost of capital.[3] If voluntary financial disclosure is fundamentally driven by earnings quality (either in a complementary way or in a substitutive way), then earnings quality will have a first order effect on the cost of capital and disclosure is merely a proxy for earnings quality. An implication is that tests which do not control for earnings quality may find significant relations between cost of capital and disclosure, but they may be largely driven by the omission of the underlying (and correlated) primitive construct – earnings quality. For example, if voluntary disclosures complement earnings quality, then firms with better earnings quality will disclose more. In this setting, tests which do not control for earnings quality will show that more disclosure reduces the cost of capital, but this effect is driven by high disclosure firms also having good earnings quality (the main driver of the lower cost of capital). Our third hypothesis (described in section 2.3) addresses the importance of conditioning on the first-order effect of earnings quality in investigating the second-order effect of disclosure.

Results of tests conducted on 677 firms' disclosures for 2001 show a significant (at the 0.001 level) complementary association between earnings quality and voluntary disclosure, implying that firms with good earnings quality select *higher* levels of disclosure than do firms with poor earnings quality. We find that greater voluntary disclosure is associated with a lower cost of capital, unconditional on other factors. This relation, however, disappears or is substantially reduced when we control for earnings quality, indicating that voluntary disclosure has little or no distinct pricing effect. These results are robust to industry-adjustments,

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[2] It should be noted that the literature predicting (and showing) cost of capital effects of disclosure and earnings quality assumes that idiosyncratic effects are priced in the capital markets. We discuss this issue further in section 2.3.

[3] Prior empirical research that tests the disclosure-cost of capital link is primarily based on theoretical research that treats disclosure as exogenous; see, for example, Botosan's [1997] tests of the Diamond and Verrecchia [1991] model. In contrast, we focus on research that models voluntary disclosure as an endogenous choice that is affected by firm fundamentals.

estimation procedures (parametric and non-parametric), and alternative proxies for both earnings quality and cost of capital. We further find that voluntary disclosure is associated with *innate* earnings quality, or earnings quality that is related to a firm's fundamental business model, and is unrelated to *discretionary* earnings quality, or the component that is, at least in part, due to managerial choices. These findings are consistent with earnings quality being a determinant of voluntary disclosure rather than disclosure choices determining a firm's earnings quality.

Our main findings are, however, sensitive to other proxies for voluntary disclosure, notably measures based on management forecasts, conference calls, and press releases. In general, press releases and conference call activity exhibit opposite relations to those found for our self-constructed score (i.e., press releases and conference call activity exhibit a substitutive, not a complementary, relation with earnings quality, and management forecasts are unrelated to earnings quality). Further, while press releases show no meaningful associations with cost of capital, management forecasts and conference call activity are associated with a higher, not lower, cost of capital.

In summary, we demonstrate the importance of viewing voluntary disclosure as a response to earnings quality when analyzing the cost of capital consequences of such disclosures. Because of the complexity and alternative operationalizations of all of the constructs we examine – cost of capital, earnings quality and voluntary disclosure – we believe that further work is needed to fully explain conflicting evidence in the literature concerning relationships among these constructs. By examining a partial set of alternative proxies for each construct and for a constant sample of firms, our study provides an initial exploration of these issues.

2. Hypotheses on the Relations among Earnings Quality, Voluntary Disclosure, and Cost of Capital

The discretion exercised by a privately informed manager or firm in disclosing information has been examined by a large literature. The primary insight from theoretical work is that managers disclose their private information because rational buyers would otherwise interpret non-disclosure as unfavorable news and consequently discount the value of the firm's assets (see Grossman and Hart, 1980; Milgrom, 1981;

Verrecchia, 1983, 2001). The manager's disclosure mitigates the adverse selection problem in capital markets by reducing information asymmetry between the firm and investors, enabling greater liquidity and lowering the firm's cost of capital (Glosten and Milgrom, 1985; Diamond and Verrecchia, 1991).

In this section, we describe the role played by the quality of information arising from the firm's underlying financial reporting system in enabling disclosure. We begin by summarizing research on the relation between a firm's disclosure choice and its earnings quality (section 2.1) and its cost of capital (section 2.2). In section 2.3, we link these literatures by emphasizing the need to examine voluntary disclosure *conditional on* earnings quality.

2.1. Earnings quality and disclosure

Early work studying voluntary disclosure treats the quality of the manager's private information as exogenous (see Grossman and Hart, 1980; Milgrom, 1981; Verrecchia, 1983). In such settings, one obtains the result that disclosure mitigates the information asymmetry in the market, so that firms with greater asymmetry increase disclosures to improve shareholders' information environment. If a measure of the firm's earnings quality is used to proxy for information asymmetry (under the belief that earnings quality is causally related to the information asymmetry),[4] the implication is that the level of a firm's disclosure is inversely correlated with earnings quality, or a substitutive relation. That is, poor (good) earnings quality firms disclose more (less). This intuition ignores, however, the fact that in such a setting the firm's disclosures would also be based on poor quality information and, hence, a rational expectations market will place less credence on such disclosures. This argument demonstrates the need to endogenize the disclosure decision and recognize that disclosures made by the manager will originate from an underlying information system that may be of poor (or of high) quality.

[4] Empirical evidence supports a positive correlation between measures of information asymmetry and measures of earnings quality. In particular, Ecker et al. [2006] document a correlation between accruals quality and both probability of informed trading scores (PINs) and bid-ask spreads. Rajgopal and Venkatachalam [2005] document a significant relation between measures of earnings quality (including accruals quality) and idiosyncratic returns volatility. Given that PIN scores, spreads and returns volatility are common measures of information asymmetry used in the literature, and given the high association among our earnings quality measures (and their similarity to those examined in this literature), we conclude that the assumed link between information asymmetry and earnings quality is well-founded.

Several theoretical studies model the endogenous relation between disclosure choice and information quality. Dye [1985] and Jung and Kwon [1988] model information quality as the probability that a manager is privately informed, and investigate his decision to disclose or withhold his information. As the probability of being informed (i.e., information quality) increases, the probability of disclosure also increases since the market is more likely to interpret non-disclosure as bad news and consequently discount the firm's value. This setting, therefore, predicts a complementary association between information quality and voluntary disclosure. An alternative characterization of information quality (which also yields a complementary association) is provided by Verrecchia [1990], who models it as the precision of the information signal observed by the firm's manager. He shows that the equilibrium disclosure threshold decreases and the probability of disclosure increases as the precision of a manager's private information increases. The intuition here is that because market participants know the precision of the manager's private information, if a firm with high quality information withholds information from the market, a rational expectations market will discount the value of the firm's assets. This force causes the firm's disclosure threshold to decrease and the probability of disclosure to increase, resulting in the prediction of more (less) disclosures for firms with good (poor) information quality, or a complementary relation. Finally, in Penno's [1997] model disclosure choice is based on two countervailing forces: as the probability of being informed increases, disclosure is more likely (as in Dye, 1985), but the concomitant reduction in information quality makes disclosure less likely (as in Verrecchia, 1990). If higher information quality significantly lowers the probability of being informed, Penno shows that disclosure may substitute for information quality.

Empirical studies of the relation between voluntary disclosure and financial information quality have found substitutive as well as complementary relations, depending on the measures of voluntary disclosure and information quality examined. In tests using AIMR scores as the proxy for voluntary disclosure and the correlation between annual returns and annual earnings as the proxy for information quality, Lang and Lundholm [1993] report that firms with low returns-earnings correlations have higher AIMR scores, or a substitutive relation. Tasker [1998] documents a similar substitutive relation between the likelihood a firm uses conference calls (her proxy for voluntary disclosure) and her proxy for the informativeness of their financial statements. In tests using management forecasts as the proxy for voluntary disclosure and earnings volatility as the proxy for information quality, Waymire [1985], Cox [1985] and Imhoff [1978] find that firms' forecast frequency is negatively related with their earnings volatility, or a complementary relation.[5] Our hypotheses on the complementary or substitutive relation between disclosure and financial information quality are:

H1a:(Complementary) Disclosures are increasing in a firm's earnings quality.
H1b:(Substitutive) Disclosures are decreasing in a firm's earnings quality.

2.2. Disclosure and cost of capital

The theoretical disclosure literature's central premise is that adverse selection among differentially informed capital market participants inhibits investment in a firm's equity. As a result, an equity issuing firm is motivated to be fully forthcoming by committing to the highest possible level of disclosure to lower its cost of capital. The literature also identifies a number of firm-specific costs of disclosure: risk-sharing (Diamond and Verrecchia, 1991), agency costs (Baiman and Verrecchia, 1996) and proprietary costs (Hayes and Lundholm, 1996). These costs offset the cost of capital benefit from disclosure and influence a firm to be less than fully forthcoming (Healy and Palepu, 2001).

Regardless of whether the disclosure decision is influenced more by proprietary costs, agency costs, or risk-sharing concerns, most prior research holds that firms that disclose less should have a higher cost of capital than firms that disclose more. Some research shows, however, that the opposite result may prevail. For example, Kim and Verrecchia [1994] model a setting where more expansive disclosures lead to greater incentives on the part of investors to acquire private information, resulting in greater information asymmetry

[5] Given that prior research uses different samples as well as different proxies for both voluntary disclosure and information quality, it is difficult to isolate the cause of conflicting results in this literature. One goal of our study is to re-examine these results using multiple proxies for each construct for a constant sample of firms; in doing so, we hope to shed light on which element of prior research designs is most sensitive to producing conflicting interpretations.

(and, by implication, a higher cost of capital).[6] As another example, Zhang [2001] models a setting where a firm selects its disclosure level, and shows that the relation between cost of capital and voluntary disclosure may be positive or negative depending on what causes variation in disclosure levels. When variation is primarily driven by factors like earnings variability, variability of liquidity shocks, or the cost of information analysis, disclosure levels are positively related to the cost of capital. Only when variation in disclosure is driven by disclosure costs does he find that the cost of capital is negatively related to disclosure levels. Based on the predictions of prior theoretical research, we do not specify the sign of the relation we expect between voluntary disclosure and cost of capital:

H2: Variation in firms' voluntary disclosure levels is associated with variation in the cost of capital.

Empirical research documents mixed results concerning the relation between voluntary disclosures and cost of capital. Botosan [1997] finds no significant association between her self-constructed disclosure score and the implied cost of equity capital for her full sample; however, she finds a negative association for the sub-sample with low analyst following. Botosan and Plumlee [2002] relate AIMR scores to the cost of equity and find that total AIMR scores exhibit no significant cost of equity effect. Further tests show, however, that the sub-component of the AIMR scores related to annual report disclosures exhibits a negative association with cost of capital (t-statistic = -1.95) while the sub-component capturing disclosures via other publications (notably interim reports) is positively associated with the cost of equity (t-statistic = 2.46). Total AIMR scores have also been shown to be negatively associated with proxies for the cost of debt (Sengupta [1998]). In a sample of UK firms, Gietzmann and Ireland [2005] identify a negative relation between voluntary disclosure and the cost of equity capital, but only for firms making "aggressive" accounting choices. Finally, we note that while studies examining other market-based proxies for the firm's information environment (such as bid-ask spreads, measures of liquidity, and probability of informed trading scores) generally find negative associations between these measures and proxies for voluntary disclosure (Welker,

[6] Similarly, McNichols and Trueman [1994] describe a disclosure setting where information asymmetry is higher pre-disclosure due to endogenous information acquisition. Of course, post-disclosure, information asymmetry declines due to news revelation. For disclosing firms, any time period may be considered pre-disclosure and then information asymmetry is likely heightened due to the anticipated news event. For non-disclosing firms, there may never be any endogenous information accumulation in anticipation of disclosure, and consequently no relation between information asymmetry and disclosure.

1995; Coller and Yohn, 1997; Healy, Hutton and Palepu, 1999; Leuz and Verrecchia, 2000; Brown and Hillegeist, 2006), the results are not consistent across all market-based proxies (Heflin, Shaw and Wild, 2005 with respect to measures of market depth; Bushee and Noe, 2000, Lang and Lundholm, 1993, and Leuz and Verrecchia, 2000 with respect to returns volatility).

We view our empirical tests of the relation between voluntary disclosure and cost of capital as extending Botosan [1997] because our proxies for these constructs are most closely related to her measures. Our tests of H2 both provide additional evidence on her findings for a larger, more recent and diverse sample of firms, and provide an important intermediate step in highlighting the unconditional and conditional associations between cost of capital and voluntary disclosure (described next).

2.3. Earnings quality, disclosure and cost of capital

A critical element of the disclosure literature is that voluntary disclosure is a *response* to information asymmetry.[7] As discussed in section 2.1, whether the response is to have more, or less, disclosure when earnings quality is poor depends on whether voluntary disclosure complements or substitutes for earnings quality. Importantly, regardless of the sign of this relation, these models characterize voluntary disclosure as responding to the more primitive construct of information quality.[8] As the more primitive construct, we expect that earnings quality (our proxy for information quality) has a first-order effect on the cost of capital (with poor earnings quality leading to a higher cost of capital), with disclosure having a second-order effect. When issued to substitute for poor earnings quality, voluntary disclosures should reduce the cost of capital because such disclosures should lower information asymmetry among capital market participants. We note, however, that absent controls for the primitive effect of earnings quality, voluntary disclosure may appear to

[7] The endogeneity of voluntary disclosure has also been examined by Gietzmann and Trombetta [2003]. In their work, a firm can communicate through both voluntary disclosure and accounting policies. They show that in equilibrium firms communicate either through conservative accounting choices or through voluntary disclosure. Consequently, voluntary disclosure is predicted to affect the cost of equity capital only for firms with aggressive accounting policies.

[8] Although we can not unequivocally rule out the possibility that information quality is a response to voluntary disclosure, we are aware of no theoretical study that characterizes voluntary disclosure as the primitive construct. More plausibly, a feedback mechanism may exist whereby voluntary disclosures (made in response to information quality) have a subsequent effect on information quality. For example, Kasznik [1999] finds that managers who issue earnings forecasts are more likely to engage in discretionary reporting behaviors to meet those forecasts. While the question of whether and how voluntary disclosures stimulate behaviors which affect information quality is an interesting question, it is beyond the scope of our paper. However, we partly address this causality concern in our robustness tests.

be positively related to the cost of capital since the disclosure variable will be negatively correlated with the omitted (and primitive) variable, earnings quality. In contrast, if disclosure complements earnings quality, better earnings quality will lead to more expansive disclosures. In this case, absent controls for the first-order effect of earnings quality, we would empirically observe a negative relation between voluntary disclosure and cost of capital. In both cases, the relation between cost of capital and disclosure *conditional* on earnings quality should be negative. A positive relation is also possible: if firms with higher cost of capital (perhaps because of poorer earnings quality) have greater incentives to issue voluntary disclosures (for example, to attempt to reduce their cost of capital), we may empirically observe a positive cross-sectional relation between voluntary disclosure and cost of capital. As a result, we cannot predict ex ante whether the relation between voluntary disclosure and cost of capital conditional on earnings quality will be positive or negative.

Moreover, both the substitution and complementary scenarios indicate that disclosure will affect the cost of capital conditional on earnings quality *if* the second-order disclosure effect is strong. In general, second-order effects are not easily discernible in broad samples reflecting a combination of underlying behaviors and forces, such as proprietary and agency costs. Since we cannot fully control for these effects, disclosure may well be related to firms' cost of capital to the extent that disclosure proxies for such correlated omitted variables. We formally state our prediction concerning the relation between disclosure and cost of capital conditional on earnings quality as:

H3: Controlling for earnings quality, variation in firms' voluntary disclosure levels is related to variation in their cost of capital.

It should be noted that the literature predicting and finding that disclosure has cost of capital effects as well as the literature predicting and finding that earnings quality is priced assumes that idiosyncratic risk is priced. From an asset-pricing literature perspective this is not an uncontroversial assertion, as traditional models of market equilibrium (such as the capital asset pricing model, CAPM; Sharpe 1964, Lintner 1965, Black 1972) assume that all relevant information is reflected in price at all times; consequently, information asymmetry should have no pricing effects. In order for idiosyncratic effects to be priced, there must be some friction that allows for disequilibrium prices for non-trivial amounts of time. The literature discussed in section 2.2 describes such situations. There is a separate but related literature showing how such effects can aggregate into *systematic* pricing effects. For example, Easley and O'Hara [2004] construct a rational expectations equilibrium model in which information asymmetry is priced.

Whether this pricing effect is diversifiable remains controversial. In analytical work, Lambert, Leuz and Verecchia [2006b] argue that the Easley and O'Hara pricing effect is not due to information asymmetry *per se*, but rather due to average information precision; they further show that this average effect cannot be diversified when firms' cash flows are correlated. The published empirical literature supports the notion that some form of an information risk/precision effect is priced (e.g., Easley, Hvidkjær and O'Hara 2002, Bhattacharya, Daouk and Welker 2003, Francis et al. 2004, 2005). A recent paper by Core, Guay and Verdi [2007] questions these findings.[9] Because the robustness of pricing tests is debated, we employ several different methods; ex-ante (implied cost of capital) and ex-post (realized returns) tests, time-series and cross-sectional designs, and cost of equity as well as cost of debt measures.

3. *Measurement of Test Variables*

Because the construction of the test variables is critical to our research question, we begin by detailing the procedures for creating these variables. We defer our discussions of the distributions of these variables to section 4, where we also describe the sample.

3.1. Voluntary disclosure score (*VolDisc*)

Within the voluntary disclosure literature, research has used several proxies for firms' voluntary disclosure practices, including management forecasts, conference calls, self-constructed scores, and externally-generated scores (AIMR scores and S&P scores). We select a self-constructed measure as our main proxy for a firm's voluntary disclosures for three reasons. First, Healy and Palepu [2001] note that self-

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[9] Specifically, Core et al. [2007] argue that information risk is likely diversifiable; because they do not acknowledge Lambert, Leuz and Verecchia [2006b] it is unclear what stance they take on the latter's arguments or proofs. Empirically, Core et al. argue that for a pricing factor to be valid, its realized returns premium (which is the estimated coefficient in the second stage regression of a two-stage approach) should be significantly positive. Using the two-stage approach, Core at al. find that, in the second stage regression, neither accruals quality nor the Fama-French SMB factor have significant risk premia, while the market risk premium (R_M-R_F) is significantly negative. We note that these findings are consistent with Fama and French [1997], who show that realized risk premia in general are insignificant.

constructed measures have increased confidence that the metric captures what it is intended to capture. In particular, self-constructed scores dominate externally-generated scores where there are more questions with respect to what disclosures are captured and about whether the scoring procedures identify true variation in firms' disclosure practices.[10] Second, because a self-constructed metric can be calculated for any firm, samples using such measures are not restricted to firms chosen by external data providers which tend to be skewed toward large firms.[11] Nor are samples restricted to firms that voluntarily disclose a particular type of item, as would be the case if one focused on management forecasts. Thus, relative to samples that use externally-provided scores or management forecasts, selection biases will be less severe for samples based on self-constructed scores. Of course, an argument can be made that focusing on one type of disclosure (such as those included in annual filings) may ignore other firm disclosures that are substitutes, thereby biasing our disclosure score towards firms that choose this disclosure over other communication media. We probe this argument in extensions (section 6) where we extend our tests to consider management forecasts, conference calls and press releases.

Third, and most importantly, the theoretical research used to motivate our hypotheses is predicated on a firm's *commitment* to a voluntary disclosure *policy*. We interpret the notions of commitment and policy to mean a stable set of disclosure practices. Our review indicates that disclosures made in annual reports and 10-K filings are relatively stable from one period to the next;[12] as such, they are likely subject to less discretion than is, for example, the decision to issue a management forecast. In addition, we believe there is less concern with voluntary disclosures made in annual reports that the objective of the disclosure is

[10] A severe form of this problem exists for Standard & Poor's (S&P) Transparency and Disclosure scores, which are based on a checklist of 98 items representing disclosures concerning financial and accounting information (35 items), governance structures (35 items), and ownership structures (28 items). It is important to note that the 98 items were chosen with an international context in mind; many of the items are included to capture variation in disclosure practices *across countries*, not within countries. On this point, Bushee [2004] concludes that "the S&P measure captures mandatory disclosures and a set of voluntary disclosures that are almost universal among S&P 500 firms." In contrast, the voluntary disclosure score developed by Botosan and the variant of her index that we use exhibit substantially greater cross-sectional variation, as would be expected by measures that focus on *voluntary* disclosure.

[11] Descriptive data in both Botosan and Plumlee [2002] and Lang and Lundholm [1996] indicate that samples using AIMR scores are skewed to very large firms. Similarly, because S&P scores are currently available only for S&P followed firms (and for a subset of very large international firms chosen by S&P), tests using S&P scores are also skewed to the largest traded firms.

[12] For a subset of 20 sample firms, we repeated our coding scheme on annual report and 10-K filings made by the firms in 1996, and we compared the values of *VolDisc* for 1996 with those in 2001. The magnitude and ordering of the disclosure scores across the two years was virtually identical.

something other than a commitment to a disclosure policy. In particular, it is unlikely that management would use voluntary disclosure in annual filings to, for example, adjust the market's expectations of earnings; rather, management is more likely to use a management forecast to achieve such a goal (King, Pownall and Waymire, 1990).

Self-constructed scores have the disadvantage of being difficult to replicate because of both the researcher judgment involved and the labor intensity of the coding process. Because our coding scheme (including the information elements examined and the procedures used to aggregate those elements) follows closely Botosan's scheme, we believe our voluntary disclosure score entails less judgment than it would absent her research. We also view our analysis of the relation between cost of capital and our self-constructed score as providing additional evidence on her same main hypothesis – but performed on a more recent, larger and more industry-diverse sample of firms.

Because our voluntary disclosure score builds on Botosan, we begin by reviewing her measure. Botosan develops and validates a disclosure index that considers information items disclosed in the annual reports of 122 machining firms for fiscal 1990. The disclosure elements pertain to five categories of information: (1) background information (e.g., description of business); (2) historical results (e.g., does the firm provide a history of return on asset information and, if so, for how many years?); (3) key non-financial statistics (e.g., number of employees); (4) forecasted information (e.g., forecasted market share); and (5) management discussion and analysis, MD&A (e.g., discussion of change in sales). Botosan combines the scores coded for each information element, across items and categories, and ranks the scores to obtain an ordinal measure of the firm's disclosure; she notes that other methods of aggregating the individual disclosure items produce similar results.

The elements of our disclosure scheme, detailed in Table 1, are similar to Botosan's with two modifications. First, we focus on only those disclosure categories and elements which are clearly voluntary in nature;[13] specifically, we exclude the background information category and the MD&A category because

[13] In sensitivity tests, we examined disclosure scores which included a fifth category capturing the level of detail provided in the firm's segment disclosures. Because the content of much of a firm's segment disclosures are mandated

the disclosures in these categories are substantially constrained by SEC reporting rules. We also note that in tests examining the cost of capital effects of each category of disclosure, Botosan finds that neither the background information category nor the MD&A category have a reliably non-zero effect. By removing these categories of items, we increase the power of our disclosure proxy to capture *voluntary* disclosure and we increase our ability to detect cost of capital effects if they exist. For similar reasons, we exclude information items in the remaining categories that are not purely voluntary in nature. Notably, we exclude order backlog from the list of non-financial statistics since item 101(c) (VIII) of SEC regulation S-K requires disclosure of order backlog to the extent it is material (Rajgopal, Shevlin and Venkatachalam, 2003). Second, we expand the set of disclosures beyond those analyzed by Botosan by adding a category called "other financial measures" where we include disclosures of non-GAAP measures of financial performance, such as free cash flows, ROI and residual income.

We code disclosure elements in each of our four categories separately for the firm's annual report and its 10-K filing. Many of the elements in our coding scheme are binary: for example, the firm either discloses a sales forecast or it does not. For these variables, we code each element as existing (value equals one) or not (value equals zero). Other elements are more continuous in nature: for example, for coding elements included in the historical results category, we code the number of periods (years or quarters, where appropriate) that the firm provides the relevant data. We combine the coded data from the two filing sources (annual report and 10-K), using the following procedures. For binary information elements, we begin with the data coded from the 10-K; if an item is missing in the 10-K, or is referenced in the 10-K as being contained in the annual report, we use the coded data from the firm's annual report. For non-binary information elements, we use the larger (in absolute value) of the 10-K or annual report coded value when the two amounts differ. Next, we convert each of the non-binary information elements into a binary variable by determining whether the firm's reported value of the element is above or below the median value reported by the sample firms. Firms above the median receive a value of one for the noted variable, those below

(conditional on having reportable segments), and because much of a firm's decisions regarding its reportable segments is determined by the complexity of its business, we do not believe that segment disclosures represent true voluntary disclosure choices made by the firm. Consistent with this argument, we find that while all of the results in the paper maintain if we include segment disclosure information, the results are weaker in terms of statistical significance.

receive a value of zero. These procedures produce a value of zero or one for each of the 25 elements of our coding scheme. We sum the values of the 25 elements to obtain the firm's raw disclosure score; by summing across information elements in this manner, we implicitly assign equal weight to each item. We then scale this raw score by the maximum firm score in our sample to obtain a percentage-based score for each firm.

Our results are not sensitive to other ways of aggregating the disclosure elements to form a disclosure score. For example, we obtain similar results if we aggregate elements by category and then assign an equal weight (25%) to each of the category scores to form an overall disclosure score. We also find similar results if we scale the continuous variables between zero and one, and include them in the sum of the scores. Nor are the results sensitive to using rank versus raw disclosure scores.[14] Finally, we obtain qualitatively similar results if we restrict attention to the disclosure score associated with only the 10-K or, separately, only the annual report.

3.2. Earnings Quality

Because there is no agreed-upon metric for the earnings quality construct, we use four different measures: accruals quality (*AQ*), earnings variability (*EarnVar*), absolute abnormal accruals ($\left|AA_j\right|$) and a combined measure based on the common factor score from these three metrics (*CF(EarnQual)*). We choose these measures because they have been used extensively in the literature and have been shown to have non-trivial market effects (Francis et al., 2004; 2005).[15]

Our first proxy is accruals quality, *AQ*, based on McNichols [2002] modification of Dechow and Dichev's [2002] model which separates accruals based on their association with cash flows by regressing working capital accruals on cash from operations in the current period, prior period, and future period, as well as the change in revenues and property, plant and equipment. The unexplained portion of the variation in working capital accruals is an inverse measure of accruals quality; that is, a greater unexplained portion

[14] In section 5.3, we report the results of tests based on component scores, where component represents one of the four categories of disclosure (k=I, II, III, or IV) detailed in Table 1.
[15] Specifically, Francis et al. [2004] report that accruals quality has larger effects on cost of capital than several other earnings attributes (earnings persistence, predictability, smoothness, value relevance, timeliness and conservatism), and that earnings variability has about the same effect as accruals quality. Francis et al. [2005] report that the absolute abnormal accruals from a Jones [1991] model have about the same capital market effects as accruals quality.

implies lower quality. We estimate equation (1) for each firm using data from t=1992-2000. Because expression (1) includes both a lead and a lag cash flow term, this requirement effectively requires that the firm has 11 years of data, 1991-2001.[16]

$$\frac{TCA_{j,t}}{Assets_{j,t}} = \phi_{0,j} + \phi_{1,j}\frac{CFO_{j,t-1}}{Assets_{j,t}} + \phi_{2,j}\frac{CFO_{j,t}}{Assets_{j,t}} + \phi_{3,j}\frac{CFO_{j,t+1}}{Assets_{j,t}} + \phi_{4,j}\frac{\Delta Rev_{j,t}}{Assets_{j,t}} + \phi_{5,j}\frac{PPE_{j,t}}{Assets_{j,t}} + \nu_{j,t} \qquad (1)$$

where $TCA_{j,t}$ = firm j's total current accruals in year t $= (\Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{j,t} + \Delta STDEBT_{j,t})$; $Assets_{j,t}$ = firm j's average total assets in year t and t-1; $CFO_{j,t}$ = firm j's cash flow from operations in year t, $CFO_{j,t} = NIBE_{j,t} - TA_{j,t}$; $TA_{j,t}$ = firm j's total accruals in year t, measured as $(\Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{j,t} + \Delta STDEBT_{j,t} - DEPN_{j,t})$; $\Delta CA_{j,t}$ = firm j's change in current assets (*Compustat* #4) between year t-1 and year t; $\Delta CL_{j,t}$ = firm j's change in current liabilities (*Compustat* #5) between year t-1 and year t; $\Delta Cash_{j,t}$ = firm j's change in cash (*Compustat* #1) between year t-1 and year t; $\Delta STDEBT_{j,t}$ = firm j's change in debt in current liabilities (*Compustat* #34) between year t-1 and year t; $DEPN_{j,t}$ = firm j's depreciation and amortization expense (*Compustat* #14) in year t; $NIBE_{j,t}$ = firm j's net income before extraordinary items (*Compustat* #18) in year t; $\Delta Rev_{j,t}$ = firm j's change in revenues (Compustat #12) between year t-1 and year t, $PPE_{j,t}$ = firm j's gross value of property, plant and equipment (Compustat #7) in year t. Firm-specific estimations of (1) yield a series of firm- and year-specific residuals, which form the basis for the accruals quality measure, $AQ_j = \sigma(\hat{\nu}_{j,t})$. AQ_j is the standard deviation of firm j's residuals, with larger standard deviations indicating poorer accruals quality.

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[16] By using the firm as its own benchmark (as opposed to estimating equation (1) by industry and using an industry-benchmark), we hope to reduce noise in the measure of accruals quality. The tradeoff we face is that the firm-specific approach requires a time-series of observations about each firm (which likely tilts our sample toward large surviving firms), while an industry approach requires only a sufficient size cross-section of firms in a given industry at a point in time (fiscal 2001, in our case). Given that other elements of our research design (notably our cost of capital proxy) also bias our sample toward medium-to-large, healthy firms, we believe that the use of the firm-specific estimation approach provides precision with little incremental restriction on our sample. As a sensitivity test, we repeat our tests using a cross-sectional based measure of accruals quality, equal to the standard deviation of the firm's five yearly residuals from industry-estimated variants of (2). Results, not reported, are similar in all respects to those based on the firm-specific time series estimates of accruals quality.

Our second measure of earnings quality is the standard deviation of the firm's earnings over 1992-2001, *EarnVar*. We define earnings as earnings before extraordinary items, scaled by total assets. Compustat definitions are the same as in the *AQ* estimations described above. Higher values of *EarnVar* indicate poorer earnings quality.

The third earnings quality metric is the absolute value of abnormal accruals generated by the modified Jones approach. To apply the modified Jones model, we estimate the following cross-sectional regression for each of the Fama-French [1997] 48 industry groups with at least 20 firms in year t:

$$\frac{TA_{j,t}}{Asset_{j,t-1}} = \kappa_1 \frac{1}{Asset_{j,t-1}} + \kappa_2 \frac{\Delta Rev_{j,t}}{Asset_{j,t-1}} + \kappa_3 \frac{PPE_{j,t}}{Asset_{j,t-1}} + \varepsilon_{j,t} \tag{2}$$

where $Asset_{j,t-1}$ = firm j's total assets (Compustat #6) at the beginning of year t,
$\Delta Rev_{j,t}$ = firm j's change in revenues (Compustat #12) between year t-1 and year t,
$PPE_{j,t}$ = firm j's gross value of property, plant and equipment (Compustat #7) in year t.

The industry- and year-specific parameter estimates obtained from equation (3) are used to estimate firm-specific normal accruals (*NA*) as a percent of lagged total assets:

$NA_{j,t} = \hat{\kappa}_1 \frac{1}{Asset_{j,t-1}} + \hat{\kappa}_2 \frac{(\Delta Rev_{j,t} - \Delta AR_{j,t})}{Asset_{j,t-1}} + \hat{\kappa}_3 \frac{PPE_{j,t}}{Asset_{j,t-1}}$, where $\Delta AR_{j,t}$ = firm j's change in accounts receivable (Compustat #2) between year t-1 and year t, and to calculate abnormal accruals (AA) in year t, $AA_{j,t} = \frac{TA_{j,t}}{Asset_{j,t-1}} - NA_{j,t}$. The absolute value of the resulting modified Jones measure of abnormal accruals, $\left|AA_{j,t}\right|$, is our third proxy for earnings quality. To make it comparable to the other earnings quality metrics, we average the $\left|AA_{j,t}\right|$ measure (by firm) over the estimation period 1992-2001, thus yielding a firm-specific measure, $\left|AA_j\right|$. (Results, not reported, are similar if we use abnormal accruals from t=2001 as the earnings quality measure.)

Our final earnings quality measure is the common factor score obtained from a factor analysis of *AQ*, *EarnVar* and $|AA|$. The resulting common factor, *CF*(*EarnQual*), retains the ordering of the underlying variables, so larger values of *CF*(*EarnQual*) indicate poorer earnings quality.

Note that all of the earnings quality metrics are estimated over a multi-year period, 1992-2001 (1991-2001 for *AQ*). We believe the use of a multi-year period enhances the construct validity of these earnings quality proxies because the disclosure theories described in section 2 speak to the underlying earnings quality of the firm, not to earnings quality measured in any individual year (which might be influenced by transitory managerial incentives).

3.3. Cost of capital

Our main cost of equity proxy (*CofE*) is derived from Value Line (VL) data on analysts' 4-year out price targets (*TP*), dividend forecasts (*DIV*), and dividend growth rates (*g*). Because they are based on forecasts, not realizations, our *CofE* measures reflect implied cost of equity estimates. Assuming that interim dividends are reinvested at the firm cost of equity capital (*CofE*), Brav, Lehavy and Michaely [2005] arrive at the following expression for the ex ante expected return: $(1+CofE)^4 = \frac{TP}{P} + \frac{DIV\left[\frac{(1+CofE)^4-(1+g)^4}{CofE-g}\right]}{P}$

where *P* = stock price nine days prior to the date of the VL report. For each firm in our sample, we determine the value of *CofE* that satisfies the equality and use this as our estimate of the firm's implied cost of equity capital. The data necessary to calculate *CofE* for each firm is available quarterly. We use the average of the firm's four quarterly estimates of *CofE* in 2001, and note that we draw similar inferences if we use any single quarterly *CofE* estimate.

We use this *CofE* measure, which is also used by Brav, Lehavy and Michaely [2005] and Francis et al. [2004] and is qualitatively the same as the VL *CofE* measure used by Botosan and Plumlee [2002], for two reasons. First, it is essentially identical to the cost of capital measure used in Botosan's [1997] original investigation of cost of capital and disclosure (Botosan and Plumlee [2005]; the identity follows from VL analysts forecasting clean surplus). This correspondence implies that a meaningful comparison can be made between our results and those in Botosan [1997].

Second, the extant literature shows that the VL *CofE* measure has higher construct validity than other implied cost of capital measures. Botosan and Plumlee [2005] compare the construct validity of four proxies for the expected cost of equity (the VL *CofE* estimate, a Gordon growth model estimate, a residual income estimate, and a PEG ratio based estimate). Based on their robust associations with known risk attributes, Botosan and Plumlee conclude that the VL *CofE* estimate and the PEG estimates are reliable cost of capital proxies, and outperform the other approaches. Some researchers argue that a significant association with next year's realized return is another test for construct validity of cost of equity proxies. Francis et al. [2004] report that, for their sample, regressions of VL *CofE* estimates on future one-year returns yield a t-statistic of 17.92 (19.53 for two-year ahead returns; 21.98 for three-year ahead returns). Core et al. [2007] report that the association between VL *CofE* and one-year ahead realized returns is marginally significant (t=1.91). We note further that the significance of these associations (as indicated by the t-statistics reported in both papers) are higher than those obtained using any other implied cost of capital model.[17]

While we believe the literature indicates that the VL *CofE* measure is preferred over other implied cost of capital measures because of both its associations with known risk attributes and its higher (relative to other measures) correlation with future realized returns, we recognize there is no consensus on the best measure of the cost of capital. Consequently, we examine several cost of capital measures: realized portfolio

[17] In particular, Guay, Kothari and Shu [2005] evaluate five other implied cost of capital models developed by Gebhardt, Lee and Swaminathan [2001], Claus and Thomas [2001], Gordon and Gordon [1997], Ohlson and Jüttner-Nauroth [2005] and Easton [2004]. Guay et al.'s evaluations are based upon statistical associations with next year's realized return. For firm-level tests, they report t-statistics of 0.85, 0.06, 0.67, -1.24, and -1.89 for the implied estimates, respectively, from these models' for industry-level tests, the t-statistics are 1.15, 0.58, 0.71, -0.81 and -0.29. Thus, their analyses reject the construct validity of all five models. In an earlier version of this paper (2003), the authors also evaluated the Fama and French [1993] 3-factor model and report t-statistics of 0.69 and -0.54 on the firm and industry level, respectively, thus also rejecting the Fama and French three-factor model. Easton and Monahan [2005] argue, however, that it makes little sense to evaluate implied cost of capital metrics based on next year's realized return if the whole point of developing such metrics is because the realized return is a poor proxy for the expected return due to the former incorporating both cash flow news and risk news (Elton, 1999; Fama and French, 2002; Campbell, 1991)). Easton and Monahan create a "news-purged" measure of return and show that in the broad cross-section of analyst-followed firms, news-purged realized returns are statistically *unrelated* to implied cost of capital estimates from earnings-based models. However, when analyst forecasts are of good quality (i.e., have low ex post forecast errors) all cost of capital models but one have at least a marginally significant positive correlation with news-purged realized returns. Easton and Monahan do not, however, evaluate target-price based models, such as the VL *CofE* model.

returns, realized firm-specific returns, other implied cost of debt and cost of equity estimates. Tests using these measures are reported in Section 6.

4. *Sample and Variable Description*

We begin by identifying all firms with data on the earnings quality measures, cost of equity, and the control variables for our tests, for fiscal year 2001. The control variables are beta (measured as the slope coefficient, *Beta*, obtained from a firm-specific CAPM regression using the 60 months preceding fiscal 2001), size (proxied by the log of the firm's market value of equity, *lnMVE*, measured at the beginning of fiscal 2001), book to market (proxied by the log of the firm's book to market ratio, *lnBM*, measured at the beginning of fiscal 2001), analyst following (proxied by the number of analysts issuing at least one earnings forecast about for the firm, *NAnalyst*, in fiscal year 2001), number of segments in which the firm operates, (*NSegments*), and firm performance (proxied by a firm's return-on-assets, *ROA*, in fiscal year 2001). In total, there are 677 firms with data on all variables. For each of the 677 firms, we read and code annual report and 10-K filings for fiscal year 2001, using the coding scheme described in section 3.1, to create the voluntary disclosure variable, *VolDisc*. Because our firms must be followed by Value Line (to calculate the implied cost of equity capital, *CofE*) and have data for 1991-2001 (to estimate earnings quality metrics), our sample firms are, on average, large and successful.[18] As shown in Table 2, the mean (median) market value of equity of our sample firms is $10.3 billion ($1.7 billion), and the mean (median) return on assets is 0.058 (0.052). Even with the bias toward larger, surviving firms, we note that the standard deviation of firm size and return on assets for our sample are not inconsequential: $36.2 billion (for market value of equity) and 0.072 (for return on assets), indicating substantial variation among our sample firms.

[18] The requirement that a firm have at least 11 years of financial data to estimate earnings quality likely results in a survivor bias; the sample over represents successful firms. To gauge the magnitude of this bias, we compared selected financial data about our sample firms with all Value Line firms and all firms on CRSP/Compustat. The results (not reported) show that our sample is similar in all respects to the Value Line population, but differs from the broader population of CRSP/Compustat firms. The 11-year data requirement therefore does not impose any more selectivity on our sample than does the requirement that the firm be followed by Value Line. The key difference between the CRSP/Compustat population and our sample (or the entire Value Line population) is that our sample contains fewer small and low-profitability firms.

Turning to the voluntary disclosure score, Table 2 reports that the mean and median number of raw disclosure elements reported by our sample firms is 7.98 (8) (of 25 possible); the standard deviation of the raw disclosure elements is 2.97. The minimum raw score is 1 while the maximum is 17 (not tabulated). As noted in section 3.1, we scale the raw disclosure scores by the maximum score of the sample firms (17), to obtain a disclosure score expressed as a fraction (*VolDisc*). For our sample, the minimum value of *VolDisc* is 5.9% and the maximum is 100% (not tabulated). As shown in Table 2, both the mean and median value of *VolDisc* are about 47%, with a standard deviation of 17.5%. Overall, both the raw and scaled data indicate substantial variation in voluntary disclosure levels across the sample firms. Breaking down the *VolDisc* score into its four component categories (defined in Table 1), Table 2 reveals substantial variation in three of the four categories. The exception is Category II (Other Financial Measures) where the majority of firms have no disclosures. We discuss results pertaining to the component scores in section 5.3.

In terms of the cost of equity, our sample's mean (median) value of 16.6% (15.6%) is similar to estimates used in Botosan [1997] who reports a mean of 20.1% for her sample of 122 machining firms in 1991, and in Francis et al. [2004] who show a mean (median) *CofE* for their sample of VL followed firms in 2001 of 16.6% (15.3%). In terms of our proxies for earnings quality, we note first that both the mean and median estimate of accruals quality (*AQ*), of 0.0159 and 0.0123, are smaller than the mean and median firm-specific estimates reported by Dechow and Dichev [2002] and Francis et al. [2004] of 0.028 (0.020) and 0.026 (0.019), respectively. However, the standard deviation of *AQ* for our sample is 0.0143, or over 80% of the mean value, suggests substantial cross-sectional variation in this variable. Our other proxies for earnings quality, *EarnVar* and $\left|AA_j\right|$, exhibit similar distributional properties as *AQ*: their standard deviations (0.0554 and 0.0283 respectively) are large compared to the mean values (0.0494 and 0.0465), indicating non-trivial within-sample cross-sectional variation in earnings quality.

Panel B of Table 2 gives the Pearson (above diagonal) and Spearman (below diagonal) correlations between *AQ*, *EarnVar*, and $\left|AA_j\right|$ and *CF*(*EarnQual*). Correlations between individual metrics are substantial, ranging from 50% to 77% (all significant at the .0001 level). The common factor has high correlations with all underlying metrics; in particular, in no case is this correlation less than 80% (and all are significant at the .0001 level). The latter finding indicates that *CF*(*EarnQual*) is a meaningful representation of the three underlying earnings quality proxies.

As a construct validity test of the earnings quality measures, Panel C, Table 2 reports the results of regressions of each earnings quality metric on factors that have been shown to be determinants of earnings quality: firm size, cash flow variability, sales variability, length of operating cycle, incidence of negative earnings realizations, intangibles intensity, and capital intensity (Dechow and Dichev, 2002; Francis et al., 2004):

$$EarnQual_j = \lambda_0 + \lambda_1 Size_j + \lambda_2 \sigma(CFO)_j + \lambda_3 \sigma(Sales)_j + \lambda_4 OperCycle_j + \lambda_5 NegEarn_j + \lambda_6 IntIntensity_j + \lambda_7 CapIntensity_j + \mu_j \quad (3)$$

where $EarnQual_j$ = the respective earnings quality metric for firm *j* (*CF*(*EarnQual*), *AQ*, *EarnVar*, or *AbsAA*)

$Size_j$ = log of the firm's average total assets (we obtain similar results using sales revenues)

$\sigma(CFO)_j$ = the standard deviation of firm j's cash flow from operations scaled by total assets

$\sigma(Sales)_j$ = the standard deviation of firm j's sales scaled by total assets

$OperCycle_j$ = the log of firm j's operating cycle

$NegEarn_j$ = the number of years where firm j reported negative values of net income before extraordinary items

$IntIntensity_j$ = firm *j*'s average ratio of research and development expense plus advertising expense divided by sales

$CapIntensity_j$ = firm *j*'s average net PP&E as a percentage of total assets

To be consistent with the estimation period used to calculate the earnings quality metrics, the independent variables in equation (3) are measured over 1992-2001. The explanatory power is above 75% for *CF*(*EarnQual*) and *EarnVar*, but even the lowest R^2 (52% for *AQ*) is fairly high. Some of the independent variables are non-trivially correlated, leading to moderate multicollinearity. Generally, however, individual coefficients are in the expected direction: firms with more volatile cash flows and revenues have poorer earnings quality, larger firms generally have better quality, firms with longer operating cycles and more losses tend to have poorer quality, and firms with higher asset intensity have better quality.[19] We

[19] The coefficient on intangible intensity may seem counterintuitive, as it is generally held that firms with more unrecorded assets (such as R&D) have poorer earnings quality. The negative coefficient is, however, an artifact of the

interpret the fact that our earnings quality metrics are well explained by known determinants as indicating that each proxy performs well at capturing earnings quality (at least as documented by prior research).

5. *Empirical Work*

5.1. Tests of the relation between voluntary disclosures and earnings quality

We begin by investigating whether there is a complementary relation (H1a) or a substitutive relation (H1b) between a firm's earnings quality and *VolDisc*. Given the ordering of our variables, H1a translates into a negative association between the earnings quality metrics and *VolDisc*, while H1b implies a positive association. Our tests of H1a and H1b include both unconditional tests and tests that condition on firm characteristics that prior literature has argued are related to firms' voluntary disclosures practices. Following prior literature (for example, Bamber and Cheon [1998]), we include firm size (*lnMVE*) as a control variable for firm-specific factors that influence disclosure policy (for example, proprietary costs). We control for growth by including the logarithm of the firm's book to market ratio, *lnBM* (Bamber and Cheon, 1998; Nagar, Nanda and Wysocki, 2003). Based on prior research showing that analyst following and firm performance are positively related to disclosure quality (Lang and Lundholm, 1993), we include *NAnalyst* and *ROA*. *ROA* also controls for the effects of poor performance on voluntary disclosure, which has been shown to be related to disclosure (Lang and Lundholm, 1993; Skinner, 1994; Nagar et al., 2003). Frankel, McNichols and Wilson [1995] document a positive association between external financing transactions and disclosure activity, arguing that firms raising external funds have incentives to make voluntary disclosures. We control for a firm's financing transaction motives using an equity-financing dummy variable, *Issue*, which equals one if the firm's split-adjusted number of outstanding common shares increased by 20 percent or more in 2001 relative to 2000, and zero otherwise. Finally, we control for firm complexity by including the number of business segments, *NSegments* (Nagar et al., 2003).

correlation structure among the independent variables. When we regress earnings quality on just the intangibles intensity, the coefficient is significantly positive.

We begin by presenting the pairwise correlations between *VolDisc*, earnings quality metrics and other firm characteristics. Panel A, Table 3 shows that all earnings quality metrics exhibit significant *negative* associations with *VolDisc* (p-values of 0.0004 or better), with *CF*(*EarnQual*) having the largest (in magnitude) correlations: -0.1811 (Pearson) and -0.2270 (Spearman). The negative sign indicates that the relation is *complementary* in nature, consistent with H1a – firms with poor (good) earnings quality issue fewer (more) disclosures. Further evidence on the importance of earnings quality in influencing firms' voluntary disclosure decisions is provided in Panel B of Table 3, where we report the results of regressing *VolDisc* on earnings quality metrics and control variables. The results show that the complementary result found in Panel A is unaffected by the inclusion of firm-specific control variables: all measures of earnings quality remain significantly negatively related to *VolDisc* (t-statistics range from -2.19 to -3.61). The last column shows regression results where we substitute decile ranks for the raw values of *CF*(*EarnQual*); again, the inference is unchanged (t-statistic = -4.50). Similar results (not reported) are found for decile rank regressions for the three other earnings quality metrics.

Somewhat surprising is the fact that none of the firm controls, except firm size and number of segments, is significantly associated with firms' disclosure scores at conventional levels. However, our results are consistent with Nagar et al. [2003] who find weak or no associations between AIMR scores and market to book ratios, firm size, number of segments, and equity issuances. Nagar et al. also report no significant associations between management earnings forecast behavior and market to book ratios and stock issuances. Further, several of the firm-specific control variables are likely subsumed in the measures of earnings quality, since the latter are correlated with similar firm characteristics as shown in Panel C, Table 2. As evidence of this conjecture, we note two observations. First, the Pearson correlations among the test and control variables in Panel A show that *CF*(*EarnQual*) exhibits significant (at the 0.05 level or better) pairwise correlations with firm size (*lnMVE*), growth (*lnBM*), external financing (*Issue*), complexity (*NSegments*), and analyst following (*NAnalyst*). Second, results of a regression excluding earnings quality (reported in the column labeled "Base Model" in Panel B) shows that firm size, book-to-market, and to a lesser extent, number of segments and analyst following, are significant in explaining *VolDisc*.

We further examine the sensitivity of these results to two industry adjustments. We begin by repeating our tests including industry indicator variables to capture potential differences in voluntary disclosure practices across industries. For this purpose, we use Fama and French's [1997] 17 industry codes to assign firms to industries (the results of this test are unchanged if we define industry based on two-digit SIC codes). Results (not tabulated) are similar in all respects to those tabled. We also examine a within-industry definition of *VolDisc* where we deduct from firm *j*'s *VolDisc* the median value of *VolDisc* for all firms in firm *j*'s industry. This procedure essentially judges the expansiveness of each firm's disclosures relative to its industry norm, as proxied by the industry median *VolDisc*. Using industry-adjusted scores mitigates concerns that cross-sectional dependencies in disclosure practices within an industry influence the results. We require at least three firms in each industry to calculate the median; all 17 industry groups meet this requirement. Results based on *IndAdj_VolDisc* (not tabulated) are similar in all respects to results based on *VolDisc*.

5.2. <u>Tests of the cost of capital effects of voluntary disclosures</u>

The complementary relation between *VolDisc* and earnings quality found in section 5.1 has implications for interpreting prior studies' tests of the cost of capital effects of voluntary disclosure. Specifically, our finding that firms with the most expansive voluntary disclosures are also those with the best earnings quality is consistent with the view that a lower cost of capital for firms with high levels of voluntary disclosure may not be driven by these firms' disclosure choices, but rather is driven by these firms having better earnings quality. We probe this issue by examining the unconditional cost of equity effects of disclosure (H2) and its conditional effects (H3). For brevity, we tabulate and discuss only results using the common factor variable for earnings quality, *CF*(*EarnQual*); results using the other proxies for earnings quality are similar in all respects.

Table 4 reports the results: the unconditional tests are reported in the columns labeled "*VolDisc,*" and the conditional tests are reported in the columns labeled "Both" (because the regression includes both *VolDisc* and *CF*(*EarnQual*) as independent variables). To show the separate effect of *CF*(*EarnQual*) on *CofE*, we also report results which examine the unconditional cost of equity effects of this variable (column labeled "*CF*(*EarnQual*)"). To assess the sensitivity of our results to outliers, we report results based on regressions based on the raw values of the variables (Panel A) and separately, their decile ranks (Panel B).

We begin by summarizing the results of regressions that exclude other factors known to affect *CofE* (beta, size and book to market); these results are reported in the columns labeled "Excluding Other Risk Factors." The results show a significant unconditional negative relation between *CofE* and *VolDisc* (t-statistic is -2.69 for the raw regression and -2.58 for the decile rank regression). To gauge the economic magnitude of this effect, we note that the coefficient estimate on *VolDisc* in the decile rank regression, of -0.0022, implies a difference of 1.98 percentage points (0.0022 times nine deciles) in the annual cost of equity between firms with the least and the most expansive disclosures. As is evident from the unconditional results for *CF*(*EarnQual*), poor earnings quality has a substantially larger effect on the cost of equity than does poor disclosure. Specifically, the coefficient estimates on *CF*(*EarnQual*) are highly significant (the t-statistics are 7.06 and 8.65 for the raw and rank regressions, respectively), with the magnitude of the decile rank coefficient suggesting a 6.66% difference in cost of equity (0.0074 times nine deciles) between the poorest and best earnings quality firms. More importantly, the conditional tests show that when both *VolDisc* and *CF*(*EarnQual*) are included in the regression, *VolDisc* is no longer significant in explaining *CofE* (t-statistic = -1.46 for raw regression, -0.72 for decile rank regression); in contrast, *CF*(*EarnQual*) remains reliably positive (t-statistic = 6.68 for raw regression, 8.27 for decile rank regression). Together with the complementary relation between *VolDisc* and *CF*(*EarnQual*) documented in Table 3, these results suggest that a finding of discounted cost of equity for high disclosure firms is not driven by their disclosure choices, but rather is driven by their better earnings quality.

Because a cost of capital effect may be priced by known asset pricing models, we also report tests that include known risk factors: *Beta*, size ($lnMVE_j$) and book to market ($lnBM_j$). The results are shown in the Table 4 columns labeled "Including Other Risk Factors." We note first that the results of regressions show that *CF*(*EarnQual*) is distinct from known risk factors (similar to results reported by Francis et al., 2004, 2005). The second observation is that *VolDisc* is not significant in any of the regressions. This finding is consistent with Graham, Harvey and Rajgopal's [2005] survey evidence showing that financial executives ranked a desire to reduce the company's cost of capital 10th among the 11 motives for voluntary disclosure. (The number one motive for voluntary disclosure was a desire to promote a reputation for transparent and accurate reporting.)

The insignificance of *VolDisc* in the regressions which include other risk factors (but which exclude *CF*(*EarnQual*)) suggests the possibility that other risk factors explain some of the same cross-sectional variation in cost of equity as does *CF*(*EarnQual*). Support for this conjecture can be found in Francis et al. [2005], who document that earnings quality measures are significant determinants of beta, size loadings, and, to a lesser extent, book-to-market loadings in cost of equity regressions. This finding suggests that it is the earnings quality aspect of the risk factor loadings which causes *VolDisc* to be insignificant when *Beta*, *lnMVE*, and *lnBM* are included as independent variables. We investigate this possibility by examining whether the portion of the risk factors that is *not* explained by *CF(EarnQual)* (determined by orthogonalizing *Beta*, *lnMVE*, and *lnBM* with respect to *CF(EarnQual)*) captures the pricing effects of *VolDisc*. Consistent with the earnings quality component of the risk factors influencing the loading on *VolDisc*, Panel C shows that when the orthoganalized portion of *Beta*, *lnMVE*, and *lnBM* are included as conditioning variables, *VolDisc* exhibits a statistically weak negative association with *CofE* (for the raw regression, the t-statistic = -1.72; for the decile rank regression the t-statistic -1.61). However, when *CF(EarnQual)* is added as an independent variable, the coefficient on *VolDisc* declines to zero (t-statistics are -0.30 and 0.10 for the raw and decile rank regressions, respectively).

As a final test, we investigate the effect of analyst following. Botosan [1997] finds that firms with low analyst following have a significant negative association between *CofE* and her self-constructed voluntary disclosure score, controlling for beta and size. Following her methodology, we include a variable capturing whether the firm's analyst following is below (above) the sample median (*Analyst* = 1 if below median, 0 otherwise) and the interaction of *Analyst* and *VolDisc*, *Analyst**VolDisc*.[20] Results (not reported) show no significant associations between *CofE* and either *Analyst* or *Analyst**VolDisc*. The coefficient estimates on all other variables retain their signs, significance, and magnitudes.

[20] The sample mean (median) analyst following is 8 (6), with a range of zero to 46 and a standard deviation of 8.

On the whole, our results show that earnings quality has a first order effect on cost of capital, while voluntary disclosure has no significant and distinct influence on the cost of capital.

5.3. Analysis of the components of *VolDisc*

As discussed previously, *VolDisc* comprises information elements in four categories: (I) summary of historical results, (II) other financial measures, (III) non-financial measures, and (IV) projected information. A key difference across the categories is that Categories II, III and IV represent information that is not easily discernible from other sources (e.g., the firm's weighted average cost of capital, its market share or forecasted sales), whereas the Category I elements are available to or readily calculable by investors (e.g., sales revenues or net income for prior quarters). Given this difference, we expect that Category I disclosures convey the least information and, therefore, have the smallest cost of capital effect.

Descriptive information about the component scores is reported in Table 2. These data show substantial cross-sectional distribution in categories I, III, and IV; category II has (only) three disclosure elements and while the distribution for this component spans the minimum of 0 to the maximum of 3 (not reported), most firms (85%) report none of the three items. Table 5, Panel A reports pairwise correlations among the total and component *VolDisc* scores. Turning first to the correlation with the total score, we note that the correlations are positive and substantial for categories I, III, and IV (ranging from 0.5189 to 0.6758); predictably, given the distributional properties noted above, these correlations are lower for category II (0.2768 and 0.2596). There is a low-to-modest correlation among component scores (ranging between 0.0064 and 0.2174), consistent with across-firm variation in disclosure choices.

Panel B, Table 5 repeats our tests of the association between voluntary disclosure and *CF(EarnQual)*, except we substitute the component scores for *VolDisc*; for comparison, we report the *VolDisc* result in the left-most column. While all component scores show a negative relation with *CF(EarnQual)*, the coefficients are reliably negative only for Category II and III scores (t-statistics of –2.94 and –5.87, respectively). Category I and IV disclosures have no discernible *CofE* effect. Further tests (not reported) show that the inclusion of control variables does not affect these findings. Panel C repeats the tests examining the association between voluntary disclosure and *CofE*, substituting the component scores for

VolDisc. Consistent with the results in Panel B, we find that the coefficient estimate relating the component score to *CofE* is significantly negative for Category II disclosures (t-statistic –2.16) and Category III disclosures (t-statistic –2.57). To assess whether the coefficients on different categories are statistically different from each other we estimate a multivariate regression, where *CofE* is regressed on all four disclosure categories. Results (not tabulated) show that the cost of equity effect of Category I and IV disclosures are statistically indistinguishable from each other (p-value = 0.75). The same holds for the cost of equity effect of Category II and III disclosures (p-value 0.91). Comparisons of the cost of equity effect of Category I and IV disclosures on the one hand and Category II and III on the other show that the cost of equity effects of Category I and IV disclosures are reliably smaller (at the 10 percent level or better) than the cost of equity effects of Category II and III disclosures (the exception is Category II compared to Category IV where the p-value is 11.5 percent). Additional tests (not reported) show that Category II and III scores behave like the total *VolDisc* score in all respects (e.g., conditioning on other control variables).

We conclude from the *VolDisc* component analysis that: (i) there is heterogeneity among firms in what type of disclosures they make in their annual filings; (ii) firms with good earnings quality primarily make disclosures which are otherwise not easy (or perhaps even possible) for investors to infer from other sources; and (iii) it is precisely these difficult-to-discern disclosures that drive the significant cost of equity effect found in the unconditional tests.

5.4. Summary

Overall, we believe the results in Tables 3-5 are consistent with the following conclusions. First, *VolDisc* is increasing in the firm's earnings quality: firms with better earnings quality issue more expansive voluntary disclosures than firms with poorer earnings quality. Second, given this complementary relation, it is not surprising that we document a significant negative association between the level of a firm's voluntary disclosure and its cost of equity, unconditional on earnings quality. Third, and consistent with the first result, when *CF(EarnQual)* is included as an explanatory variable, the negative association between *CofE* and *VolDisc* disappears. We note that the fact that we do not find a cost of equity effect for voluntary disclosure in the presence of earnings quality does not necessarily imply that no effect exists; as with any empirical study documenting a null result, it is possible that measurement errors in our test variables explain the absence of a meaningful conditional pricing effect.

6. *Additional Tests*

We investigate the sensitivity of our findings to three research design choices: the use of the VL *CofE* measure, the measurement of earnings quality, and the focus on self-constructed voluntary disclosure scores derived from annual filings. In terms of the cost of equity issue, we examine whether our results are robust to using ex post (i.e., realized returns-based) as well as ex-ante measures of the cost of equity, and whether ex-ante results are robust to different ex ante cost of capital measures.

6.1 Alternative cost of capital measures

6.1.1 Realized returns

As discussed earlier, the issue of whether ex-ante (i.e., implied) or ex-post (i.e., realized returns-based) cost of capital proxies are preferred remains controversial. Because the purpose of our paper is not to weigh in on this debate, we present sensitivity tests based on realized returns, using both a portfolio design and a firm-specific design. Before embarking on these tests, we believe a caveat is warranted. Specifically, while the empirical asset pricing literature often uses average subsequent realized returns to proxy for expected returns in large-sample studies (e.g., Fama and French [1992], [1993]), caution should be exercised when the sample is limited, as it is in our case.

We use the firm's subsequent daily stock returns for all trading days over a two-year interval: between July 1, 2002, and June 30, 2004; this interval allows for some firms' fiscal years ending as late as May 2002. To avoid the methodological problems associated with compounding returns for periods longer than a month (Fama [1998]; Mitchell and Stafford [2000]), we employ a calendar-time portfolio regression approach. Specifically, we form a *Hi-Lo VolDisc* portfolio that takes a long position in the 20% of firms with the highest *VolDisc* score (i.e., firms with the most expansive disclosures), and a short position in the 20% with the lowest *VolDisc*. Similarly, we form a *Hi-Lo CF*(*EarnQual*) portfolio that is long in the 20% of firms with the highest *CF*(*EarnQual*) (i.e., firms with the poorest earnings quality) and short in the 20% of firms with the lowest *CF*(*EarnQual*). The long-short ordering of each portfolio maintains consistency with our main tests, in that we expect the *Hi-Lo VolDisc* portfolio to have a negative average realized return (because high disclosure firms should have lower returns, on average, than low disclosure firms), and we expect the *Hi-Lo CF*(*EarnQual*) portfolio to have a positive average realized return (because poor earnings quality firms should have higher cost of equity than good earnings quality firms).

Panel A of Table 6 shows the average daily and annualized return for the *Hi-Lo* portfolios, as well as for the excess market return (*RMRF*) and the Fama-French [1992, 1993] size and book-to-market factors (*SMB* and *HML*). The realized returns for both *Hi-Lo* portfolios are in the predicted directions: high disclosure firms have a lower average return than low disclosure firms, with an annualized difference of -5.99% between the top and bottom quintiles; separately, good earnings quality firms have a higher average return than poor earnings quality firms, with an annualized difference of +10.91% between the top and bottom quintiles. The market risk premium and size premium are in the expected directions (10.76% and 7.82%, respectively), while the book-to-market factor is slightly negative for our sample period (-0.57%).

We next regress the daily *Hi-Lo VolDisc* return on the daily *Hi-Lo CF*(*EarnQual*) return. As expected given the complementary relation found in our main tests, Table 6, Panel B shows that this association is reliably negative (t=-33.26, R^2=0.6894). We further note that the intercept in this regression is indistinguishable from zero, consistent with there being no distinct *VolDisc* effect once one controls for earnings quality.

Over a finite time interval, the realized return to the *Hi-Lo* portfolios could be due to either expected return differentials, abnormal return differentials, or both. To probe the source of these differences, we examine changes in factor loadings resulting from conditioning on earnings quality. The columns labeled "CAPM" in Panel B of Table 6 show how *Hi-Lo CF*(*EarnQual*) influences the *VolDisc* effect on beta. Here we begin by regressing *Hi-Lo VolDisc* on *RMRF*, where we find that the coefficient estimate (beta) is -0.2535 (t=-15.47); this result suggests that high disclosure firms have significantly lower betas than low disclosure firms, consistent with high disclosure firms having a lower CAPM cost of capital (similar to the results in Table 4 for implied cost of equity). When we add *Hi-Lo CF*(*EarnQual*) to the regression (results reported in next column), we find that the beta differential declines by roughly 70%, from -0.2535 to -0.0731 (although remaining statistically significant with a t-statistic of -5.55). The same pattern of factor loading differentials emerges for Fama-French three-factor loadings (reported in the columns labeled “3 factor model”). Specifically, the loadings on *RMRF*, *SMB* and *HML* are significant and of the expected sign, i.e., high disclosure firms have lower loadings than low disclosure firms on the *RMRF* and the *SMB* factors, and a higher loading on the *HML* factor. Since the *RMRF* and the *SMB* factor had positive factor premiums during this period and the *HML* factor had a negative factor premium (see Panel A), all three factor loadings indicate that high disclosure firms had lower 3-factor realized returns than low disclosure firms. When we add *Hi-Lo CF*(*EarnQual*) to the regression, the loadings on all three factors diminish in absolute magnitude by between 55% and 69%, indicating that the cost of equity effect of disclosure is substantially reduced in the presence of earnings quality. To gauge the economic magnitude of these results, we multiply the factor loadings by the annualized factor premiums from Panel A. Without the control for earnings quality, the cost of equity differential between high and low disclosure firms is −5.95% (= [−0.2328]×10.7616% + [−0.4084]×7.8244% + 0.4295×[−0.5748%]; this differential is very close to the raw *Hi-Lo VolDisc* value of -5.99% reported in Panel A. The differential declines to −2.47% (= [−0.1041]×10.7616% + [−0.1623]×7.8244% + 0.1346× [−0.5748%]) when we control for earnings quality.

The above realized returns test is based on portfolio returns and factor loadings; it is a traditional test in the sense that it *presumes* the validity of standard asset pricing models such as the CAPM and the 3-factor model, i.e. it takes the significance of the factor premia for granted. It does not, therefore, jointly test individual firms’ factor loadings and the significance of the factor premia. To investigate this issue further, we next conduct a two-stage test, similar to the two-stage test proposed by Core, Guay and Verdi [2007]. In the first stage regression we regress excess daily returns on *Hi-Lo VolDisc,* and then incrementally add *Hi-Lo CF*(*EarnQual*) (to control for earnings quality), *RMRF* (to control for the CAPM) and SMB and HML (to control for the 3-factor model). For brevity, we report only the formula for the 3-factor model:

$$R_{it} - R_{Ft} = a_i + d_i \, HiLoVolDisc_t + e_i \, HiLoCF(EarnQual)_t + \\ + b_i \, RMRF_{it} + s_i \, SMB_{it} + h_i \, HML_{it} + \zeta_{it} \qquad (4a)$$

In the second stage, we collect the firm-specific loadings from (4a) and estimate the factor premia conditional on the first stage loadings, by regressing the mean daily excess return over the sample period on the parameter estimates from the first stage regression:

$$\overline{R_i - R_F} = \alpha_i + \delta \hat{d}_i + \varepsilon \hat{e}_i + \beta \hat{b}_i + \sigma \hat{s}_i + \theta \hat{h}_i + \xi_i \qquad (4b).$$

The second stage parameter estimates represent the two-stage estimates of the factor premia over the sample period. The results are tabulated in Panel C of Table 6. The first two columns marked 'Excluding other risk factors' show that the average daily premium for *VolDisc* is negative, as expected, and significant (t=-6.35). When we include *CF*(*EarnQual*), the coefficient estimate for *VolDisc* is cut in half and its significance drops to a t-statistic of -2.79. The coefficient for *CF*(*EarnQual*) is positive as expected with a t-statistic of 6.52. The magnitude is similar to the raw *CF*(*EarnQual*) value reported in Panel A of Table 6. As the remaining columns in Panel C show, including controls for the CAPM and the 3-factor model do not meaningfully change these results.[21]

Overall, we interpret the results reported in Table 6 as consistent with the implied cost of equity results shown in Table 4. Specifically, there is a non-trivial difference in ex post returns between high and low disclosure firms, and this differential is substantially reduced when earnings quality is introduced. Specifically, (i) factor loadings in asset pricing models (CAPM or three factor model) decrease substantially in the presence of controls for earnings quality, and (ii) two-stage estimates of the return premium due to disclosure are halved, both in absolute magnitude and statistical significance, in the presence of controls for earnings quality.

6.1.2 Alternative implied cost of capital metrics

[21] The estimated premia for *RMRF* and *HML* are insignificant in the second stage regression, whereas the *SMB* premium is reliably positive. This test, therefore, does not confirm the empirical validity of the CAPM or the Fama-French 3-factor model over our (short) sample period. This result is not an artifact of our sample, as Core, Guay and Verdi [2007] find equally weak results when they implement a monthly- returns version of the two-stage test over a much longer time period. In particular, they find that only *HML* is priced as expected.

The main implied cost of capital tests in Table 4 use the Value Line implied cost of capital proxy (VL *CofE*). As described earlier, we choose this model because extant tests of the validity of implied cost of capital estimates show that this proxy has higher construct validity than other measures. Notwithstanding this evidence, we investigate the sensitivity of our main results to two other ex-ante cost of capital metrics: debt ratings (an ex-ante cost of debt measure) and PEG ratios (an alternative ex-ante cost of equity measure, as developed in Easton [2004]). We use debt ratings because it allows us to side-step the debate about which is the 'best' ex-ante cost of equity proxy, and because Sengupta [1998] concludes that disclosure quality (as measured by AIMR scores) is negatively associated with cost of debt. We use PEG ratios, because Botosan and Plumlee [2005] find that the PEG ratio metric, along with the VL *CofE* metric, has demonstrable construct validity as an implied cost of capital measure. Easton and Monahan [2005], however, do not find that the PEG ratio metric has construct validity in the broad cross-section of analyst-followed firms; however, they conclude that it is a valid proxy when analyst earnings forecasts are accurate.[22]

For the debt rating test, we use S&P Credit Ratings as available on Compustat. Debt ratings can range from AAA (highest quality) to D (default). We re-code the Compustat data to remove unassigned and similar codes, as shown in the Appendix. We lose firms that have no debt ratings, and the resulting sample size is n=411. The results, which are tabulated in Panel A of Table 7, show that there is a significant unconditional relation between *VolDisc* and debt ratings (t=-3.77, R^2=0.0313). *CF*(*EarnQual*) is more strongly related with debt ratings (t=9.64, R^2=0.1834). When we include both *VolDisc* and *CF*(*EarnQual*) in the regression, the absolute magnitude of the *VolDisc* coefficient diminishes from -3.15 to -2.05; however *VolDisc* remains statistically significant. These effects may be overstated because the tests do not control for the effects of other factors known to affect the cost of debt in general and debt ratings in particular. Apart from general cost of capital determinants such as beta, size and book-to-market, other factors are financial leverage, return on assets, and interest coverage (Kaplan and Urwitz [1979]; Palepu, Healy and Bernard

[22] Other implied cost of equity models are rejected both by Botosan and Plumlee [2005] and by Easton and Monahan [2005].

[2000]).[23] When we include these control variables, the explanatory power increases substantially, to between 54 and 60 percent. *VolDisc* remains significant when *CF*(*EarnQual*) is not included in the regression (t=-2.31), but loses significance when *CF*(*EarnQual*) is introduced (t=-1.56). *CF*(*EarnQual*) remains highly significant regardless of specification (the t-statistic is never lower than 8.83). Overall, we interpret the debt ratings test as providing evidence consistent with the main results: both *VolDisc* and *CF*(*EarnQual*) are significant individually, but *VolDisc* loses some of its effect when *CF*(*EarnQual*) is introduced, both in settings with and without control variables.

We implement the *PEG* ratio based implied cost of equity (r_{PEG}) model as in Botosan and Plumlee [2005]:

$$r_{PEG} = \sqrt{\frac{eps_5 - eps_4}{P_0}} \tag{5}$$

Botosan and Plumlee use the 5- and 4-year out EPS forecasts because they better meet the sample inclusion criteria for most firms (positive earnings and positive earnings growth) than do near-term forecasts. Guay, Kothari and Shu [2005] use a similar implementation. Our results are not sensitive to whether we use near-term or long-term EPS forecasts. The r_{PEG} results are tabulated in Panel B of Table 7. Because of the sample inclusion requirements, the sample size in this test is n=623. While the coefficient is negative, this test does not indicate a statistically significant unconditional *VolDisc* effect on cost of capital. The *CF*(*EarnQual*) effect, however, is similar in terms of significance to the effect demonstrated in the main test in Table 4. This result is robust to the inclusion of other risk factors.

Unlike the VL *CofE* tests (and also unlike the debt rating tests, the portfolio-based realized returns tests, and the two-stage firm-specific realized returns test), the r_{PEG} test does not show a significant unconditional *VolDisc* effect. To probe the relative construct validity of the VL *CofE* measure (which we use in our main tests) and the r_{PEG} measure we first note that they are similar in their exposure to traditional risk measures. The risk loadings for the VL *CofE* measure in Table 4 show that VL *CofE* is positively

[23] Earnings volatility is an additional factor known to influence debt ratings. Since earnings volatility is included as one of the earnings quality components in *CF*(*EarnQual*), the significant coefficient on *CF*(*EarnQual*) is expected. However, even when we include earnings volatility as a separate control variable, the coefficient on *CF*(*EarnQual*) remains significant despite non-trivial multicollinearity.

related to beta, negatively related to firm size, and positively related to the book-to-market ratio. The same is true for the r_{PEG} loadings in Table 7. Second, we regress the average monthly return over the next year on the two implied cost of equity measures (not tabulated). When we regress realized return on VL *CofE* the t-statistic is 2.98, whereas the regression of r_{PEG} on realized return yields a t-statistic of -0.45. Thus, validity tests conducted on our relatively limited sample yield the same inferences as in prior studies' large-sample tests: both VL *CofE* and r_{PEG} are related to known risk proxies in the expected direction (Botosan and Plumlee [2005]), r_{PEG} does not show any relation with subsequent realized return (Easton and Monahan [2005], Guay, Kothari and Shu [2005]), whereas VL *CofE* shows a significant relation with realized return (Francis et al. [2004], Core, Guay and Verdi [2007]). The evidence on the construct validity of r_{PEG} is therefore mixed, both in our sample and in prior large sample studies, making – we believe – the r_{PEG} results less reliable.

6.1.3 Summary of alternative cost of capital tests

The alternative tests are consistent with three observations. First, unconditionally, cost of capital is negatively associated with *VolDisc*, when cost of capital is measured using (a) VL's implied cost of capital measure (a cross-sectional test), (b) portfolio realized returns (a time-series test), (c) individual firm realized returns in a two-stage test (a mixed time-series and cross-sectional design), (d) debt ratings (a cross-sectional test), but not when cost of capital is (e) implied from PEG ratios (a cross-sectional test). Second, across all cost of capital measures considered, poorer earnings quality firms have significantly higher cost of capital. Third, when voluntary disclosure and earnings quality are jointly considered, the unconditional *VolDisc* effect on cost of capital is in all cases substantially reduced, and is insignificant in many cases.

6.2 Alternative earnings quality proxies and causation

Our second set of sensitivity tests examines other proxies for earnings quality and sheds light on the direction of causation; i.e., whether earnings quality results in greater disclosure or vice-versa. In Table 3, we show that the relation between *VolDisc* and earnings quality is the same regardless of which proxy we use for earnings quality. For brevity, we do not tabulate the cost of equity results for all earnings quality proxies, but results are similar in all cases to those reported for *CF(EarnQual)*.

Next, we decompose our earnings quality metric into two components; one, the *innate* earnings quality, (i.e., quality associated with the firm's production function, competitive environment, and business model, and therefore largely outside of management's short-term control) and *discretionary* earnings quality (earnings quality under more immediate management control). We separate the two components of earnings quality by regressing *CF*(*EarnQual*) on the set of innate factors, as described in section 4, equation (3), and tabulated in Table 2, Panel C. We retain the predicted value from this regression as the proxy for innate earnings quality, $CF(EarnQual)^{Innate}$ and use the residual as the proxy for discretionary earnings quality $CF(EarnQual)^{Discr}$. Following Francis et al. [2004, 2005] who use a similar procedure to separate the two components, we view innate earnings quality as less of a choice and more an exogenous variable related to a firm's (arguably more time-invariant) fundamentals, and discretionary earnings quality as largely a choice made by the firm.

We next regress $CF(EarnQual)^{Discr}$ on *VolDisc* and find no significant relation (t-statistic = -0.98, results not tabulated). We then regress *VolDisc* on $CF(EarnQual)^{Innate}$ and $CF(EarnQual)^{Discr}$, one at a time as well as jointly, with and without the control variables used in Table 3, Panel B. $CF(EarnQual)^{Innate}$ is significant in all cases (its t-statistic ranges from -3.46 to -5.56 depending on the test specification), whereas $CF(EarnQual)^{Discr}$ is never significant (no t-statistic exceeds one in absolute value). Results, not tabulated, are very similar for the other earnings quality metrics. We interpret these results as implying that innate earnings quality is more likely to be a determinant of voluntary disclosure than is voluntary disclosure likely to be a determinant of discretionary earnings quality. As always, however, caution is warranted in statements about causation. In this case, the interpretation hinges on the specification of the innate and discretionary components, and that there are no additional variables that, if omitted, would systematically change the results.[24]

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[24] The earnings quality metrics may be influenced by corporate events during the estimation period, most notably merger and acquisition (M&A) activity. To gauge the sensitivity of our results to this issue, we obtained M&A data from the Thomson SDC data base for our sample firms over 1991-2001 (the earnings quality estimation period).

6.3 Alternative measures of voluntary disclosure

Our final analysis explores other measures of voluntary disclosure, notably management forecast behavior, number of firm-initiated press releases, and conference call activity.[25] In contrast to the sensitivity tests examining alternative proxies for cost of equity and earnings quality, we have no a priori reason for believing that management forecasts, press releases or conference calls should exhibit predictable correlations with earnings quality or with cost of equity. In particular, there is little extant evidence about whether different types of voluntary disclosure capture similar constructs; an exception is Botosan's [1997] correlation of her score with AIMR scores.[26] Our study provides evidence on these correlations and examines the behavior of each disclosure type with respect to earnings quality and the cost of equity. An important contribution of this extension is that we maintain the same sample of firms; hence, any differences found across forms of voluntary disclosure cannot be attributed to differences in the power of the tests, the time period studied, or to the composition of firms comprising the sample.

Management forecasts are from First Call. For each firm, we construct a management forecast score (*MFS*) as follows. If the firm provides no forecast guidance in 2001, we assign a value of *MFS*=0. If guidance is provided but the forecast is purely qualitative (i.e., no point estimate or range is given), we assign a value of *MFS*=1 to the forecast. If a range estimate is given, we assign a value of *MFS*=2 to the forecast. If a point estimate is given, we assign a value of *MFS*=3 to the forecast. To ensure the quality of the coding, we manually read each company's guidance. We sum the values over all forecasts made by the firm in 2001, to generate their final *MFS* score.[27] Data on press releases are hand-collected from Factiva. We search for all

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Because much of the M&A activity is minor, we define a significant acquisition as one where the price paid for the target firm is at least 10% of the beginning-of-year market value of the acquiring firm. Using this definition, 96 of our 677 sample firms had significant M&A activity. We repeat our tests excluding these 96 firms and find results very similar in terms of both magnitude and statistical significance.

[25] We cannot examine AIMR scores for our sample because the Association for Investment Management and Research (AIMR) ceased preparing these scores in 1996/1997.

[26] Botosan [1997] reports an insignificant correlation between her self-constructed disclosure score and AIMR scores for a sample of 24 machining firms where both measures are available. Excluding two firms viewed as outliers, she finds a significant (at the 0.04 one-tailed level), positive correlation. She notes (footnote 17 of her paper) that these results should be interpreted with care both because of the small number of observations and because of the difficulty in benchmarking the expected magnitude of any correlation given that it is not clear that AIMR scores are appropriate benchmarks for self-constructed scores.

[27] We also examine the firm's maximum forecast *MFS* score; results are similar and not tabulated.

press-releases pertaining to each sample firm (using variants of the firm's name and ticker symbol to ensure completeness); we use the total number of press releases made in calendar year 2001 as the measure of the firm's press release activity (*PR*). Data on conference calls are from BestCalls.com and First Call Historical Database. Our proxy for conference call activity is the number of conference calls held by the firm in 2001, *NCalls*. Due to the skewness in each of these variables, we use the log transformation of one plus the variable score in our tests.

Table 2 describes the distribution of the raw and logged values of *MFS*, *PR* and *NCalls*. Most sample firms (69.4%; not tabulated) supplied some form of management forecast guidance in 2001; the mean value of *MFS* is 6.03 and the median is 4. All but two firms had at least one press release on Factiva (not tabulated), with the mean and median value of *PR* being 90.82 and 38, respectively. The average (median) number of conference calls was 4.5 (4). The pairwise correlations among *VolDisc*, *log(1+MFS)*, *log(1+PR)* and *log*(*1+NCalls*), as well as between each of these variables and *CF(EarnQual)*, are reported in Panel A, Table 8. We first note that the correlations between *log(1+MFS), log(1+PR)* and *log(1+NCalls)* (ranging from 0.18 to 0.45, all significant at the 0.0001 level) are higher than is the correlation between any of these measures and *VolDisc* (where the largest correlation is 0.0785 and most are insignificantly different from zero). This finding suggests that the voluntary disclosure construct captured by disclosures in annual filings is distinct from that captured by management forecast, press release, or conference call activity. We also note that in contrast to the significant negative association found between *VolDisc* and *CF(EarnQual)*, the other voluntary disclosure proxies exhibit either a positive, or no, relation with earnings quality.

In terms of associations with the cost of equity, Panel B (*MFS* results) and Panel D (*NCalls* results) show that, unlike the prior results for *VolDisc*, management forecast and conference call behavior are unconditionally *positively* related to the cost of equity. That is, greater forecasting activity and more conference calls are associated with *larger* values of *CofE*. This positive association maintains in conditional tests which control for earnings quality as well as other risk factors.[28] In contrast, Panel C (*PR* results) shows that press release behavior is unrelated to the cost of equity in both unconditional and conditional tests.[29]

In summary, sensitivity tests indicate that our main findings – of a complementary relation between voluntary disclosure and earnings quality (H1a), a negative unconditional cost of equity effect for voluntary disclosure (H2), and an insignificant cost of equity effect for voluntary disclosure conditional on earnings quality (H3) – are robust to alternative proxies for cost of equity and for earnings quality. However, when we use other proxies for voluntary disclosure (management forecast behavior and conference call activity) we find weak evidence of a *substitutive* relation between these forms of voluntary disclosure and earnings quality (H1b), a *positive* unconditional cost of equity effect, and no evidence that conditioning on earnings quality influences the cost of equity effect.

A potential explanation for the differing results across our proxies for voluntary disclosure is that they are all simply measures of different *forms* of voluntary disclosure: forward looking information supplied by management; contemporaneous discussion of results in conference calls; an overall index of voluntary disclosure in mandatory filings. Each form is characterized by qualitatively different content and, presumably, different intentions on the part of management. We therefore believe the sensitivity of results to differences in the proxy for voluntary disclosure indicate that more work is needed to understand the nature, sources and implications of differences among forms of voluntary disclosure. While such work could begin with comparisons such as ours', we believe those comparisons will necessarily be context- and decision-specific, because we are aware of no single criterion, or set of criteria, against which various voluntary disclosure proxies can be evaluated. However, future work could shed light on research contexts, and decision contexts, in which one proxy, or one type of proxy, is superior. For example, under what

[28] Botosan and Plumlee [2002] document a positive association between cost of equity and the interim report sub-component of the AIMR ratings. An explanation for our finding of a positive association between *CofE* and *MFS* is provided by the empirical management forecasting literature which documents that, on average, management forecasts contain more bad news than good news, attributable at least in part to a desire on the part of forecasting firms to reduce expected litigation costs and/or reputation costs from surprising market participants with bad news (Skinner, 1994], Kasznik and Lev, 1995; Brown, Hillegeist and Lo, 2005). To the extent litigation and reputation costs are higher for firms experiencing operational or financial trouble, we would expect greater management forecast activity to be associated with a higher cost of capital.

[29] Results are similar if we include all variables in one regression rather than test each individually. Specifically, *MFS* and *NCalls* are significantly related to *CofE* even in the presence of control variables whereas *VolDisc* and *PR* are not.

circumstances is an index that aggregates across multiple topics preferred to a point estimate for a given item? When is forward-looking information preferred? Does the medium of communication (written in a 10-K versus spoken in a conference call) matter? Are different forms of voluntary disclosure designed to achieve different goals? Although we believe *VolDisc* is the best measure for our setting (for the reasons described in section 3.1), we caution that other settings may call for other measures that might yield different interpretations.

7. *Summary and Conclusion*

We provide empirical evidence on two aspects of firms' voluntary disclosure decisions: (1) how voluntary disclosure relates to earnings quality; and (2) whether and how voluntary disclosures are priced by the market. For both questions, we use a self-constructed score of voluntary disclosures of financial information included in firms' annual filings. With regard to the first question, we find a significant complementary association: firms with better (worse) earnings quality have more (fewer) voluntary disclosures. With regard to the second question, we find a significant negative relation between voluntary disclosure and proxies for the cost of capital unconditional on earnings quality. Given the complementary relation between voluntary disclosure and earnings quality, we find that the cost of capital effect for voluntary disclosure is substantially reduced or disappears completely when we condition on earnings quality. These findings highlight the role of earnings quality in influencing voluntary disclosure decisions and their perceived outcomes.

Our results are generally robust to alternative measures of earnings quality and cost of capital;[30] they are, however, sensitive to the proxy used for voluntary disclosure. Specifically, we find that a self-constructed index based on voluntary disclosures contained in annual filings behaves differently from proxies for voluntary disclosure that are linked to management forecasts, conference calls or press releases. The former two (management forecasts and conference calls) generally show opposite relations to those found for

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[30] The one exception is that for one of the five cost of capital measures (r_{PEG}) there is no unconditional cost of capital effect of voluntary disclosure, although the earnings quality effect is consistent across all five cost of capital measures.

the index, while the last (press releases) shows no meaningful associations with either earnings quality or cost of capital. Because our tests of these alternative forms of disclosure are conducted on a relatively large sample of firms whose composition does not vary across tests, our design mitigates the possibility that these results are due to differences in sample size, time period or sample composition. We view the exploration of the differences found across voluntary disclosure forms as providing a rich avenue for further research.

Appendix: Debt Rating Scores

S&P Debt Rating	Compustat numerical code(s)[31]	Our debt rating score, *DebtRating*
AAA	2	1
AA+	4	2
AA	5	3
AA-	6	4
A+	7	5
A	8	6
A-	9	7
BBB+	10	8
BBB	11	9
BBB-	12	10
BB+	13	11
BB	14	12
BB-	15	13
B+	16	14
B	17	15
B-	18	16
CCC+	19	17
CCC or CC	20,23	18
C	21,24	19
D or SD	27,29,90	20

[31] Compustat data item #280.

Table 1
Description of Coding Scheme Used to Analyze Annual Reports and 10-K Filings

I. Summary of historical results

a. Return on assets or sufficient information to compute ROA (net income, tax rate, interest expense and total assets)
b. Net profit margin or sufficient information to compute PM (net income, tax rate, interest expense and sales)
c. Asset turnover or sufficient information to compute TAT (sales and total assets)
d. Return on equity or sufficient information to compute ROE (net income and total equity)
e. Number of quarters that firm discloses sales and net income
f. Trends in the industry
g. Discussion of corporate strategy

II. Other financial measures

a. Free cash flow (or cash flow other than those reported in SCF)
b. Economic profit, residual income type measure
c. Cost of capital (wacc, hurdle rate, EVA target rate)

III. Non-financial measures

a. Number of employees
b. Average compensation per employee
c. Percentage of sales in products designed in the past few (3-5) years
d. Market share
e. Units sold (or other output measure, e.g., production)
f. Unit selling price
g. Growth in units sold (or growth in other output measure, e.g., production)
h. Growth in investment (expansion plans, number of outlets etc)

IV. Projected information (for company as whole)

a. Forecasted market share
b. Cash flow forecast
c. Capital expenditures, R&D expenditures or general investment forecast
d. Profit forecast
e. Sales forecast
f. Other output forecast
g. Industry forecast (of any kind)

Table 2
Descriptive Data About the Sample and Variables

Panel A: Distributional statistics

Variable	N	mean	std. dev.	10%	25%	median	75%	90%
Raw Disc (Total)	677	7.98	2.97	4	6	8	10	12
Raw Disc Cat. I	677	2.30	1.50	1	1	2	3	5
Raw Disc Cat. II	677	0.15	0.38	0	0	0	0	1
Raw Disc Cat. III	677	3.18	1.52	1	2	3	4	5
Raw Disc Cat. IV	677	2.35	1.58	0	1	2	3	5
VolDisc (Total)	677	0.4695	0.1749	0.2353	0.3529	0.4706	0.5882	0.7059
VolDisc Cat. I	677	0.3288	0.2137	0.1429	0.1429	0.2857	0.4286	0.7143
VolDisc Cat. II	677	0.0497	0.1282	0.0000	0.0000	0.0000	0.0000	0.3333
VolDisc Cat. III	677	0.4549	0.2169	0.1429	0.2857	0.4286	0.5714	0.7143
VolDisc Cat. IV	677	0.3351	0.2260	0.0000	0.1429	0.2857	0.4286	0.7143
CofE	677	0.1659	0.0709	0.0853	0.1146	0.1564	0.2068	0.2551
Realized excess return	670	0.0026	0.0323	-0.0263	-0.0112	0.0021	0.0156	0.0304
Realized return	670	0.0037	0.0323	-0.0251	-0.0100	0.0033	0.0167	0.0316
AQ	677	0.0159	0.0143	0.0040	0.0070	0.0123	0.0198	0.0324
EarnVar	677	0.0494	0.0554	0.0113	0.0198	0.0344	0.0565	0.0962
AbsAA	677	0.0465	0.0283	0.0186	0.0262	0.0397	0.0583	0.0834
Beta	677	0.7952	0.5714	0.1463	0.4203	0.6981	1.0518	1.6085
Size	677	10,323	36,234	246	537	1,699	5,420	19,470
BM	677	0.5944	0.6328	0.1274	0.2552	0.4622	0.7080	1.1139
ROA	677	0.058	0.072	0.001	0.025	0.052	0.093	0.136
Issue	677	0.007	0.086	0.000	0.000	0.000	0.000	0.000
NSegments	677	2.739	1.499	1.000	2.000	3.000	4.000	5.000
Analyst following	677	8.019	7.860	0.000	2.000	6.000	12.000	20.000
MFS	677	6.043	7.398	0.000	0.000	4.000	9.000	16.000
log (1+*MFS*)	677	1.401	1.106	0.000	0.000	1.609	2.303	2.833
PR	677	90.817	321.526	14.000	22.000	38.000	71.000	139.000
log (1+*PR*)	677	3.762	1.002	2.708	3.135	3.664	4.277	4.942
NCalls	677	4.510	2.278	1.000	4.000	4.000	5.000	7.000
log (1+*NCalls*)	677	1.596	0.534	0.693	1.609	1.609	1.792	2.079

Panel B: Pairwise Correlations between Earnings Quality Metrics

	CF(EarnQual)	*AQ*	*EarnVar*	*AbsAA*
CF(EarnQual)	1.0000	0.9114	0.8009	0.8356
		<.0001	*<.0001*	*<.0001*
AQ	0.8980	1.0000	0.6300	0.6270
	<.0001		*<.0001*	*<.0001*
EarnVar	0.8184	0.7684	1.0000	0.5072
	<.0001	*<.0001*		*<.0001*
AbsAA	0.8645	0.6232	0.5350	1.0000
	<.0001	*<.0001*	*<.0001*	

Panel C: Regressions of Earnings Quality Metrics on Innate Factors

	Earnings Quality Metric			
	CF(EarnQual)	*AQ*	*EarnVar*	*AbsAA*
$\sigma(CFO)$	4.6552	0.1193	0.6634	0.3887
t-stat.	25.21	12.80	25.47	21.69
$\sigma(Sales)$	0.1177	-0.0002	0.0178	0.0117
t-stat.	2.69	-0.08	3.21	2.74
$ln(Assets)$	-0.0201	-0.0007	-0.0006	-0.0014
t-stat.	-4.52	-2.98	-1.05	-3.21
OperCycle	0.0229	0.0012	0.0048	-0.0008
t-stat.	3.81	3.94	5.99	-1.42
NegEarn	0.3727	0.0173	0.0505	0.0075
t-stat.	8.91	8.00	8.83	1.83
IntIntensity	-0.1913	-0.0080	0.0422	-0.0352
t-stat.	-5.93	-4.77	9.13	-11.32
CapIntensity	-0.1867	-0.0070	0.0134	-0.0246
t-stat.	-6.04	-4.38	3.27	-8.22
Adj. R2	0.7666	0.5247	0.8198	0.6550

Sample description and variable definitions: The sample consists of 677 Value-Line followed firms for fiscal 2001. *Raw Disc* = the number of voluntary disclosure elements (out of 25) found in the sample firms' combined 10-K and annual report; *Raw Disc Cat. K*, K=I, II, III, or IV = the raw disclosure score for information elements included in category K (the information elements in each category are shown in Table 1); *VolDisc* = the firm's voluntary disclosure score, expressed as a percentage of the maximum number of coded items attained by the sample firms; *VolDisc Cat. K* = the percentage voluntary disclosure score for each information category K; *CofE* = implied cost of equity estimate, derived from Value Line dividend forecasts and price target data; *AQ* = the standard deviation of the nine regression residuals obtained from a regression of the firm's year t working capital accruals on year t, t-1, and t+1 cash flows from operations, as well as the year t change in revenues and year t property plant and equipment (all variables scaled by total assets), where the regression is estimated using data from t=1992-2000; *EarnVar* = standard deviation of earnings before extraordinary items, scaled by total assets, over 1992-2001; *AbsAA* = the average value of the firm's absolute abnormal accruals; *Beta* = coefficient from firm-specific CAPM regression using the 60 months preceding fiscal 2001); *MVE* = the firm's market value of equity measured at the beginning of fiscal 2001; *BM* = the firm's book to market ratio measured at the beginning of fiscal 2001; *ROA* = return on assets; *Issue* = 1 if the firm's split-adjusted number of outstanding common shares increased by 20 percent or more in 2001 relative to 2000, and zero otherwise; *NSegments* = the number of business segments that the firm operates in. *Analyst following* = the number of analysts following the firm at the beginning of fiscal year 2001; *MFS* = management forecast score; *PR* = number of firm-initiated press releases in 2001; *NCalls* = number of conference calls held by the firm in 2001. σ(*CFO*) is the 1992-2001 standard deviation of the firm's cash flow from operations. σ(*Sales*) is the 1992-2001 standard deviation of the firm's sales revenues. *OperCycle* is the log of the sum of the firm's days accounts receivable and days inventory. *NegEarn* is the proportion of losses over 1992-2001. *Int_Intensity* is the sum of the firm's reported R&D and advertising expense as a proportion of its sales revenues. *Cap_Intensity* is the ratio of the net book value of PP&E to total assets.

Table 3

Tests of the Relation Between Voluntary Disclosure Score and Earnings Quality[a]

Panel A: Pairwise correlations between VolDisc, Earnings Quality variables, and control variables

	VolDisc	*CF(Earn-Qual)*	*AQ*	*EarnVar*	*AbsAA*	*lnMVE*	*lnBM*	*ROA*	*Issue*	*NSegm*	*NAnalyst*
VolDisc	1.0000	-0.1811	-0.1365	-0.1527	-0.1814	0.0775	0.0334	0.0050	-0.0169	0.1038	-0.0050
		<.0001	*0.0004*	*<.0001*	*<.0001*	*0.0437*	*0.3854*	*0.8958*	*0.6614*	*0.0069*	*0.8970*
CF(EarnQual)	-0.2270	1.0000	0.9114	0.8009	0.8356	-0.1363	-0.1858	0.0245	0.0804	-0.1660	0.1087
	<.0001		*<.0001*	*<.0001*	*<.0001*	*0.0004*	*<.0001*	*0.5246*	*0.0366*	*<.0001*	*0.0047*
AQ	-0.1708	0.8980	1.0000	0.6300	0.6270	-0.1561	-0.1227	0.0235	0.0944	-0.1429	0.0493
	<.0001	*<.0001*		*<.0001*	*<.0001*	*<.0001*	*0.0014*	*0.5422*	*0.0140*	*0.0002*	*0.2004*
EarnVar	-0.1714	0.8184	0.7684	1.0000	0.5072	-0.0286	-0.2500	0.0060	0.0470	-0.1551	0.1368
	<.0001	*<.0001*	*<.0001*		*<.0001*	*0.4581*	*<.0001*	*0.8763*	*0.2225*	*<.0001*	*0.0004*
AbsAA	-0.2230	0.8645	0.6232	0.5350	1.0000	-0.1384	-0.1330	0.0300	0.0543	-0.1316	0.1139
	<.0001	*<.0001*	*<.0001*	*<.0001*		*0.0003*	*0.0005*	*0.4358*	*0.1581*	*0.0006*	*0.0030*
lnMVE	0.0941	-0.1951	-0.1874	-0.1118	-0.1916	1.0000	-0.6040	0.2277	0.0181	0.1866	0.6570
	0.0143	*<.0001*	*<.0001*	*0.0036*	*<.0001*		*<.0001*	*<.0001*	*0.6381*	*<.0001*	*<.0001*
lnBM	0.0283	-0.1587	-0.1317	-0.1761	-0.1147	-0.5968	1.0000	-0.3164	-0.0760	0.0585	-0.4484
	0.4629	*<.0001*	*0.0006*	*<.0001*	*0.0028*	*<.0001*		*<.0001*	*0.0481*	*0.1282*	*<.0001*
ROA	0.0124	0.1214	0.1104	0.1264	0.1001	0.2132	-0.4936	1.0000	-0.0242	-0.0935	0.2596
	0.7468	*0.0015*	*0.0040*	*0.0010*	*0.0091*	*<.0001*	*<.0001*		*0.5291*	*0.0149*	*<.0001*
Issue	-0.0157	0.0526	0.0428	0.0387	0.0622	0.0268	-0.0726	-0.0401	1.0000	0.0035	-0.0266
	0.6841	*0.1715*	*0.2660*	*0.3151*	*0.1057*	*0.4872*	*0.0592*	*0.2978*		*0.9268*	*0.4901*
NSegments	0.1042	-0.1663	-0.1098	-0.1421	-0.1629	0.1575	0.0651	-0.1369	0.0070	1.0000	-0.0700
	0.0067	*<.0001*	*0.0042*	*0.0002*	*<.0001*	*<.0001*	*0.0906*	*0.0004*	*0.8554*		*0.0687*
NAnalyst	-0.0026	0.2162	0.1796	0.2612	0.1769	0.5587	-0.4355	0.3178	-0.0159	-0.0968	1.0000
	0.9460	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*0.6804*	*0.0118*	

Panel B: Regressions of *VolDisc* on Earnings Quality variables and control variables

	Base	Regressions based on raw values				*Decile rank of*
Variable	Model	*CF(EarnQual)*	*AQ*	*EarnVar*	*AbsAA*	*CF(EarnQual)*
EarnQual	--	-0.0645	-1.0897	-0.3496	-0.9041	-0.0120
t-stat.	--	-3.33	-2.19	-2.73	-3.61	-4.50
lnMVE	0.0180	0.0099	0.0141	0.0134	0.0097	0.0027
t-stat.	2.94	1.51	2.19	2.12	1.50	0.39
lnBM	0.0228	0.0116	0.0172	0.0135	0.0133	0.0053
t-stat.	2.30	1.12	1.67	1.30	1.30	0.51
NAnalyst	-0.0016	-0.0006	-0.0012	-0.0010	-0.0004	0.0005
t-stat.	-1.36	-0.49	-1.02	-0.83	-0.38	0.43
ROA	0.0577	0.0392	0.0526	0.0310	0.0460	0.0516
t-stat.	0.59	0.40	0.54	0.32	0.47	0.53
Issue	-0.0240	-0.0051	-0.0098	-0.0180	-0.0097	-0.0073
t-stat.	-0.31	-0.07	-0.13	-0.24	-0.13	-0.10
NSegments	0.0072	0.0070	0.0066	0.0066	0.0074	0.0078
t-stat.	1.54	1.49	1.40	1.41	1.59	1.66
Adj. R^2	0.0172	0.0319	0.0228	0.0288	0.0346	0.0434

Sample description and variable definitions: see Table 2.

[a] Panel A reports the pairwise correlations between our voluntary disclosure score (*VolDisc*) and proxies for the firm's earnings quality (*CF(EarnQual), AQ, EarnVar, and AbsAA)* as well as firm-specific variables. Panel B reports coefficient estimates and t-statistics obtained from regressions of *VolDisc* on the earnings quality proxies conditional on other factors expected to influence disclosure levels.

Table 4
Tests of the Relation Between Cost of Equity Capital and Voluntary Disclosure

Panel A: Regressions based on raw values of *VolDisc* and *CF(EarnQual)* [a]

	Excluding Other Risk Factors			Including Other Risk Factors		
Variable	*VolDisc*	*CF(EarnQual)*	Both	*VolDisc*	*CF(EarnQual)*	Both
VolDisc	-0.0392	--	-0.0201	-0.0072	--	-0.0044
t-stat.	-2.69	--	-1.46	-0.51	--	-0.32
CF(EarnQual)	--	0.0470	0.0452	--	0.0257	0.0256
t-stat.	--	7.06	6.68	--	3.38	3.36
Beta	--	--	--	0.0486	0.0415	0.0412
t-stat.	--	--	--	11.18	8.67	8.51
lnMVE	--	--	--	-0.0035	-0.0016	-0.0015
t-stat.	--	--	--	-2.02	-0.88	-0.85
lnBM	--	--	--	0.0156	0.0188	0.0189
t-stat.	--	--	--	-4.46	5.23	5.23
Adj. R^2	0.0107	0.0693	0.0695	0.1906	0.2039	0.2028

Panel B: Regressions based on decile ranks of *VolDisc* and *CF(EarnQual)* [a]

	Excluding Other Risk Factors			Including Other Risk Factors		
Variable	*VolDisc*	*CF(EarnQual)*	Both	*VolDisc*	*CF(EarnQual)*	Both
VolDisc	-0.0022	--	-0.0006	-0.0002	--	0.0001
t-stat.	-2.58	--	-0.72	-0.23	--	0.15
CF(EarnQual)	--	0.0074	0.0073	--	0.0048	0.0048
t-stat.	--	8.65	8.27	--	4.65	4.64
Beta	--	--	--	0.0489	0.0370	0.0371
t-stat.	--	--	--	11.18	7.49	7.44
lnMVE	--	--	--	-0.0036	-0.0003	-0.0003
t-stat.	--	--	--	-2.07	-0.17	-0.18
lnBM	--	--	--	0.0156	0.0203	0.0202
t-stat.	--	--	--	4.39	5.65	5.63
Adj. R^2	0.0099	0.1007	0.0987	0.1903	0.2157	0.2145

Panel C: Regression including orthogonalized risk factors[b]

	Raw regressions		Decile rank regressions	
Variable	Without *CF(EarnQual)*	With *CF(EarnQual)*	Without *CF(EarnQual)*	With *CF(EarnQual)*
VolDisc	-0.0241	-0.0042	-0.0013	0.0001
t-stat.	-1.72	-0.30	-1.61	0.10
CF(EarnQual)	--	0.0514	--	0.0071
t-stat.	--	7.87	--	8.40
Orthog_Beta	0.0391	0.0416	0.0391	0.0351
t-stat.	7.79	8.52	7.77	7.22
Orthog_lnMVE	0.0018	-0.0020	0.0019	0.0003
t-stat.	0.93	-1.02	0.94	0.13
Orthog_lnMB	0.0231	0.0184	0.0231	0.0209
t-stat.	6.23	5.02	6.22	5.78
Adj. R^2	0.1393	0.2032	0.1387	0.2117

Sample description and variable definitions: see Table 2.

[a] We report the coefficient estimates and t-statistics obtained from OLS regressions of *CofE* on known risk factors (*Beta*, size as proxied by the log of market value, *lnMVE*, and the log of the firm's book to market ratio, *lnBM*), earnings quality (*CF(EarnQual)*), and voluntary disclosure score, *VolDisc*. Panel A reports results using raw values of the variables; Panel B reports results replacing the test variables, *VolDisc* and *CF(EarnQual)*, with their decile ranks.

[b] Panel C shows the coefficient estimates and t-statistics obtained from OLS regressions of *CofE* on voluntary disclosure score, *VolDisc*, and orthogonalized risk factors, with and without controls for earnings quality, *CF(EarnQual)*. The orthogonalized portion of beta, *Orthog_Beta*, is the portion of beta not explained by *CF(EarnQual)*; it equals the residuals obtained from regressing beta on *CF(EarnQual)*. *Orthog_lnMVE* and *Orthog_lnMB* are calculated analogously.

Table 5
Analysis of the Components of the Voluntary Disclosure Measure

Panel A: Correlation between *VolDisc* measures (total measure and subscore measures)

	VolDisc	*VolDisc Cat I*	*VolDisc Cat II*	*VolDisc Cat III*	*VolDisc Cat IV*
VolDisc	1.0000	0.5491	0.2768	0.6434	0.6758
		<.0001	*<.0001*	*<.0001*	*<.0001*
VolDisc Cat. I	0.5189	1.0000	0.1224	0.0178	0.0397
	<.0001		*0.0014*	*0.6437*	*0.3024*
VolDisc Cat. II	0.2596	0.0891	1.0000	0.0643	0.1000
	<.0001	*0.0204*		*0.0948*	0.0093
VolDisc Cat. III	0.6321	0.0064	0.0560	1.0000	0.2174
	<.0001	*0.8671*	*0.1458*		*<.0001*
VolDisc Cat. IV	0.6625	0.0315	0.1032	0.2120	1.0000
	<.0001	*0.4125*	*0.0072*	*<.0001*	

Panel B: Regressions of VolDisc subscores on Earnings Quality

Variable	*VolDisc*	*VolDisc Cat I*	*VolDisc Cat II*	*VolDisc Cat III*	*VolDisc Cat IV*
CF(EarnQual)	-0.0839	-0.0371	-0.0342	-0.1276	-0.2270
t-stat.	-4.77	-1.71	-2.94	-5.87	-0.98

Panel C: Regressions of the cost of equity (CofE) on VolDisc subscores

Variable	*VolDisc*	*VolDisc Cat I*	*VolDisc Cat II*	*VolDisc Cat III*	*VolDisc Cat IV*
Coefficient. Est.	-0.0392	-0.0102	-0.0430	-0.0301	-0.0152
t-stat.	-2.69	-0.85	-2.16	-2.57	-1.34

Sample description and variable definitions: see Table 2.

[a] Panel A reports Pearson (above diagonal) and Spearman (below diagonal) pairwise correlations between the noted variables. Panel B reports the coefficient estimates and t-statistics obtained from OLS regressions of the noted *VolDisc* score (total score or component score) on earnings quality. Panel C reports the coefficient estimates and t-statistics obtained from OLS regressions of the cost of equity estimate (*CofE*) on the noted disclosure variable.

Table 6

Tests of the Relation Between Average Realized Cost of Capital Measures and Voluntary Disclosure[a]

Panel A: Raw returns to high-low VolDisc portfolio, high-low CF(EarnQual) portfolio, excess market return, and the SMB and HML factors, based on realized daily returns[a]

	Mean daily return	Annual return (compounded
Hi-Lo VolDisc	-0.0237%	-5.9926%
Hi-Lo CF(EarnQual)	0.0434%	10.9131%
RMRF	0.0464%	10.7616%
SMB	0.0306%	7.8244%
HML	-0.0014%	-0.5748%

Panel B: Risk loadings of Hi-Lo VolDisc portfolio, based on realized daily returns[b]

Variable		CAPM		3-factor model	
Intercept	0.0000	-0.0001	0.0001	-0.0001	0.0001
t-stat.	0.12	-0.38	0.39	-0.38	0.66
Hi-Lo CF(EarnQual)	-0.5172	--	-0.4787	--	-0.3688
t-stat.	-33.26	--	-27.01	--	-15.56
RMRF	--	-0.2535	-0.0731	-0.2328	-0.1041
t-stat.	--	-15.47	-5.55	-16.38	-7.29
SMB	--	--	--	-0.4084	-0.1623
t-stat.	--	--	--	-14.78	-5.69
HML	--	--	--	0.4295	0.1346
t-stat.	--	--	--	10.05	3.43
Adj. R^2	0.6894	0.3242	0.7149	0.5817	0.7170

Panel C: Two-stage regressions, based on realized returns[c]

Variable	Excluding other risk factors		CAPM		3-factor model	
Intercept	0.0005	0.0005	0.0006	0.0007	0.0005	0.0007
t-stat.	9.50	9.49	5.83	7.08	4.92	6.37
Hi-Lo VolDisc	-0.0002	-0.0001	-0.0002	-0.0001	-0.0002	-0.0001
t-stat.	-6.35	-2.79	-6.10	-3.20	-5.26	-2.44
Hi-Lo CF(EarnQual)	--	0.0004	--	0.0005	--	0.0005
t-stat.	--	6.52	--	7.40	--	7.35
RMRF	--	--	0.0001	0.0000	0.0001	-0.0001
t-stat.	--	--	0.96	-0.31	1.12	-0.65
SMB	--	--	--	--	0.0003	0.0003
t-stat.	--	--	--	--	4.71	4.52
HML	--	--	--	--	0.0000	0.0001
t-stat.	--	--	--	--	-0.42	1.01
Adj. R^2	0.0560	0.0664	0.0584	0.0788	0.0757	0.0886

Sample description and variable definitions: see Table 2.

[a] Panel A reports the average daily and annualized realized returns to a *Hi-Lo VolDisc* portfolio and a *Hi-Lo CF(EarnQual)* portfolio, as well as the average daily and annualized excess market return (*RMRF*), *HML* factor, and *SMB* factor, measured over all trading days between July 1, 2002, and June 30, 2003. The *Hi-Lo VolDisc* portfolio return is the return on the 20% of firms with the largest value of *VolDisc* (i.e., those with the most expansive disclosures) minus the return on the 20% of firms with the smallest values of *VolDisc* (i.e., those with the least expansive disclosures). The *Hi-Lo CF(EarnQual)* portfolio return is the return on the 20% of firms with the largest value of *CF(EarnQual)* (i.e., those with the worst earnings quality) minus the return on the 20% of firms with the smallest values of *CF(EarnQual)* (i.e., those with the best earnings quality).

[b] Panel B reports the coefficient estimates and t-statistics for regressions of the return to the *Hi-Lo VolDisc* portfolio on the returns to the *Hi-Low CF(EarnQual)* portfolio, the excess market return, and the returns to the *HML* and *SMB* factors.

[c] Panel C reports the second stage coefficient estimates and t-statistics for regressions of average excess return on first stage regression estimates of loadings on the *Hi-Lo VolDisc* ,the *Hi-Low CF(EarnQual)* portfolio, *RMRF, SMB*, and *HML.*

Table 7

Tests of Alternative Implied Cost of Capital measures and Voluntary Disclosure

Panel A: Regressions of S&P Debt Ratings on VolDisc and CF(EarnQual)[a]

	Excluding Other Determinants			Including Other Determinants		
Variable	*VolDisc*	*CF(EarnQual)*	Both	*VolDisc*	*CF(EarnQual)*	Both
VolDisc	-3.1515	--	-2.0505	-1.3661	--	-0.8665
t-stat.	-3.77	--	-2.67	-2.31	--	-1.56
CF(EarnQual)	--	4.1704	3.9619	--	3.2640	3.1942
t-stat.	--	9.64	9.07	--	9.07	8.83
Size	--	--	--	-0.7706	-0.5636	-0.5647
t-stat.	--	--	--	-8.86	-6.60	-6.63
ROA	--	--	--	-2.1334	-3.6248	-3.1548
t-stat.	--	--	--	-0.90	-1.64	-1.42
Leverage	--	--	--	4.9039	5.7215	5.7097
t-stat.	--	--	--	5.48	6.79	6.79
InterestCov	--	--	--	-0.0129	-0.0095	-0.0097
t-stat.	--	--	--	-2.13	-1.67	-1.70
Beta	--	--	--	2.1201	1.6127	1.5581
t-stat.	--	--	--	10.29	8.17	7.78
lnBM	--	--	--	1.0263	1.1222	1.1242
t-stat.	--	--	--	7.23	8.42	8.45
Adj. R^2	0.0313	0.1834	0.1955	0.5431	0.6048	0.6062

Panel B: Regressions of *rPEG* on VolDisc and CF(EarnQual)[b]

	Excluding Other Risk Factors			Including Other Risk Factors		
Variable	*VolDisc*	*CF(EarnQual)*	Both	*VolDisc*	*CF(EarnQual)*	Both
VolDisc	-0.0064	--	0.0042	0.0110	--	0.0125
t-stat.	-0.68	--	0.45	1.33	--	1.52
CF(EarnQual)	--	0.0237	0.0238	--	0.0121	0.0125
t-stat.	--	5.77	5.62	--	2.74	2.84
Beta	--	--	--	0.0291	0.0250	0.0257
t-stat.	--	--	--	11.18	8.85	8.98
lnMVE	--	--	--	-0.0042	-0.0030	-0.0031
t-stat.	--	--	--	-3.96	-2.68	-2.82
lnBM	--	--	--	0.0159	0.0178	0.0177
t-stat.	--	--	--	7.40	8.02	7.94
Adj. R^2	0.0000	0.0502	0.0466	0.2840	0.2907	0.2922

Sample description and variable definitions: see Table 2.

[a] We report the coefficient estimates and t-statistics obtained from OLS regressions of debt ratings on voluntary disclosure score, *VolDisc,* earnings quality (*CF(EarnQual)*), and known determinats of debt ratings (firm size, ROA, leverage, interest coverage, beta, book-to-market). The appendix contains the debt rating numeric transformation rules.

[b] We report the coefficient estimates and t-statistics obtained from OLS regressions of *rPEG* estimates of the cost of equity on voluntary disclosure score, *VolDisc,* earnings quality (*CF(EarnQual)*), and known determinants of cost of equity (beta, size, and book-to-market).

Table 8
Tests of Management Forecasts, Press Releases and Conference Calls

Panel A: Pairwise correlations between *VolDisc* , *MFS* , *PR* , and *CF(EarnQual)* [a]

	VolDisc	*log(1+MFS)*	*log(1+PR)*	*log(1+NCalls)*	*CF(EarnQual)*
VolDisc	1.0000	0.0562	0.0002	0.0673	-0.1811
		0.1442	*0.9968*	*0.0803*	*<.0001*
log(1+MFS)	0.0785	1.0000	0.1826	0.3002	-0.0157
	0.0412		*<.0001*	*<.0001*	*0.6835*
log(1+PR)	0.0314	0.1854	1.0000	0.4194	0.0718
	0.4142	*<.0001*		*<.0001*	*0.0619*
log(1+NCalls)	0.0354	0.2582	0.4456	1.0000	*0.1022*
	0.3584	*<.0001*	*<.0001*		*0.0078*
CF(EarnQual)	-0.2270	-0.0215	0.0183	0.1102	1.0000
	<.0001	*0.5759*	*0.6348*	*0.0041*	

Panel B: Regressions of *CofE* on *MFS* and *CF(EarnQual)* [b]

Variable	Excluding Other Determinants		Including Other Determinants	
log(1+MFS)	0.0077	0.0081	0.0093	0.0087
t-stat.	3.33	3.62	4.37	4.12
CF(EarnQual)	--	0.0472	--	0.7043
t-stat.	--	7.21	--	3.30
Beta	--	--	0.0498	0.0247
t-stat.	--	--	12.02	8.98
lnMVE	--	--	-0.0042	-0.0025
t-stat.	--	--	-2.46	-1.39
lnBM	--	--	0.0145	0.0175
t-stat.	--	--	4.24	4.93
Adj. R^2	0.0163	0.0850	0.2177	0.2250

Panel C: Regressions of *CofE* on *PR* and *CF(EarnQual)* [b]

Variable	Excluding Other Determinants		Including Other Determinants	
log(1+PR)	0.0006	-0.0014	0.0042	0.0023
t-stat.	0.25	-0.58	1.39	0.74
CF(EarnQual)	--	0.0471	--	0.0246
t-stat.	--	7.10	--	3.17
Beta	--	--	0.0481	0.0413
t-stat.	--	--	11.14	8.60
lnMVE	--	--	-0.0053	-0.0026
t-stat.	--	--	-2.51	-1.15
lnBM	--	--	0.0148	0.0183
t-stat.	--	--	4.18	4.97
Adj. R^2	0.0001	0.0675	0.1926	0.2034

Panel D: Regressions of *CofE* on *NCalls* and *CF(EarnQual)* [b]

Variable	Excluding Other Determinants		Including Other Determinants	
log(1+NCalls)	0.0186	0.0133	0.0196	0.0182
t-stat.	3.92	2.86	4.07	3.79
CF(EarnQual)	--	0.0451	--	0.0206
t-stat.	--	6.77	--	2.73
Beta	--	--	0.0456	0.0397
t-stat.	--	--	10.65	8.32
lnMVE	--	--	-0.0057	-0.0039
t-stat.	--	--	-3.16	-2.06
lnBM	--	--	0.0149	0.0176
t-stat.	--	--	4.33	4.94
Adj. R^2	0.0210	0.0778	0.2122	0.2197

Sample description and variable definitions: see Table 2.

[a] Panel A reports Pearson (above diagonal) and Spearman (below diagonal) pairwise correlations between the noted variables. Panel B reports the coefficient estimates and t-statistics obtained from OLS regressions of *CofE* on known risk factors (*Beta*, firm size (as proxied by the log of market value, *lnMVE*), and the log of the firm's book to market ratio, *lnBM*), earnings quality quality (*CF(EarnQual)*, and management forecast score, *log(1+MFS)*. Panel C reports similar information using the press release measure of disclosure, *log (1+PR)*, and Panel D shows similar information for the conference call measure of disclosure, *log(1+NCalls)*.

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