DIMENSIONS OF DISCLOSURE AND THE COST OF EQUITY CAPITAL: EVIDENCE FROM THE POST REGULATION FAIR DISCLOSURE PERIOD

by

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(Under the Direction of Stephen P. Baginski)

ABSTRACT

Prior research provides mixed evidence on disclosure's effect on cost of equity capital. I investigate these mixed results by delineating disclosure into four separate dimensions - *type*, *quantity*, *precommitment*, and *quality* – and measure how *quantity*, *precommitment*, and *quality* affect cost of equity capital, holding *type* constant. Recognizing the endogeneity associated with these dimensions and using a sample of management earnings forecasts from 2001 and 2002, I find evidence that *precommitment*, *quantity*, and *quality*, individually, have a negative association with cost of equity capital as predicted by theoretical research. When all dimensions are considered jointly, disclosure *precommitment* is negatively related to cost of equity capital and the remaining dimensions are unrelated or weakly related to cost of equity capital. I also document that cost of equity capital increases around the act of disclosure. Management forecasts with lower expected bias, issued over longer horizons, and which lead to lower levels of uncertainty about future earnings attenuate the increases in cost of equity capital surrounding the act of disclosure. My results suggest that a firm's maintained commitment of issuing forecasts in periods of high information asymmetry (*precommitment*) is more effective in lowering cost of equity capital than issuing higher quality forecasts (*quality*) or issuing a forecast at regular intervals (*quantity*), given that *quantity* and *quality* are generally insignificant after controlling for *precommitment*.

INDEX WORDS: cost of equity capital, voluntary disclosure, management earnings forecasts, disclosure quantity, disclosure quality, disclosure precommitment

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DEDICATION

To Jessica: I could not have done this without your love, support, and constant encouragement. Thank you for being a constant source of joy in my life.

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CHAPTER 1

INTRODUCTION

In this study, I identify a framework for empirical tests of the relation between disclosure and the cost of equity capital. The framework relies on a delineation of disclosure dimensions – *type*, *quantity*, *precommitment*, and *quality* – that are generally co-mingled in extant research. Using this framework, I provide empirical tests of the effects of individual disclosure dimensions on cost of equity capital for a particular disclosure *type* (a direct disclosure of a value-relevant payoff - management earnings forecasts), other dimensions of disclosure held constant.

Economic theory predicts a negative association between disclosure and cost of equity capital (Diamond and Verrecchia 1991; Easley and O'hara 2004). Although empirical results are generally supportive of this relationship (e.g., Botosan 1997; Sengupta 1998), extant empirical work co-mingles several dimensions of disclosure (i.e., disclosure type, disclosure quantity, disclosure precommitment, and disclosure quality) into a single hypothesized disclosure effect on cost of equity capital. Disclosure *types* include both voluntary and mandated disclosures of value-relevant payoff expectations (e.g., forecasts of earnings, cash flows, dividends, etc.) as well as other less direct disclosures (e.g., plants closings, reasons for cost increases, strategic changes, etc.). Disclosure *quantity* represents the volume of disclosures made by a company. Disclosure *precommitment* represents a continuing commitment by a company to disclose relevant information when necessary. Disclosure *quality* represents the disclosure's ability to move security prices.

Understanding the relation between disclosure and cost of equity capital requires isolation of individual dimensions of disclosure. The dimensions exist, and managers may choose disclosure strategies that emphasize alternative dimensions. If the dimensions of disclosure (and the effects of the dimensions on cost of equity capital) are not perfectly correlated, then it is necessary to isolate individual disclosure dimensions to understand the effectiveness of alternative disclosure strategies. Otherwise, it is not clear whether greater beneficial effects of disclosure on cost of equity capital are achieved by changing the quantity of disclosure, increasing the quality of disclosure, substituting out of one kind of disclosure for another, committing to consistent disclosures, or some combination thereof. The effects of alternative disclosure dimensions on cost of equity capital may be negatively correlated, suggesting that not every disclosure strategy yields the overall expected negative relation between "disclosure" and cost of equity capital. For example, Botosan and Plumlee (2002) suggest that the relation between disclosure and cost of equity capital switches from a negative to a positive relation when switching from the annual report to more timely types of disclosure. Similarly, Piotroski (2002) documents increases in proxies for information asymmetry (a determinant of cost of equity capital) following management earnings forecasts.

My disclosure dimension framework requires empirical test designs that specify the exact disclosure dimensions being studied and that control for the other disclosure dimensions. To provide initial evidence on three disclosure dimensions (*precommitment, quantity, and quality*), I focus my empirical tests on one particular *type* of public disclosure, management forecasts of quarterly earnings. Quarterly management earnings forecasts are voluntary and provide an explicit estimate of earnings, a fundamental input into equity valuation. [1] Survey data

[1] Also, quarterly forecasts appear to be the avenue of choice for bad news (Skinner 1984). Bad news is generally considered to be more credible than good news (Hutton et al. 2003).

(Fleishman-Hillard Research 2000) identifies forward-looking information (e.g., forecasts, strategic and business plans, and projections) as one of the most important types of disclosure for publicly traded companies. Further, the ability to easily identify the explicit act of public forecasting and the existence of a body of research into the determinants of management forecasting enable the development of reasonable proxies for the various disclosure dimensions.

I sample management forecasts of quarterly earnings from the Thomson Financial First Call Corporation database that are released after the effective date of post-Regulation Fair Disclosure (hereafter, Reg FD). Reg FD was implemented on October 23, 2000 in an effort to level the playing field for all investors by eliminating selective disclosure. I sample post-Reg FD management earnings forecasts to avoid the potential effects of a change in disclosure regulation on my tests. Further, sampling post-Reg FD greatly enhances the likelihood that publicly-released management forecasts are a less noisy proxy for all forecast disclosures, both public and private. Prior research supports the argument that Reg FD was successful in reducing the amount of selective disclosure (Gintschel and Markov 2004). My sample consists of 1,759 firms with a measured cost of equity capital level, of which 1,253 issued a total of 6,079 forecasts in 2001 and 2002.

I examine the effects of the *precommitment*, *quantity,* and *quality* of this particular *type* of forward-looking disclosure on cost of equity capital. In a levels test, I measure forecast *precommitment* by whether the company tends to issue management forecasts during periods characterized by initially high information asymmetry. I measure forecast *quantity* by the number of management earnings forecasts issued by a given company over the sample period, and I proxy management earnings forecast *quality* with the general tendency for market reaction to the company's forecasts. I derive implied cost of equity capital measures using the price-earnings-growth (PEG) method.[2] Because my measures of forecast disclosure dimensions are firm-specific (rather than event specific), I examine the association of forecast dimensions with cost of equity capital levels rather than changes.

Failure to control for the determinants of the different disclosure dimensions may lead to spurious inferences regarding the economic relation between disclosure and cost of equity capital (Fields et al. 2001; Core 2001; Cohen 2003). Additionally, Easley and O'hara (2004) suggest that firms may choose disclosure dimensions, such as quantity and quality, to influence their cost of equity capital. Accordingly, I control for the endogenous nature of the dimensions of disclosure by employing a two-stage model using instrumental variables.

Recognizing the endogenous nature of the different dimensions of disclosure, I find that disclosure precommitment is negatively related to cost of equity capital as predicted by theory. Disclosure quantity is also negatively related to cost of equity capital, consistent with recent theoretical predictions by Easley and O'hara (2004). I also find that disclosure quality is negatively related with cost of equity capital, consistent with recent theoretical predictions by Leuz and Verrecchia (2004) and Easley and O'hara (2004). When the dimensions are considered jointly, disclosure precommitment is negatively related to cost of equity capital, whereas, the remaining dimensions are no longer significantly related to cost of equity capital.

I also provide a detailed analysis on disclosure quality. When disclosure quality is broken down into four elements, two of the elements, the average forecast error and average forecast horizon, are significantly related to cost of equity capital. When precommitment and quantity are considered with the elements of quality (rather than quality as a single dimension), precommitment and quantity are both negatively related to cost of equity capital, and the average

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[2] The PEG method is a variation of the dividend discount model. Botosan and Plumlee (2005) champion the superiority of this method over alternate methods of estimating implied cost of equity capital based on its consistent

forecast error and average forecast horizon are still significantly related to cost of equity capital. I also document that cost of capital increases around the act of disclosure and that management forecasts with lower expected bias, issued over longer horizons, and which lead to lower levels of uncertainty about future earnings attenuate the increases in cost of equity capital surrounding the act of disclosure.

I also assess three alternative measures of disclosure quantity based on the number of quarters a forecast is issued, the time between forecasts, and the percentage of non-zero-return trading days. All three, when isolated from the other dimensions provide results consistent with Easley and O'hara (2004). When the alternative quantity measures are combined with disclosure precommitment and disclosure quality, the results are fairly consistent. One exception is that, for two of the alternative quantity measures, quality is negatively related to cost of equity capital as predicted. Another exception occurs when using the measure based on time between forecasts. With this measure, disclosure precommitment is not statistically significant and quantity is significantly related to cost of equity capital.

Further analyzing disclosure precommitment yields interesting results. I investigate disclosure quantity and quality for precommitted firms and find that quantity is *positively* related to cost of equity capital. While this is contrary to theory, these findings, considered in total, reconcile alternative findings in the literature (Leuz and Verrecchia 2000; Botosan and Plumlee 2002; and Piotroski 2002) that show different relations between "disclosure" and cost of equity capital.[3] Specifically, I show that disclosure quantity, in isolation, is negatively associated with

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relation to various firm-risk measures.

[3] Botosan and Plumlee (2002) find a positive (no) association between a group of more timely (investor relation) disclosures and the cost of equity capital. I extend their results by focusing on one type of disclosure that could fall into either of those two groups. By documenting that the quantity of one type of these disclosures decreases cost of equity capital and that the effect becomes insignificant when other dimensions are considered, I show that within these two groups of disclosures it is important to further identify the exact type of disclosure and control for all the dimensions of that disclosure.

cost of equity capital, consistent with Easley and O'hara (2004). This association becomes insignificant when quantity is combined with disclosure precommitment and disclosure quality, and the association becomes significantly *positive* when assessing disclosure quantity for only precommitted firms.

Sensitivity analysis shows that the inferences drawn about the relation between the dimensions of disclosure and cost of equity capital are not affected when other public forecast disclosures are added as a control variable in my second stage regression or if the analysis is done without financial firms in the sample. One exception is that when assessing the incremental associations between the dimensions of disclosure and cost of equity capital for firms with a December 31 year-end, precommitment is not significant and quantity is significantly related to cost of equity capital. However, each dimension is negative and significant when considered individually.

Overall, my results suggest that a firm's maintained commitment to issue a forecast in periods of high information asymmetry (*precommitment*), issuing more forecasts (*quantity*), and issuing higher quality forecasts (*quality*) are associated with a lower cost of equity capital (consistent with King et al. 1990; Leuz and Verrecchia 2004; Easley and O'hara 2004) . However, my results also suggest that a firm's maintained commitment to issue a forecast in periods of high information asymmetry (*precommitment*) is more effective in lowering cost of equity capital than issuing higher quality forecasts (*quality*) or issuing more forecasts (*quantity*), given that these latter two dimensions are generally insignificant after control for precommitment. In fact, that act of disclosure (quantity=1) is associated with increases in cost of equity capital in a short window changes tests (consistent with Piotroski 2002).

Further, my results extend Leuz and Verrecchia (2000) by documenting the importance of controlling for disclosure precommitment in a disclosure study, and I do so with a large sample that is more generalizable to U.S. firms. My findings also extend Piotroski (2002) in a similar fashion by linking the act of disclosure to changes in the cost of equity capital. The results also answer a call by Easley and O'hara (2004) for empirical implications on the effects of quantity and quality of information on cost of equity capital.

In section 2, I develop hypotheses from a detailed discussion of the link between disclosure and cost of equity capital, past disclosure measures, and a framework for analysis based on the different dimensions of disclosure. In section 3, I present my two-stage empirical model including a discussion of all variables. In section 4, I discuss the sample selection procedure and present descriptive statistics. In section 5, I provide correlation and chi-square analysis of the different dimensions of disclosure. In section 6, I present my empirical results. In section 7, I perform sensitivity analysis. In section 8, I perform additional analysis on disclosure quality, and I present my conclusions in section 9.

CHAPTER 2

HYPOTHESIS DEVELOPMENT

2.1 The Link Between Disclosure and the Cost of Equity Capital

The past two decades has witnessed heightened discussion of if and how enhanced disclosure practices benefit firms. Theoretical research in the late 1980's and early 1990's supports a negative relation between disclosure level and cost of equity capital. Amihud and Mendelson (1986) assert that disclosure reduces the adverse selection component of the bid-ask spread and reduces the firm's cost of equity capital. Diamond and Verrecchia (1991) claim that disclosure reduces the adverse price impact of a large trade causing investors to take a larger position in a firm's stock, increasing demand for the firm's stock, thus reducing the firm's cost of equity capital. More recently, Easley and O'hara (2004) show that both the quantity and quality of public information affect asset pricing in equilibrium and should therefore be included in asset pricing models.

The relation between disclosure and cost of equity capital has also been subject to public debate. In 1994, the Special Committee on Financial Reporting of the American Institute of Certified Public Accountants (1994) (i.e., Jenkins Committee) stated that greater disclosure benefits firms by lowering the firm's cost of equity capital. That same year, the Financial Executives Institute (Berton 1994) argued that enhanced disclosures would add to share price volatility thereby increasing risk and cost of equity capital.

Motivated by these arguments, Botosan (1997) empirically tests whether there is a negative association between disclosure level and direct estimates of cost of equity capital. Estimating cost of equity capital directly is important because prior literature had only examined the effect of disclosure on variables thought to be positively related to cost of equity capital due to the difficulty in obtaining cost of equity capital estimates. Botosan (1997) limits her sample to the 1990 annual reports of companies in the machinery industry and develops a disclosure index based on disclosures in each firm's annual reports. Her index includes five items from the annual report: background information, summary of historical results, key non-financial statistics, projected information and management discussion and analysis. Botosan (1997) estimates cost of equity capital using an accounting based valuation formula developed by Edwards and Bell (1961), Ohlson (1995) and Feltham and Ohlson (1995) and documents a negative association between disclosure level and cost of equity capital for those firms with a low analyst following. While Botosan's (1997) results are limited to firms with low analyst following for one year in one industry, her results generated further research on the relation between cost of equity capital and disclosure.

Botosan and Plumlee (2002) examine whether Botosan's (1997) results generalize to a sample not limited to one year and one industry by using AIMR disclosure scores for a period of eleven years as the starting point for their sample. Botosan and Plumlee (2002) also extend Botosan's (1997) results by looking at different types of disclosures. Botosan (1997) only examined the annual report, but Botosan and Plumlee (2002) examine all the disclosures covered by the AIMR scores: annual report, quarterly and other published reports, and investor relations. By using the short horizon form of the dividend discount model to estimate cost of equity capital, they find that, similar to Botosan (1997), the cost of equity capital is decreasing in annual report disclosure level. Additionally, they find a *positive* relation between the cost of equity capital and the ratings of more timely disclosures (i.e., quarterly reports). While this finding was contrary to their expectations, they note that this finding is consistent with managers' claims that a higher volume of timely disclosure increases the cost of equity capital through increased stock price volatility and the similar view of the Financial Executives Institute (Berton 1994).

Piotroski (2002) draws on managers' claims of increased volatility following disclosure and Botosan and Plumlee's (2002) findings to motivate his study on stock price volatility following a management earnings forecast. While Piotroski (2002) does not directly measure the effect of an earnings forecast by management on cost of equity capital, he does measure the forecast's effect on two proxies for information asymmetry: excess intra-day price volatility and the standard deviation of returns. Piotroski (2002) finds that the average management earnings forecast is followed by increased volatility in the fifteen-day period following the traditional announcement window and that this increase is significantly greater than the volatility generated by comparable economic news on an earnings announcement date. The information asymmetry literature assumes a positive association between information asymmetry and cost of equity capital. Thus, the findings of Piotroski (2002) suggest that disclosure increases cost of equity capital in the short term.

In summary, starting with the theoretical research of Amihud and Mendelson (1986) and Diamond and Verrecchia (1991), and continuing through empirical work by Botosan (1997), evidence seems to indicate a negative association between disclosure and cost of equity capital. Botosan and Plumlee (2002) confirm Botosan's (1997) findings that a negative relation exists between annual report disclosure and cost of equity capital, but also document a positive relation between more timely disclosures and cost of equity capital. Piotroski (2002) explores one of these more timely disclosures by examining the effect that quarterly and annual management earnings forecasts have on short-term stock price volatility and finds that forecasts seem to drive up volatility in the short-term.

When assessing how disclosure affects cost of capital, empirical studies have only recently begun to differentiate between disclosure quantity and quality. This new approach is predicated by analytical work by Easley and O'hara (2004). Easley and O'hara (2004) consider both public and private information in their model and define quantity as the ratio of public disclosures to total disclosures and quality as the precision of the disclosure. Easley and O'hara (2004) show that an increase in either quantity or quality of disclosure lowers a firm's cost of capital through lower information risk.[4] Recent research has begun to separately measure disclosure quantity and quality.

Botosan et al. (2004) examine the association between disclosure quality (both private and public) and cost of equity capital. Drawing on the theoretical basis provided in Easley and O'hara (2004), Botosan et al. (2004) capture the underlying quality of investors' public and private information sets. They find that an inverse relation exists between the quality of public disclosure and cost of equity capital, as predicted by Easley and O'hara (2004), but this relation is more than offset by the positive relation that exists between the cost of equity capital and private disclosure quality.

Zhang (2005) also utilizes the theoretical findings of Easley and O'hara (2004) to measure how proprietary costs affect the quantity and quality of voluntary disclosures. While, Zhang does not assess the effects of disclosure quantity and quality on cost of equity capital, Zhang's study does provide additional analysis on the quantity and quality of disclosure. Zhang measures quantity as the percentage of non-zero-return trading days during the disclosure window and quality as the sum of the standardized values of analyst forecast dispersion and

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[4] An extension to Easley and O'hara's (2004) study is done by Hughes et al. (2004). They find that within large economies information from private signals about idiosyncratic shocks has no effect on cost of capital. While this contradicts the findings of Easley and O'hara (2004), it is important to note that Hughes et al. (2004) do not consider

mean analyst forecast errors squared. Zhang finds that firms with high proprietary costs issue a higher quantity of disclosures that are less precise and accurate (i.e., lower quality) than firms with low proprietary costs.

Leuz and Verrecchia (2004) analytically examine the link between information quality and a firm's cost of equity capital. They argue that higher information quality improves coordination between firms and investors with respect to capital investment decisions, causing a lower cost of equity capital. Leuz and Verrecchia (2004) directly link a firm's cash flows to information quality by designing a model in which the quality of the report affects share price. Share price, in turn, affects investment choice and ultimately cost of equity capital. Leuz and Verrecchia (2004) model cost of equity capital as the rate of return that results when the firm's expected price per share is equated to the firm's expected net cash flow. This method allows them to emphasize the second moment effect of the rate of return, which shows whether the report is anticipated to be of high quality or low quality. They find that higher quality leads to a lower cost of equity capital, and they also show that this link does not disappear when diverse portfolios are formed. The latter result is extremely important because it contradicts a common argument that disclosure quality reduces only idiosyncratic noise and is not reflected in cost of equity capital.

While past empirical research did not separate the dimensions of disclosure (e.g., Botosan 1997; Botosan and Plumlee 2002), more recent research (e.g., Botosan et al. 2004; Zhang 2005) has drawn on the recent theoretical work of Easley and O'hara (2004) and separated out the dimensions of disclosure. My study extends this body of literature by separately measuring three dimensions of disclosure (*precommitment*, *quantity* and *quality*) for one type of voluntary

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public information in their analysis. They define all information as private signals to only informed investors. Easley and O'hara (2004) account for both public and private information.

disclosure (a management earnings forecasts) and examining how these dimensions affect cost of equity capital. My study answers a specific call by Easley and O'hara (2004) to investigate how the quantity and quality of information affect cost of equity capital.

2.2 Disclosure Measures

Past approaches to measuring "disclosure" vary greatly. Botosan (1997) creates her own firm-specific disclosure index based on five different disclosures from each firm's annual report. Lang and Lundholm (1996) use disclosure scores reported by the *Report of the Financial Analysts Federation Corporate Information Committee* (hereafter FAF) from 1985-1989. Similar to the AIMR scores used in Botosan and Plumlee (2002), the FAF scores come from analysts who evaluated a firm's disclosures in three categories: annual published information, other published information (including quarterly filings, press releases and proxy statements) and investor relations.

A shortcoming of these measures is that they co-mingle the dimensions of disclosure. Botosan (1997) points out in her first footnote that:

> Disclosure quality is also important but very difficult to assess. As a result, researchers tend to assume quantity and quality are positively related. This assumption seems justified given the importance of managers' reporting reputations and the constraints placed on managers by legal liability (p.324).

In their study on stock return volatility, Bushee and Noe (2000) note that the AIMR rankings "encompass both qualitative and quantitative aspects of disclosure" (p.173). As a result, researchers tend to refer to their disclosure measures as a measure of disclosure level, not disclosure quality or disclosure quantity. Further, the AIMR and FAF rankings are based on several different disclosure types; therefore, it is impossible to determine if one or more disclosure type affects cost of equity capital.[5]

The disclosure indices have additional disadvantages. Botosan's (1997) index is difficult to replicate and test over a larger sample. Both Botosan's (1997) and Hail's (2002) indices are limited to the disclosures from the annual report. Even though the annual report is an important piece of information used by analysts, it is quite different in nature than other disclosure types used by analysts (e.g., unaudited earnings forecasts by management). Both the FAF and AIMR scores are no longer produced. Thus, it is not possible to replicate prior results with more recent samples. Additionally, the more recent S&P disclosure index only examines whether information was disclosed, not the quality of the disclosure. Most importantly, none of the measures explicitly distinguish between the different dimensions of disclosure, and none include any measure of precommitment.

2.3 A Framework for Analysis Based on the Dimensions of Disclosure

Managers can employ a variety of disclosure strategies when releasing private information to the market. They can change the quality of the disclosures, alter the quantity of disclosures, utilize different types of disclosure, or make a commitment to consistent disclosure.

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[5] More recently, Hail (2002) uses a disclosure score similar to Botosan's (1997) developed by the Swiss Banking Institute (SBI). It is based on voluntary information companies provided with respect to Swiss GAAP in their annual report. Hail (2002) refers to his measure as disclosure quality even though it is also both a function of quantity and quality. Hail notes that "To assess a firm's disclosure quality I focus on the *amount* of voluntary disclosure provided in its annual report (p.7)." Also, Standard & Poor's (S&P) performed a Transparency and Disclosure study to incorporate disclosure items that S&P's Governance Services uses in its interactive corporate governance service (Patel and Dallas 2002). They explicitly state that they did not attempt to assess the quality of the disclosure (Patel and Dallas 2002, p4). Similar to the AIMR and FAF rankings, the S&P study also bases its disclosure rankings on several different disclosure types.

Isolating the individual dimensions of disclosure allows a calibration of the effects of different disclosure strategies on cost of equity capital.

Type

One dimension of disclosure is disclosure *type*. Figure 1 shows five general types of disclosures. The first is voluntary disclosures of management earnings forecasts, which is the type considered in this study. The next four types classify disclosures based on mandated versus other voluntary disclosures, and within these classifications, whether the disclosure is precisely or less precisely related to users' decision making variables.[6]

Management earnings forecasts are one *type* of voluntary disclosure of a value-relevant payoff. They are common in practice, thus providing a sample size large enough to perform my analysis. Management earnings forecasts are sufficiently credible to move security prices in predictable ways (Ajinkya and Gift 1984; Waymire 1984; Baginski 1987; Pownall and Waymire 1989; and Baginski, Conrad and Hassell 1993).

It is likely that different disclosure types have different effects on cost of equity capital. Disclosures of items that assist forecasts of payoffs, but that are farther removed from payoffs, require investors to engage in more analysis, likely resulting in higher forecast errors. Also, investors with greater information processing capabilities might use indirect disclosures to gain an informational advantage. Both of these conditions could lead to a higher cost of equity capital. Finally, the effects of disclosure type on cost of equity capital might depend on whether the disclosure type is voluntary and unaudited or mandated and audited. Therefore, empirical

[6] For example, voluntary disclosure types that are likely more precise relevant payoff expectations include earnings forecasts, cash flow projections, forecasts of future dividends, and sales projections. Some voluntary disclosures, such as plant closings, strategic business changes, and explanations of cost increases, are less direct and further removed from payoffs used in firm valuation.

results on one disclosure type are not generalizable to other disclosure types. Recognizing this issue, the dimension framework holds type constant and specifies three disclosure dimensions within type – precommitment, quantity, and quality.

<u>Precommitment</u>

Within each disclosure type is the *precommitment* to disclose. Diamond and Verrecchia (1991) define disclosure as "a choice of an accounting technique or a committed policy of making earnings or other forecasts" (p.1330). Note that they are silent as to which specific type of disclosure they are investigating and the quality of the disclosure. Theoretically, firms committed to credibly disclosing information reduce information asymmetry for their stock by reducing information risk faced by uninformed investors (King, Pownall and Waymire 1990). Leuz and Verrecchia (2000) find support for this hypothesis when examining German firms switching to International Accounting Standards (IAS) or United States generally accepted accounting principles (US GAAP) for financial reporting purposes. Switching firms commit to increased disclosure under IAS or US GAAP. Their results show that these switching firms experience lower bid-ask spreads and higher share turnover upon announcing the change in financial reporting.

While prior research defines precommitment as a committed forecasting policy (Diamond and Verrecchia 1991), my definition recognizes that precommitment does not imply an uninterrupted time series of management forecasts. If a firm simply forecasts earnings every period even when information asymmetry is low, then although a disclosure policy clearly exists, the ability of the policy to reduce cost of capital is suspect. In fact, in the context of McNichols and Trueman (1994), the predictability of the upcoming forecast event might actually stimulate private information search (a condition that can lead to greater information asymmetry and higher cost of equity capital).

My definition of precommitment requires that a forecast disclosure is made when conditions signal a need for a forecast (i.e., information asymmetry is higher than normal). My definition also distinguishes precommitment from the quantity of forecasts released. Issuing a large quantity of forecasts does not imply precommitment if the forecasts are not made to reduce information asymmetry. Thus, I do not expect all firms issuing a higher quantity of forecasts to be precommitted to disclosure.

Quantity

A second dimension of disclosure is disclosure *quantity.* Disclosure quantity represents the volume or level of disclosures made by a company. Further, the act of disclosure can be interpreted within the disclosure quantity dimension as a firm separating itself from the set of firms that do not disclose (i.e., quantity is greater than zero). Because management earnings forecasts are voluntary, managers can easily modify the quantity released.

Clear theoretical predictions have only recently been advanced for the relation between cost of equity capital and disclosure quantity (disclosure type, quality, and precommitment held constant). Easley and O'hara (2004) show that higher quantity is associated with lower costs of equity capital. However, a possible alternative hypothesis is that issuing too many forecasts in a period sends a negative signal to the market about management's level of certainty concerning earnings. This uncertainty signal would be magnified if the multiple disclosures convey negatively correlated earnings changes. If these conditions are true, then increasing quantity increases information risk and analyst dispersion causing a higher level of information asymmetry. These alternative conditions might lead to a positive relation between quantity and cost of equity capital. While the findings of Easley and O'hara (2004) suggest a negative relation between disclosure and cost of equity capital, there are situations where perhaps this relation switches to a positive one. This could provide an explanation for some of the mixed results seen in prior literature.

Quality

A third dimension of disclosure is disclosure *quality*. With respect to cost of equity capital, disclosure quality represents the ability of a disclosure to move security prices. In addition to disclosure quantity, Easley and O'hara (2004) also takes into account disclosure quality, and Leuz and Verrecchia (2004) specifically investigate disclosure quality (which they define as higher reporting precision). Together, these papers provide a theoretical negative link between disclosure quality and cost of equity capital.[7]

Statement of Financial Accounting Concepts No. 2 (FASB 1980, hereafter SFAC No.2) discusses the qualitative characteristics of accounting information. SFAC No.2 defines a hierarchy of qualities that make information useful for decision making. The two primary qualities of decision usefulness are relevance and reliability. Relevance and reliability are the two qualities "that distinguish 'better' (more useful) information from 'inferior' (less useful) information" (p.14). While the characteristics are defined in terms of accounting information in general, it can be applied to disclosure types such as management earnings forecasts.

For information to be relevant, it must be capable of making a difference in a decision. SFAC No.2 identifies three components of relevance that information needs to make a difference

[7] Leuz and Verrecchia (2004, page 3) point out that prior research in this area has presupposed that there is a theoretical link between information quality and the firm's cost of equity capital.

in a decision (p.10-11). The first component is predictive value, and it requires that the information increases the probability that users correctly forecast the outcome of events in the past, present, or future. The second component of relevance is feedback value, defined as the quality of information that enables user to confirm or correct prior expectations. The third component of relevance is timeliness, defined as having the information available to a decision maker before it loses its capacity to influence decisions.

The second primary quality of decision usefulness is reliability. SFAC No.2 defines reliability as information that is reasonably free from error and bias and faithfully represents what it purports to represent (p.10-11). Similar to relevance, reliability is also broken into three components: verifiability, representational faithfulness, and neutrality. SFAC No.2 defines verifiability as the ability through consensus among measurers to ensure that information represents what it purports to represent; representational faithfulness as the correspondence or agreement between a measure or description and the phenomenon that it purports to represent; and neutrality as the absence of bias in information intended to attain a predetermined result or to induce a particular mode of behavior.

I define the four sub-elements of management earnings forecast q*uality* as forecast accuracy, forecast specificity, forecast horizon, and forecast bias. Forecast accuracy is the absolute value of the difference between the management earnings forecast and actual earnings. Forecast specificity depends on whether the forecast is a point, range, open interval or qualitative estimate. Forecast horizon is the number of calendar days between the earnings forecast and period-end. Forecast bias is the difference between the management earnings forecast and actual earnings. Figure 2 shows a mapping of SFAC No. 2 qualitative characteristics into my four sub-elements of quality (forecast accuracy, specificity, horizon, and bias).[8] Inaccurate forecasts, less specific forecasts, untimely (short horizon) forecasts, and biased forecasts are of a lower quality because they are less likely to remove information asymmetry.

In summary, prior research has investigated combinations of all four dimensions of disclosure in empirical settings. Figure 1 shows the links investigated in Botosan (1993), Botosan and Plumlee (2002), Leuz and Verrecchia (2000), Piotroski (2002), and the current study. However, none have isolated all four disclosure dimensions in their empirical analysis. My framework allows me to isolate disclosure dimensions and draw specific inferences on the link between the individual disclosure dimensions and cost of equity capital for a specific disclosure type, quarterly management earnings forecasts.

2.4 Predictions

Controlling for one dimension of disclosure (*type*), my three primary hypotheses stated in alternative form are as follows:

H1: A firm's *precommitment* to disclose management earnings forecasts when needed is negatively related to that firm's cost of equity capital.

H2: The *quantity* of management earnings forecasts issued by a firm is either positively or negatively related to that firm's cost of equity capital.

H3: The *quality* of management earnings forecasts issued by a firm is negatively related to that firm's cost of equity capital.

It is important to note that the negative relation in H1 and H3 have both been predicted theoretically (e.g., King et al. 1990; Leuz and Verrecchia 2004; Easley and O'hara 2004). While Easley and O'hara (2004) predict a negative relation between quantity and cost of equity capital, recent empirical research suggests that management earnings forecasts quantity may actually

[8] Acceptance of an exact one-to-one mapping is not necessary to motivate the four sub-elements of quality.

increase cost of equity capital (Botosan and Plumlee 2002; Piotroski 2002) despite not controlling for the other dimensions of disclosure. Accordingly, I use two-tailed tests of H2.

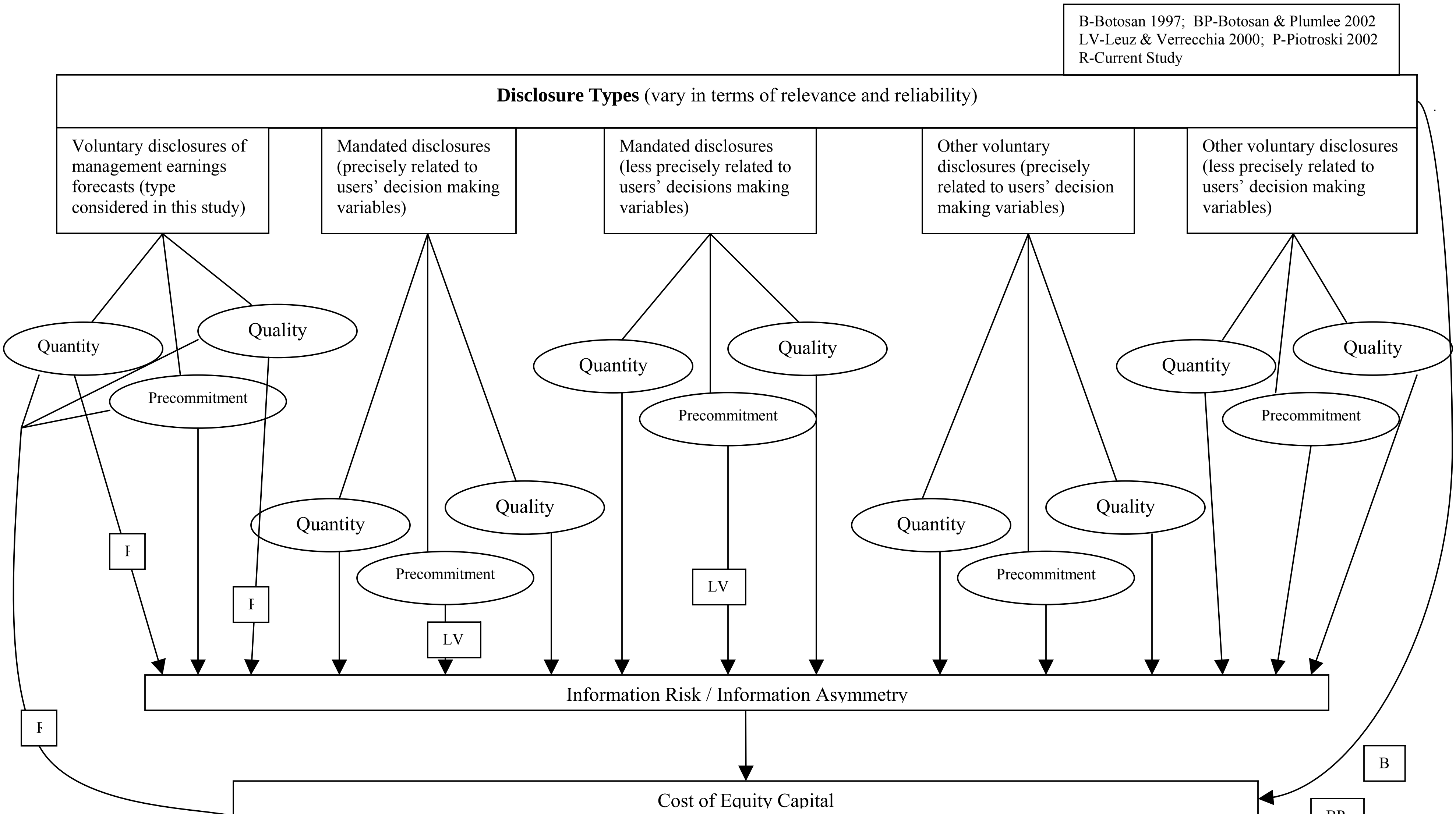

Figure 2.1 – Dimensions of Disclosure

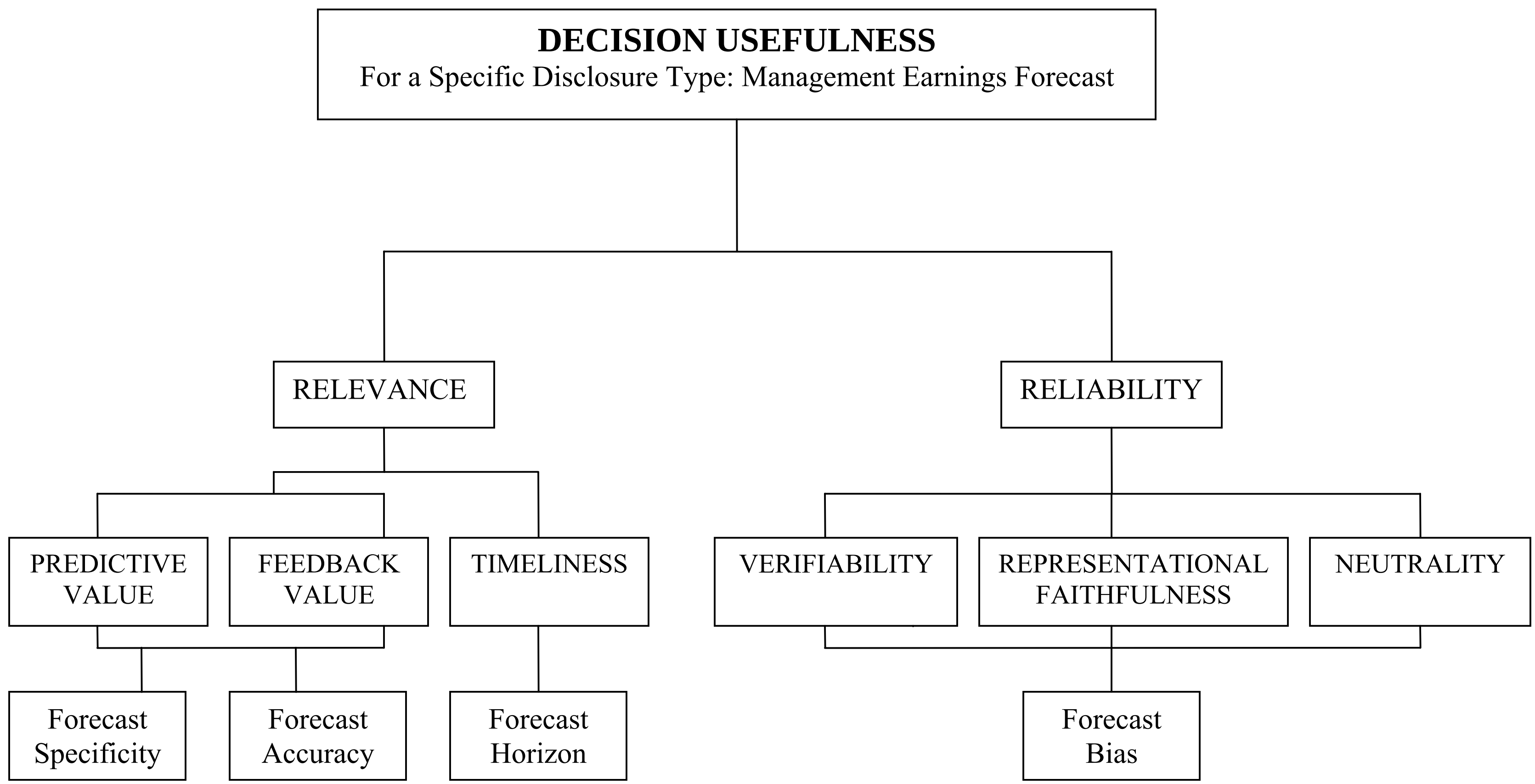

Figure 2.2 – Disclosure Quality Framework

CHAPTER 3

RESEARCH DESIGN AND EMPIRICAL PROXIES

3.1 General Description of Levels Test

My primary analysis is a levels test that focuses on firm-specific disclosure dimensions. More specifically, I sample firms post-Reg FD, measure dimensions of their management earnings forecasting behavior, and determine the effect of each disclosure dimension on the firm's cost of equity capital. Because each disclosure dimension represents an endogenous choice, my study uses a two-stage process using instrumental variables to control for endogeneity.[9] I use a probit model in the first stage to model disclosure dimension choice. The second stage is an OLS model that uses the fitted probability of the disclosure dimension from the first stage as an instrumental variable to control for the endogenous nature of the dimension choice.[10]

3.2 First Stage Models

In my first stage, I use probit to model the different dimensions of disclosure. In each model, a single disclosure dimension is specified as a binary dependent variable (1,0), with

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[9] Appendix A presents a brief summary of the econometric concerns of endogeneity.
[10] The use of instrumental variables to control for endogeneity is consistent with Cohen (2003) and Heflin, Shaw, and Wild (2003), and is noted by Leuz and Verrecchia (2000) to be an alternative solution to self-selection bias in first stage disclosure and second stage disclosure effect modeling.

various explanatory variables aimed at capturing the probability of the binary variable equaling one. I use the following three probit models for my first stage analysis:

$$\Pr(PreCom_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \varepsilon_i) \quad (1)$$

$$\Pr(Quantity_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \beta_7 Offer_i + \varepsilon_i) \quad (2)$$

$$\Pr(Quality_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \beta_7 Offer_i + \varepsilon_i) \quad (3)$$

Where:

$PreCom_i$	equals 1 if the firm's precommitment level is above the sample median (see eq. 4) and 0 otherwise;
$Quantity_i$	equals 1 if the firm issued more management earnings forecasts than the average firm during 2001 and 2002 and 0 otherwise;
$Quality_i$	equals 1 if the firm's management earnings forecast quality is above the sample average (see eq. 5) and 0 otherwise;
$CapIntensity_i$	equals total assets less current assets all divided by total assets at the end of 2000 (From Compustat: [Data6-Data4]/Data6);
ROA_VAR_i	equals the variability of return on assets measured by taking the highest ROA less the lowest ROA over a five year period (years 1998-2002) and dividing by the five year average of ROA, where ROA is measured as Income before Extraordinary Items divided by total assets (From Compustat: Data18/Data6);
$Analyst_i$	equals the number of financial analysts following each firm at the end of 2000 (Obtained from the IBES Summary Statistics file);
$InstOwner_i$	equals percentage of shares held by institutional owners on December 31, 2000 (Obtained from Compact Disclosure);
$HIGHTECH_i$	equals 1 for high tech firms and 0 otherwise;
$REGULATE_i$	equals 1 for firms in regulated industries and 0 otherwise;
$Offer_i$	equals end of 2002 common shares outstanding less end of 2000 common shares outstanding divided by end of 2000 common shares outstanding (all net of treasury stock; From Compustat: [Data25-Data87]).

My first binary dependent variable is *PreCom*, which is equal to one if a firm is precommitted to public disclosure and zero otherwise. I classify a firm as precommitted if it issues a forecast when information asymmetry (i.e., the bid-ask spread) is high. While other information asymmetry proxies could have been used, bid-ask spreads are easily attainable from

CRSP and managers have been shown to issue forecasts in response to high bid-ask spreads (Coller and Yohn 1997). I run the following firm-specific probit model for all sample firms (post-Reg FD forecasters and post-Reg FD non-forecasters) over the years 1995-2002[11]:

$$\Pr(MEF_{it} = 1) = f(\alpha_{it} + \beta_{1i} IA_{i,t-1} + \varepsilon_{it}) \qquad (4)$$

Where:

MEF_{it}	1 if the firm issued a management earnings forecast in the 31 day period following the measurement of IA and 0 otherwise;
$IA_{i,t-1}$	information asymmetry for firm i measured as the average bid-ask spread for the last three days of each month.

The coefficient estimate of β_1 from each firm-specific probit analysis serves as each firm's level of precommitment to public disclosure. I then determine *PreCom* by taking the median of β_1 for the sample and setting *Precom* equal to one for firms with above median levels of precommitment and zero otherwise.[12]

My second probit model's binary dependent variable is *Quantity*, which represents the number of management earnings forecasts issued for each firm in 2001 and 2002 from the Thompson Financial First Call database. I take the mean number of forecasts issued for the sample and set *Quantity* equal to one if the firm issued more forecasts than the sample mean and zero otherwise.

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[11] The 1995-2002 period is used to better capture a firm's commitment to disclosure over time. Any effect of pre-Reg FD forecasts on cost of equity capital is controlled for by the inclusion of a control variable that measures cost of equity capital at the beginning of the sample period (*LagCOC*).

[12] *Quantity* and *Quality* are split at the sample mean, but due to the large variation in measures of the continuous value of *PreCom* in equation (4), I split *PreCom* at the sample median value.

The dependent variable for the third model is *Quality*, which measures the quality of the management earnings forecast as the ability of the forecast to move security prices. To capture this, I estimate the following firm-specific regression over the years 1995-2002[13]:

$$Return_i = \alpha_0 + \beta_1 \frac{MEFest_i - PreAF_i}{price_i} + \varepsilon_i \qquad (5)$$

Where:

$Return_i$	Holding period return for each firm from the CRSP daily stock file for a three-day-window [-1,1] where day 0 is the forecast date;
$MEFest_i$	The forecast estimate for point estimates, midpoint for range estimates, and lower (upper) limit for minimum (maximum) estimates;
$PreAF_i$	This is the consensus analyst forecast in the month preceding the management earnings forecast taken from the IBES Summary Statistics File;
$Price_i$	This is the preannouncement share price taken from the CRSP daily stock file ten days prior to the management earnings forecast.

I use the adjusted R^2 from each firm-specific regression of equation (5) as my proxy for the level of the forecast's quality. To obtain my dichotomous variable, *Quality*, I set all firms with an adjusted R^2 above the sample mean equal to 1 and all firms with an adjusted R^2 below the sample mean equal to 0.

I use explanatory variables to capture both the costs and benefits of the dimensions of disclosure. Explanatory variables include capital intensity (*CapIntensity*) to proxy for the level of financing needs (Lang and Lundholm 1993; Leuz and Verrecchia 2000; Zhang 2005) and barriers to entry (Piotroski 2003; Cohen 2003), which are environmental conditions that encourage disclosure; the variability of return on assets (*ROA_VAR*) to capture the expected lower disclosure when earnings forecasting is difficult (Cox 1985; Waymire 1986); analyst following (*Analyst*) to capture the expected positive relation between disclosure and analyst

[13] I use the 1995-2002 time period here because the number of observations in each firm-specific regression depends on the number of forecasts. By using a larger time period, I allow more forecasts to enter my model creating more observations in each firm-specific regression.

following (Lang and Lundholm 1996); institutional ownership (*InstOwner*), included to capture the expected positive association between lower dispersion of investors and forecasting activity (Leuz and Verrecchia 2000; Cohen 2003; Ajinkya et al 2005); indicator variables for firms in high tech industries (*HIGHTECH*) and regulated industries (*REGULATE*) are included to capture the tendency of firms in high tech industries to issue more forecasts to fend off litigation and the tendency of regulated firms to issue less forecasts due to the amount of information already provided throughout the year to regulatory agencies (Kasznik and Lev 1995; Baginski et al 2004). Equity offerings (*Offer*) are included in equations (2) and (3). Empirical analysis has shown that managers may increase disclosure quantity when accessing the capital markets to reduce information risk or "hype" the stock (Lang and Lundholm 2000). An increase in equity offerings over the sample period should increase the quantity of management earnings forecasts issued over the same period.

The fitted probabilities of equations (1) – (3) are used as instrumental variables for *PreCom*, *Quantity*, and *Quality* in my second stage model. This controls for the endogenous nature of choosing disclosure type.[14]

3.3 Second Stage Model

My second-stage dependent variable is a firm's cost of equity capital at the end of 2002. Prior studies have used a variety of cost of equity capital measures.[15] I measure cost of equity

[14] While switching to a dichotomous (1,0) variable does cause a loss of information, my predictions are based on ordinal relations between each dimension and cost of equity capital. Accordingly, the dichotomous specification better matches the hypotheses, and to the extent that the specification reduces noise in the variable, test power increases.

[15] See Botosan and Plumlee (2005) and Easton and Monahan (2005) for a review of other cost of equity capital measures.

capital using the PEG method, which is derived from the dividend discount model.[16] The formula below is taken from Easton (2004).

$$r_{PEG} = \sqrt{\frac{E_0(eps_2) - E_0(eps_1)}{P_0}} \tag{6}$$

Where:

r_{PEG}	estimated cost of equity capital;
E_0	the expectations operator;
P_0	stock price at end of sample period;
eps_t	earnings per share at time t, where eps_2 (eps_1) represents expected EPS two (one) periods ahead.

The PEG method assumes no changes in abnormal earnings beyond the forecast horizon and no dividend payments prior to the earnings forecasts. By focusing only on forecasted earnings, the PEG method does not require any explicit expectations of future dividends. In changes tests, described later, I must control for the changes in payoffs caused by a specific management forecast in order to isolate cost of equity capital changes. Therefore, use of the PEG method avoids modeling the effect of a management earnings forecast on expectations about future dividends in favor of easily measuring the effect of the management forecast on analysts' earnings expectations.[17]

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[16] Easton (2004, p77) notes that the PEG measure is equal to the price-earnings ratio divided by an earnings growth rate. Using a price-to-forward earnings ratio (PE) for stock recommendations requires that a high (low) PE implies a low (high) expected rate of return, but the earnings of next period may not be indicative of the future stream of earnings. Thus, the PEG captures the comparison of the PE ratio and earnings growth rate as a basis for stock recommendations.

[17] Botosan and Plumlee (2005) advocate the use of the PEG measure but use expected earnings five years out less expected earnings four years out as their numerator in equation (6). The rationale is that using a longer forecast horizon provides more assurance that the assumption of zero abnormal growth in earnings beyond the forecast horizon is not violated. In my analysis, I use expected earnings two years out less expected earnings one year out as their numerator in equation (6), consistent with Easton (2004). However, to mitigate the concern of using a shorter forecast horizon, I employ Cook's D stat in my analysis to remove influential observations. Cook's D statistic measures the change in the parameter estimates caused by deleting each observation. Observations with extreme Cook's D statistics are those that are exerting undue influence on the regression coefficients, and are therefore removed.

To measure the dimensions of disclosure's effect on cost of equity capital, I estimate various alternatives of the following cross-sectional OLS model:

$$COC_i = \alpha_0 + \beta \; DIMENSION_i + \beta' X_i + \varepsilon_i \qquad (7)$$

Where:

COC_i	Cost of equity capital level at the end of 2002 calculated using the PEG method;
$DIMENSION_i$	A vector of the fitted probabilities of the three dimensions obtained from the first stage regressions;
X_i	Vector of control variables discussed below.

3.4 Control Variables

As well as the dimensions of disclosure, there are other determinants of cost of equity capital levels that I control for in my analysis: beginning cost of equity capital level (*LagCOC*), market beta (*BETA*), long-term growth rates (*LTG*), log of market value of equity (*Size*), leverage (*LEV*) and the log of the book-to-market ratio (*LnBM*). *LagCOC* is calculated at the end of 2000 using the PEG method. I measure lagged cost of equity capital shortly after the enactment of Reg FD as a proxy for overall disclosure effects on cost of equity capital of pre-Reg FD disclosure. Because Reg FD's focus was on changing the private communication practices of management, not the nature of mandatory disclosures, pre-Reg FD cost of equity capital also proxies for post-Reg FD mandatory disclosure effects on cost of equity capital. I expect *LagCOC* to be positively associated with *COC*. *LTG* is included to control for risk associated with growth opportunities for each firm and is estimated using the long-term growth rates from IBES.[18] Gebhardt et al. (2001) and Botosan and Plumlee (2005) find *LTG* to be positively associated with cost of equity capital. *BETA* is included in the model to control for systematic risk. *BETA* is estimated using the market model with a minimum of 30 out of 60 monthly returns and a market index return equal to the value-weighted NYSE/AMEX return. Botosan (1997) and Botosan and Plumlee (2002) find *BETA* to be positive associated with cost of equity capital. Fama and French (1992) and Baginski and Wahlen (2003) find a negative relation between *Size* and cost of capital. The log of the common equity of the firm scaled by the market value of equity, *LnBM,* is included because Fama and French (1992), Gebhardt et al. (2001), and Baginski and Wahlen (2003) find a positive relation between *LnBM* and the cost of equity capital. *LEV,* measured as long-term debt plus any debt in current liabilities divided by total assets, is included to proxy for the amount of debt in the firm's capital structure. Botosan and Plumlee (2005) find *LEV* to be positively associated with cost of equity capital.

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[18] For firms with missing growth rates on IBES, I used the ratio of forecasted EPS one period ahead to current forecasted EPS (consistent with Gebhardt et al. 2001). While EPS one period ahead is a component of the PEG measure, this process was used on less than 5% of the sample firms.

CHAPTER 4

SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

Table 4.1 outlines my sample selection procedure. First, I calculate the cost of equity capital for all possible firms at the end of my sample period, December 31, 2002. I use the IBES summary statistics file to obtain analyst expectations of EPS two periods and one period ahead. I use median analyst forecasts released on the third Thursday of January 2003 (January 16, 2003) as my proxy for expected EPS.[19] I delete any firms where EPS two periods ahead is less than EPS one period ahead.[20] I then obtain stock prices from IBES for January 15, 2003 and calculate the level of cost of equity capital using the PEG method. This yields 3,532 firms with a measured level of cost of equity capital (*COC*) and long-term growth rate (*LTG*).

My second step is to calculate the number of quarterly management earnings forecasts (*Quantity*) issued by each firm with a measured cost of equity capital level. I total the number of forecasts from the First Call Corporate Investor Guidelines (CIG) database between January 1, 2001 and December 31, 2002. The 3,532 firms (some forecasters, some not) issued a total of

[19] The IBES summary statistics file releases the consensus analyst forecasts on the third Thursday of every month. I chose to use the consensus from the January 2003 release in order to ensure capturing all management earnings forecasts issued in 2002. The EPS one period ahead reflects fiscal year end 2003 and two periods ahead reflects fiscal year end 2004.

[20] I deleted approximately 3% of the firms with decreasing EPS forecasts. Also, for firms missing a forecast two periods ahead, I use the firm's long-term growth rate to estimate EPS two periods ahead. This process is consistent with Easton and Monahan (2005).

8,638 forecasts. I then measure *PreCom* for my sample firms lowering my sample to 3,124 Firms. Of the 3,124 firms, 963 are coded as precommitted to disclosure. My next step is to measure *Quality* as described in section 3.2. *Quality* cannot be determined for firms that did not issue a forecast, resulting in 1,688 firms with a measurable *Quality*.

I calculate all control variables for the 3,124 firms with a measurable precommitment. Control variables are obtained from Compustat, CRSP, IBES, and Spectrum. Missing data in the calculation of control variables reduces my sample size to 1,759 firms (some forecasters, some non-forecasters) issuing a total of 5,911 management earnings forecasts. Of these 1,759 firms, 621 are identified as precommitted to public disclosure by equation (4).

Table 4.2, Panel A shows descriptive statistics for the 1,759 firms in the final sample. Sample firms had a median cost of equity capital level of 10.40% and issued a median number of two management earnings forecasts. Sample firms had a median size at the end of 2002 of 813.83 ($mil), median long-term earnings growth rate of 13.85%, median institutional ownership of 53.72%, and a median analyst following of six.[21] I also divided the sample into forecasting firms and non-forecasting firms (not shown). Forecasting firms experience, on average, a 0.36% higher cost of equity capital than firms not issuing a forecast and issue a median quantity of four forecasts. Forecasting firms also have a median of three more analysts following the firm, and approximately 20% higher institutional ownership.

Table 4.2, Panel B presents a closer look at the estimation results for *PreCom*. The mean explanatory power for the 1,281 separate firm-specific probit models is 28.22%. To define *PreCom* as a dichotomous variable, I split the sample at the median β_1 of 0.0007. Also, if the dependent variable in equation (4) for each firm was always either a 1 or 0, I could not run the

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[21] By requiring analyst expectations two periods ahead, the sample is biased more toward larger, more heavily followed firms. Thus, the results may not generalize to a sample of smaller firms.

probit model for that firm. However, if a firm never issued a management forecast, I define it as not precommited to disclosure (*PreCom* = 0). Therefore, in later tables in which *PreCom* is a dichotomous variable, the sample size increases to 1,759 observations.

Focusing on the sample years 2001 and 2002, Panel C shows the distribution of *Quantity*. Note the substantial variation in the number of management forecasts issued by the firms in the sample. Firms issuing a quantity of eight or more forecasts (during an eight quarter period) suggests that there could be a number of firms with a clear policy to issue disclosures every quarter. Panel D provides a closer look at the model used to estimate *Quality*. The 1,173 separate firm-specific ordinary least squares models yield a mean adjusted R^2 of 0.0844, which is where the sample is split to specify the dichotomous variable *Quality*. Values above the mean represent the highest quality (*Quality* = 1).

Table 4.1
Sample Selection

	Firms	Forecasts	Precommitted
Initial sample of all firms with measurable *COC & LTG*	3,532		
Sample of all firms with measurable *Quantity*	3,532	8,638	
Sample of all firms with measurable *PreCom*	3,124[a]	8,352	963
Sample of all firms with measurable *Quality*	1,688[b]	7,817	837
Less missing data for:[c]			
Beta	(406)	(714)	(99)
Size	(52)	(74)	(15)
LEV	(12)	(21)	(1)
LnBM	(61)	(147)	(23)
LagCOC	(752)	(1,340)	(185)
Analyst	-	-	-
InstOwner	(5)	(7)	-
CapIntensity	(46)	(46)	(10)
ROA_VAR	(7)	(7)	(2)
Offer	(24)	(85)	(7)
Final Sample	**1,759**	**5,911**	**621**

[a]Of the 3,124 firms with a measurable *COC*, *Quantity*, and *PreCom*, 1,281 did not issue a forecast during the two-year sample period.

[b]*Quality* cannot be determined for firms that did not issue a forecast during 1995-2002. This results in the final sample of firms with a measurable *Quality* of 1,688. Additional loss of firms with a measurable level of quality due to control variables results in the final sample of 1,173 used in the regression analysis.

[C]Control variable measurement is done on the 3,124 firms with a measurable *COC*, *Quantity*, and *PreCom* because *Quality* is not used in every regression. This results in a loss of observations when *Quality* is added to the second-stage regressions.

Table 4.2
Descriptive Statistics and Sample Distribution

Panel A: Descriptive Statistics[a]

Variable[c]	N[b]	Mean	Std Dev	75th pct	Median	25th pct
PreCom	1,281	0.2021	21.3636	0.3709	0.0007	-0.3485
Quantity	1,759	3.3604	3.9159	5	2	0
Quality	1,173	0.0844	0.1236	0.1173	0.0280	0.0010
InstOwner	1,759	0.5051	0.2637	0.7123	0.5372	0.3105
CapIntensity	1,759	0.2578	0.2337	0.3964	0.1867	0.0649
Analyst	1,759	8.2672	6.8162	11	6	3
ROA_VAR	1,759	3.4851	26.1106	2.0305	0.8663	0.3775
Offer	1,759	0.2118	0.5833	0.2165	0.0363	0
COC	1,759	0.1278	0.0902	0.1396	0.1040	0.0824
LagCOC	1,759	0.1178	0.0724	0.1353	0.1009	0.0800
Beta	1,759	0.9300	1.7584	1.7462	0.8088	0.0580
LTG	1,759	18.628	39.499	20	13.85	9
Size (millions)	1,759	4,959.20	16,945	2,844.01	813.83	264.56
LEV	1,759	0.2130	0.1801	0.3312	0.1966	0.0477
LnBM	1,759	0.6479	0.4597	0.8080	0.5570	0.3531

[a]Table provides summary statistics for primary variables in empirical analysis. *PreCom*, *Quality* and *Quantity* are shown before conversion to the 1,0 indicator variables used in the respective probit analysis.
[b]Statistics are based on 1,759 firms. *PreCom* and *Quality* are based on 1,281 and 1,173 firms, respectively. This is due to the inability to calculate equations (4) and (5) if the firms never issued a forecast. For *PreCom*, firms that never issued a forecast are coded as 0 resulting in a sample size of 1,759 when PreCom is converted to a dichotomous variable.
[c]Variable definitions are as follows: *PreCom* is level of precommitment from equation (4); *Quantity* is the number of forecasts issued by each firm in 2001 and 2002; *Quality* is the quality of the forecast measured in equation (5); *InstOwner* is the percentage of shares held by institutions as of December 31, 2000; *CapIntensity* is total assets less current assets divided by total assets at the end of 2000; *Analyst* is the number of analysts following each firm; *ROA_VAR* is return on asset variability: This is the high ROA less the low ROA for each firm over a five year period divided by the absolute value of the five year average of ROA where ROA is measured as Income before Extraordinary Items divided by total assets; *Offer* is common shares outstanding (net of common shares held as treasury stock; Data25-Data87 in Compustat) at the end of 2002 less Common shares outstanding (net of common shares held as treasury stock) at the beginning of 2001 all divided by Common shares outstanding (net of common shares held as treasury stock) at the beginning of 2001; *COC* is calculated using equation (7) at the end of 2002 using the Summary Statistic file from IBES for EPS expectations; *LagCOC* is COC at January 18, 2001; *BETA* is estimated using the market model with a minimum of 30 out of 60 monthly returns and a market index equal to the value weighted NYSE/AMEX return; *LTG* is long-term growth factor from IBES Summary Statistic file at the end of 2002; *Size* is the natural log of the market value of equity at December 31, 2002; *LEV* is leverage calculated as long-term debt plus any debt in current liabilities divided by total assets; and *LnBM* is the natural log of the book-to-market ratio measured as book value of equity divided by common shares outstanding multiplied by end of year stock price at the end of 2002 where the statistics shown here represent the book-to-market ratio before calculating the natural log.

Panel B: Descriptive statistics for model used to identify *Precommitted* firms

$$\Pr(MEF_{it} = 1) = F(\alpha_{it} + \beta_1 IA_{i,t-1} + \varepsilon_{it}) \quad (4)$$

MEF_{it} 1 if the firm issued a management earnings forecast in the 31 day period following the measurement of IA and 0 otherwise;

$IA_{i,t-1}$ information asymmetry for firm i measured as the average bid-ask spread for the last three days of each month.

	N	Mean	Median	Std. Deviation
Pseudo R^2	1,281	0.2822	0.2840	0.1259

	25th Percent	Median	75th Percent	Mean	Std. Dev.
β_1 estimates (*PreCom*)	-0.3485	0.0007	0.3709	0.2021	21.3636

Panel C: Distribution of the *Quantity* of earnings forecasts made by a firm in 2001 & 2002

Number of Forecasts	0	1	2	3	4	5	6	7	8
Number of firms	558	235	177	140	113	106	87	63	77

Number of Forecasts	9	10	11	12	13	14	15	16	>16
Number of firms	67	31	27	25	15	10	10	5	13

Panel D: Descriptive statistics for model used to measure *Quality*

$$Return_i = \alpha_0 + \beta_1 \frac{MEFest_i - PreAF_i}{price_i} + \varepsilon_i \quad (5)$$

Where:

$Return_i$ Holding period return for each firm from the CRSP daily stock file for a three-day-window [-1,1] where day 0 is the forecast date;

$MEFest_i$ The forecast estimate for point estimates, midpoint for range estimates, and lower (upper) limit for minimum (maximum) estimates;

$PreAF_i$ This is the consensus analyst forecast in the month preceding the management earnings forecast taken from the IBES Summary Statistics File;

$Price_i$ This is the preannouncement share price taken from the CRSP daily stock file ten days prior to the management earnings forecast.

	N	Mean	Median	Std. Deviation
adjusted R^2 (*Quality*)	1,173	0.0844	0.0280	0.1236

CHAPTER 5

ANALYSIS OF THE DIMENSIONS OF DISCLOSURE

Because this is the first study to delineate disclosure into four separate dimensions, it is important to ensure that the dimensions do not measure the same construct (i.e., are highly positively correlated). Table 5.1 shows Spearman correlations for the dimensions of disclosure each defined continuously. The correlations between *PreCom* and *Quantity* and *Quality* are either not reliably different from zero or relatively small. Of particular interest, *PreCom* is negatively correlated with *Quantity*, suggesting that increasing the quantity of disclosure does not imply that a firm is precommitted to disclosure. *PreCom* and *Quality* are not significantly correlated, which suggests that being a high quality forecaster does not imply that the firm is precommitted to disclosure. Also, *Quantity* and *Quality* are positively correlated. This is important since prior research has often assumed that measuring disclosure quantity is also capturing quality (Botosan 1997, Hail 2002). However, the relatively low correlation (Spearman correlation coefficient of 0.1982) might help explain the mixed evidence found in past studies on the relation between disclosure and cost of equity capital that did not control for the different dimensions of disclosure (Botosan and Plumlee 2002).

Because *PreCom*, *Quantity*, and *Quality* are converted to dichotomous variables for the first stage of the two stage regression procedure, Table 5.2 presents contingency tables for descriptive purposes. Note that once the variables are transformed in this manner, all dimensions are still distinct measures. Panel A shows a chi-square analysis between *Quantity* and *PreCom*. Of the 649 firms issuing more forecasts than the sample average, only 294 are defined as being precommitted to disclosure, while the remaining 355 are defined as not being precommitted to disclosure. The analysis also shows that of the 1,110 firms issuing less than the average number of forecasts, 327 of them are still considered precommitted to disclosure. Panel B shows that of the 567 firms considered precommitted to disclosure, only 184 are high quality forecasters. Also, of the 606 firms not considered precommitted to disclosure, 200 firms are high quality forecasters. Finally, Panel C finds that of the 534 firms issuing a below average number of forecasts, 176 are still considered to be high quality forecasters.

To summarize Tables 5.1 and 5.2, the disclosure dimensions are not perfectly correlated, and failure to delineate disclosure dimensions could possibly be the cause of mixed results seen in prior research concerning disclosure's relation with cost of equity capital. Of course, *PreCom* and *Quality* might be measured with so much error that they lack validity as proxies, and this drives a lower association with *Quantity* of management forecasts issued. This condition will bias my tests against finding the expected negative theoretical relation between cost of equity capital and both *PreCom* and *Quality*.

Table 5.1
Spearman Correlations Among Disclosure Dimensions (Measured as Continuous Variables)

Variable	*PreCom* (Tendency to forecast when information asymmetry is high)	*Quantity* (Number of forecasts)	*Quality* (Ability of forecast to reduce information asymmetry)
PreCom	1.0000	-0.0881 (0.0016)	-0.0324 (0.2684)
Quantity		1.0000	0.1982 (<.0001)
Quality			1.0000

The table presents Spearman correlation coefficients (probabilities) for the continuous versions of *PreCom*, *Quantity*, and *Quality* prior to conversion to a dichotomous variable. Because *PreCom* and *Quality* can only be measured for firms that issued a forecast, the number of observations above for *PreCom* and *Quality* are 1,281 and 1,173, respectively. Firms that never issued a forecast are coded as *PreCom*=0 resulting in 1,759 firms for *PreCom* when the dichotomous variable is measured.

PreCom is level of precommitment from equation (4); *Quantity* is the number of forecasts issued by each firm in 2001 or 2002; *Quality* is the quality of the forecast measured in equation (5).

Table 5.2
Chi-Square Associations of Disclosure Dimensions (Measured as Dichotomous Variables)

Panel A: Forecasting frequency (Quantity) and precommitment (PreCom)

Observations	*PreCom*		
Quantity	1	0	Total
1	294	355	649
0	327	783	1,110
Total	621	1,138	1,759
Chi-Square = 44.9951, p < 0.0001			

Panel B: Forecast quality (Quality) and precommitment (PreCom)

Observations	*Quality*		
PreCom	1	0	Total
1	184	383	567
0	200	406	606
Total	384	789	1,173
Chi-Square = 0.0405; p = 0.8405			

Panel C: Forecast quality (Quality) with forecasting frequency (Quantity)

Observations	*Quality*		
Quantity	1	0	Total
1	208	431	639
0	176	358	534
Total	384	789	1,173
Chi-Square = 0.0220; p = 0.8821			

PreCom equals one for firms whose level of precommitment is above the median level for the sample and zero otherwise; *Quality* equals one for firms with above the mean level for the sample and zero otherwise; and *Quantity* equals one for firms with above the mean level for the sample and zero otherwise.

CHAPTER 6

EMPIRICAL RESULTS

6.1 First Stage Results

Table 6.1 reports the results of the first stage probit analysis. The fit for equation (1) (pseudo R^2 of 0.5567) is similar to that reported by Leuz and Verrecchia (2000) (McFadden R^2 of 0.408), who model the choice to precommit to a change to higher quality GAAP with a slightly different set of variables. Pseudo R^2 in the *Quantity* and *Quality* equations are 54.04% and 55.79%, respectively.

Consistent with Leuz and Verrecchia (2000), I am less concerned with the signs and significance of individual explanatory variables, focusing more on including several variables suggested by prior literature to obtain a high explanatory power for disclosure decisions in the first stage. As pointed out by Cohen (2003), first stage regressions need not be correctly specified to mitigate endogeneity bias.

6.2 Second Stage Multivariate Analysis (Hypothesis Testing)

Table 6.2 presents the results of various specifications of equation (7). The first specification focuses on the relation between *PreCom* and cost of equity capital, where *PreCom* is the fitted probability from equation (1). The coefficient on *PreCom* is significantly negative as predicted, suggesting that firms precommitted to disclosure experience a lower cost of equity capital than other firms.[22] This result supports H1.

The next column estimates the relation between the fitted probabilities of *Quantity* from equation (2) and the firm's cost of equity capital (a test of H2). The coefficient on *Quantity* is negative and significant, which implies that firms issuing more management earnings forecasts experience a lower cost of equity capital. The negative relation is consistent with the theoretical predictions of Easley and O'hara (2004).

The next column estimates the relation between *Quality* and cost of equity capital, where *Quality* is the fitted probability from equation (3). The coefficient on *Quality* is significantly negative as predicted by H3, suggesting that firms issuing higher quality management earnings forecasts experience a lower cost of equity capital than other firms.

In the next column, *Quality* is replaced with sub-elements defined from the Conceptual Framework – accuracy, bias, horizon, and specificity[23] – where each variable is the average value over 2001 and 2002, and accuracy and bias are their respective rank-ordered averages.[24] Two of the four sub-elements are significantly related to the cost of equity capital with expected signs. *AvgError* (i.e., inaccuracy) measures the rank-ordered average absolute value of management forecast errors in 2001 and 2002. The significant positive coefficient implies that inaccuracy is associated with a higher cost of equity capital. *AvgMFH* is the average forecasting horizon of forecasts issued in 2001 and 2002, and thus, proxies for the timeliness of management

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[22] All control variables are significant and in the predicted direction for all regression specifications. Therefore, I focus attention on the coefficients relating to the dimensions of disclosure.

[23] The sub-element analysis is a one-stage test using equation (7). The mean (median) values for *AvgError, AvgBias, AvgMFH, AvgMFS* are 0.0044 (0.0018), 0.0012 (0.0000), 57.88 (55.71), and 2.13 (2), respectively, where the values for *AvgError* and *AvgBias* are based on their unranked values.

[24] I use rank-ordered averages because I am testing the ordinal relation between these sub-elements of quality and cost of equity capital.

forecasts. The significant negative coefficient implies that firms issuing longer horizon (i.e., more timely) forecasts have lower costs of equity capital.

The last two columns examine incremental effects of including all dimensions. The primary conclusion is that precommitment is the only dimension of disclosure incrementally associated with a reduced cost of equity capital. Correlation results provided earlier show that precommitment is distinct from the other dimensions of forecasts. After controlling for precommitment, the *Quantity* and *Quality* dimensions are still negative as predicted but insignificant. This conclusion is not robust to an alternative specification of *Quality*. When the quality sub-elements replace *Quality*, *PreCom* and *Quantity* are both significantly negative, and the two sub-elements of quality (inaccuracy and timeliness) are significant.

Table 6.1
First Stage Results

This table summarizes first stage probit results of the following equations:

$$\Pr(PreCom_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \varepsilon_i) \quad (1)$$

$$\Pr(Quantity_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \beta_7 Offer_i + \varepsilon_i) \quad (2)$$

$$\Pr(Quality_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \beta_7 Offer_i + \varepsilon_i) \quad (3)$$

	Equation 1 Pr(*PreCom$_i$*=1)	**Equation 2** Pr(*Quantity$_i$*=1)	**Equation 3** Pr(*Quality$_i$*=1)
Variable	Coefficient Chi-Square	Coefficient Chi-Square	Coefficient Chi-Square
Intercept	0.7761 86.42***	1.4419 235.33***	0.5481 20.03***
CapIntensity	0.1717 1.50	-0.3532 6.11**	-0.1065 0.34
ROA_VAR	-0.0028 0.96	-0.0034 1.00	0.0034 0.52
Analyst	-0.0249 27.01***	-0.0295 36.42***	0.0022 0.16
InstOwner	-0.3752 8.79***	-1.4124 109.87***	-0.1516 0.78
HIGHTECH	-0.2268 7.87***	-0.2270 7.42***	-0.0552 0.32
REGULATE	0.2416 3.45*	0.4656 11.23***	0.0800 0.18
Offer		0.0519 0.86	-0.0446 0.42
Pseudo R^2	0.5567	0.5404	0.5579

*, **, and *** indicate chi-square statistical significance at p<0.1, p<0.05 and p<0.01.
PreCom is 1 if the firm's precommitment level is above the sample median and 0 otherwise; *Quantity* is1 if the firm issued more management earnings forecasts than the average during 2001 and 2002 and 0 otherwise; *Quality* is 1 if the firm's quality level is above the sample average and 0 otherwise; *CapIntensity* is measured as total assets less current assets all divided by total assets at the end of 2000; *ROA_VAR* is the variability of return on assets is measured by taking the highest ROA less the lowest ROA over a five year period (years 1995-2000) and dividing by the five year average of ROA, where ROA is measured as Income before Extraordinary Items divided by total assets; *Analyst* is the number of financial analysts following each firm at the end of 2000; *InstOwner* represents the percentage of shares held by institutional owners on December 31, 2000; *HIGHTECH* is 1 if the firm is in a high tech industry and 0 otherwise; *REGULATE* is 1 if the firm is in a regulated industry and 0 otherwise; and *Offer* is measured as ending (end of 2002) common shares outstanding less beginning (end of 2000) common shares outstanding divided by beginning common shares outstanding (all net of treasury stock).

Table 6.2
Second Stage Regression Results

		Various Multivariate Regression Specifications					
		PreCom Effect	*Quantity* Effect	*Quality* Effect	*Quality* Elements Effect	Incremental Effects	Incremental Effects
Variable	Expected Sign	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)
Intercept	+/-	0.1580 11.96***	0.1362 14.78***	0.2494 5.57***	0.0951 7.74***	0.2382 3.96***	0.1889 8.71***
PreCom	-	-0.0710 -5.08***				-0.0780 -2.27**	-0.0621 -1.88**
Quantity	+/-		-0.0392 -5.43***			-0.0197 -0.92	-0.0334 -1.85*
Quality	-			-0.2132 -3.26***		-0.0665 -0.76	
AvgError	+				0.0000 2.54***		0.0000 2.60***
AvgBias	+				0.0000 0.11		-0.0000 -0.07
AvgMFH	-				-0.0001 -1.80**		-0.0001 -2.28**
AvgMFS	-				-0.0003 -0.09		-0.0020 -0.64
LagCOC	+	0.2228 9.59***	0.2161 9.78***	0.2346 7.88***	0.2170 6.65***	0.2310 7.80***	0.2157 6.68***
LTG	+	0.0006 8.11***	0.0005 7.93***	0.0004 4.93***	0.0005 5.29***	0.0004 5.68***	0.0004 4.95***
Beta	+	0.0024 3.32***	0.0023 3.22***	0.0023 2.65***	0.0034 3.66***	0.0019 2.15**	0.0022 2.35***
Size	-	-0.0046 -5.28***	-0.0041 -4.95***	-0.0029 -2.72***	-0.0022 -1.87**	-0.0072 -5.62***	-0.0066 -5.05***
LnBM	+	0.0136 7.10***	0.0137 7.34***	0.0134 5.23***	0.0110 4.05***	0.0120 4.72***	0.0097 3.65***
LEV	+	0.0298 4.32***	0.0222 3.27***	0.0133 1.51*	0.0174 1.87**	0.0256 2.77***	0.0277 2.85***
Adj. R^2		0.1806	0.1810	0.1617	0.1747	0.1885	0.2037
N[a]		1,664	1,665	1,107	915	1,106	913

*, **, and *** indicate statistical significance at p<0.1, p<0.05 and p<0.01, respectively using one-tailed tests or two-tailed tests if no clear sign prediction.

Where; *PreCom* is the fitted probability from equation (1); *Quantity* is the fitted probability from equation (2); *Quality* is the fitted probability from equation (3); *AvgError* is the rank-ordered average accuracy of all forecasts for each firm in 2001&2002; *AvgBias* is the rank-ordered average bias of all forecasts issued by a firm in 2001&2002; *AvgMFH* is the average forecast horizon of all forecasts issued by each firm in 2001&2002; *AvgMFS* is the average specificity of each forecast in 2001&2002; *LagCOC* is COC at January 18, 2001; *LTG* is long-term growth factor from IBES Summary Statistic file; *BETA* is estimated using the market model with a minimum of 30 out of 60 monthly returns and a market index equal to the value weighted NYSE/AMEX return; *Size* is the natural log of the market value of equity at December 31, 2002; *LnBM* is the natural log of the book-to-market ratio measured as book value of equity divided by common shares outstanding multiplied by end of year stock price; *LEV* is leverage calculated as long-term debt plus any debt in current liabilities divided by total assets.

[a]Regressions using *PreCom* and *Quantity*, *Quality*, and the quality elements had 1,759, 1,173, and 971 observations, respectively. The N shown here is the result of influential observations being deleted using Cook's d statistic.

CHAPTER 7

SENSITIVITY ANALYSIS

7.1 One-Stage Tests

Larcker and Rusticus (2004) find that there are 35 articles (the search covers the following journals: *Accounting, Organizations and Society, Contemporary Accounting Research, Journal of Accounting and Economics, Journal of Accounting Research, Journal of Financial Economics,* and *The Accounting Review*) that have used some form of instrumental variable estimation since 2000, indicating that this methodology is common in contemporary accounting research. However, they add that many of the instrumental variable applications can possibly produce misleading parameter estimates and inferential tests. They find that for two typical accounting research studies (disclosure's effect on cost of capital and the association between chief executive officer compensation and the power of corporate insiders) OLS estimation is preferable to instrumental variable estimation. As such, I run equation (7) for each dimension where DIMENSION is the actual value of the dimension and not the fitted probabilities obtained from equations (1)-(3).

Table 7.1 documents the results of these four one-stage OLS regressions. OLS results for *PreCom* and *Quality* are both positive and insignificant, and the results for *Quantity* are still significant but positive suggesting *Quantity* increases cost of capital. When all dimensions are included in the same regression, Quantity is still positive and significant. If I assume that all dimensions are properly measured, these single stage results imply that disclosure has either a positive or no effect on cost of equity capital, inconsistent with theory and prior empirical literature.[25] While the instrumental variables employed in my study are not necessarily perfect instruments, I believe that the use of instrumental variables is warranted given the endogenous nature of the three dimensions of disclosure investigated and the suggestion by Easley and O'hara (2004) that firms choose dimensions such as quantity and quality.

7.2 Effects of Other Disclosure Types

Because the theoretical literature generally focuses on the effect that disclosure, in general, has on cost of equity capital and not one specific type of disclosure, it is important to assess the effect that other types of disclosure have on cost of equity capital. To do this, I run my two-stage analysis and include in the second stage regression (equation (7)) a variable for the quantity of annual management earnings forecasts (*Annual*) and another variable (*Other*) that includes the number of all other voluntary disclosure types (cash earnings per share, cash flow per share, EBITDA, funds from operations) from First Call.[26]

Table 7.2 shows the second stage results with the two new explanatory variables.[27] Comparing the results in Table 7.2 with the original results in Table 6.2, it is noticeable that the addition of these two explanatory variables increases the explanatory power of the tests (adjusted R^2 increases range from 0.8% to 2.32%). In the first three columns, *PreCom*, *Quantity*, and *Quality* have all increased in significance. In the last column, *PreCom* is the only significant dimension when all dimensions are included in the regression. Note that the two additional control variables are also measures of quantity. Thus, my results show that higher quantity of

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[25] Cohen (2003) also obtains conflicting results in one stage tests, and he argues that the two-stage approach is superior in controlling for self-selection bias.

[26] *Quantity* is highly correlated with *Annual* (Spearman correlation coefficient of 0.5426) suggesting that quarterly management earnings forecasts proxies for the overall earnings forecasting behavior of a firm. *Quantity* was not correlated with *Other*.

[27] The first stage probit results are omitted here because the first stage model has not changed, and thus, the results are the same as those already presented in Table 5.

different types of forecasts are also associated with lower costs of equity capital, consistent with Easley and O'hara (2004).

7.3 December 31 Fiscal Year End Firms

It is common for empirical studies using cost of equity capital proxies to include only firms that have a December 31 fiscal year end (e.g., Easton 2004). This is done to ensure that all control variables and the market implied discount rate and growth rate are measured at the same point in time. To test sensitivity to this issue, I run my two-stage analysis for all firms in my sample with a December 31 fiscal year end.

Table 7.3 presents the first stage probit results. The results presented in Table 7.3 are fairly consistent with those presented in Table 6.1. A few exceptions are that in equation (1), *CapIntensity* is now significant, while *HIGHTECH* and *REGULATE* are not significant. In equation (2), *Offer* is now significant, while *HIGHTECH* and *REGULATE* have decreased in significance. Also, the overall pseudo R^2 for each probit model has decreased slightly.

Table 7.4 presents the second stage OLS results. The overall R^2 for each regression has increased. *PreCom, Quantity*, and *Quality* are still negative and significant as predicted. When all dimensions are combined, *Quantity* is now negative and significant, while *PreCom* is no longer significant suggesting that my results may not generalize to smaller subsets of my sample.

7.4 Alternative Quality Specifications

Prior research notes that disclosure quality is difficult to estimate because it is unobservable (e.g., Botosan 1997; Botosan et al. 2004). Because this is the first paper to explicitly measure disclosure quality for one specific type of disclosure, I define an alternative specification of disclosure quality.

The alternative (*AltQuality*) measures the extent to which management forecasts remove information asymmetry. While *Quality* considers the information asymmetry between managers and analysts, *AltQuality* considers the information asymmetry present between informed and uninformed investors by using the bid-ask spread as the proxy for information asymmetry. Using all quarterly management earnings forecasts for a given firm from 1995 to 2002, I estimate the following firm-specific regression:

$$\Delta IA_i = \alpha_0 + \beta_{1_i} MEF_i + \varepsilon_i \qquad (8)$$

Where:

ΔIA_i	Change in the bid-ask spread between months for every month from 1995 to 2002 where the change is calculated as the average of the first month's spread less the second month's spread (where the average is the average of the last three days of each month);
MEF_i	Equal to 1 if the firm issued a management earnings forecast during each month from 1995 to 2002 and 0 otherwise.

A positive ΔIA_i indicates that information asymmetry decreased in the month after the forecast. The β_1 from each firm-specific model serves as my proxy for disclosure quality (*AltQuality*), where a large, positive coefficient implies that the forecast decreased information asymmetry (higher quality). To obtain the dichotomous version of *AltQuality* used in the first stage regression, I set *AltQuality* equal to one if the firm's β_1 is above the sample average and zero otherwise.

The results are presented in Tables 7.5 and 7.6. In Table 7.6, the coefficient on *AltQuality* is insignificant, when considered in isolation, but is negative and significant as predicted when combined with *PreCom* and *Quantity*. *PreCom* and *Quantity* are also negative and significant. The odd result of *AltQuality* being positive and insignificant when considered in isolation but significantly negative when combined with *PreCom* and *Quantity* can possibly be explained by the high negative correlation between *PreCom* and *AltQuality* (Spearman correlation coefficient of -0.3616).[28] When *PreCom* is removed and *AltQuality* and *Quantity* are run in the same regression (not shown), *Quantity* is still negative and significant, but *AltQuality* is now positive and insignificant. Overall, these results illustrate the difficulty in properly measuring disclosure quality. Perhaps future research could examine a combination of the two measures as a possible alternative to the measures presented in this study.

7.5 The Effect of Financial Firms

Easton (2004) refers readers to http://www.fool.com/School/TheFoolRatio.htm for a description of the PEG ratio. This site notes that the PEG ratio may not work for firms in the financial industry. As such, I run my primary analysis without financial firms to test their effect on my results. The results in Tables 7.7 and 7.8 indicate that removing financial firms from the sample has a minimal effect on the results. The overall power of the first stage increased slightly, but the second stage results remain fairly consistent with Table 6.2. The only exception is that *Quality* is now insignificant when isolated from the other dimensions, however, the sub-elements of quality are still consistent with Table 6.2. Thus, removing financial firms from the sample does not change the inferences being drawn from the results in the primary analysis.

7.6 Alternative Quantity Specifications

While my current measure of *Quantity* provides a direct number of the quarterly management earnings forecasts issued in 2001 and 2002, this measure can be misleading. For

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[28] *AltQuality* and *Quantity* are positively correlated (Spearman correlation coefficient of 0.0713) as expected, but *AltQuality* has a weaker correlation with *Quantity* than does *Quality*. *AltQuality* has a mean (median) value of

example, assume a firm has a clear disclosure policy that calls for issuing one forecast per quarter. This firm would have a quantity of eight forecasts in 2001 and 2002. This is a reasonable situation for firms with clear disclosure policies, but not all firms have clear disclosure policies. There could also be firms with a quantity of eight that only issued forecasts in a few quarters due to factors such as high information asymmetry or high earnings variability in certain quarters. To address this issue, I compare three alternative specifications of disclosure quantity with my original measure.

The first quantity alternative (*AltQuantity1*) is based on the number of quarters a firm issues a forecast in 2001 and 2002, regardless of how many forecasts are issued in each quarter. Thus, under this alternative, the maximum quantity can be eight (i.e., eight quarters in 2001 and 2002). This alternative helps to separate firms that are regular forecasters from those that are sporadic forecasters. The second quantity alternative (*AltQuantity2*) is based on the average number of days between forecasts. Firms not issuing a forecast are deleted from this analysis. I expect this alternative measurement to have the opposite sign of the *AltQuantity1* because a longer time between forecasts is indicative of more sporadic forecasting behavior.

The third measure (*AltQuantity3*) is used by Zhang (2005). Zhang defines quantity as the percentage of non-zero-return trading days during the disclosure window. Zhang draws on Theil's (1967) definition of information as a change in the expectations of the outcome of an event to support the rationale that stock price changes reflect shifts in investors' beliefs in equilibrium. Zhang adds that this results from investors' responses to disclosures of new information (p.4). Thus, a high occurrence of non-zero-return trading days implies higher new information (i.e., high quantity) flow to the market.

0.0043 (-0.0033).

The results of the two stage analysis are presented in Tables 7.9 and 7.10. As expected, *AltQuantity2* is significant and has the opposite sign of *AltQuantity1*. *AltQuantity3* is also negative and significant. *AltQuantity2* is the only alternate quantity measure that remains significant when combined with the other dimensions, but *PreCom* is not significant when combined with *AltQuantity2*. All alternative quantity measures are highly correlated with *Quantity* (*AltQuantity3* has the lowest Spearman correlation coefficient at 0.2348 and *AltQuantity1* has the highest at 0.9909), and all three are at least weakly correlated with *Quality*. Overall, the alternative quantity measurements do not change the inferences drawn.

7.7 Quantity and Quality in Precommitted Firms

To further analyze precommitted firms, I assess whether quantity and quality affect cost of equity capital for those firms where *PreCom* is equal to one. To do this, I run the two stage analysis on *Quantity* and *Quality* for the firms coded as precommitted to disclosure. Table 7.11 presents the results of the second stage. In addition to *Quantity* and *Quality*, I include the quality elements and the alternative quality measures (*AltQuality*) in the analysis. An intriguing result for precommitted firms is that the relation between the quantity of forecasts and cost of equity capital has switched from a negative to a positive and significant relation. This might explain why *Quantity* is not as significant when all dimensions are combined in Table 6.2. Both quality measures (*Quality* and *AltQuality*) are negative and significant as predicted, but the sub-elements of quality are less significant with inaccuracy being the only significant element.

7.8 Omitting LagCOC

LagCOC is calculated at the end of 2000 to proxy for overall disclosure effects on cost of equity capital of pre-Reg FD disclosure. Because Reg FD's focus was on changing the private communication practices of management, not the nature of mandatory disclosures, pre-Reg FD cost of equity capital also proxies for post-Reg FD mandatory disclosure effects on cost of equity capital. Because of the positive correlation between *COC* and *LagCOC* (Spearman correlation coefficient of 0.254), it is necessary to ensure that the overall results are not sensitive to the inclusion or omission of *LagCOC*. I run my initial two stage analysis omitting *LagCOC* to analyze the effect, if any, of *LagCOC* on the inferences being drawn. The results in Table 7.12 show that the main effect is a loss in explanatory power. The three dimensions of disclosure have consistent results with the original results in Table 6.2, and the two significant elements of quality (*AvgError* and *AvgMFH*) increase in explanatory power when isolated from the other dimensions. In summary, the main inferences being drawn are not influenced by the inclusion of *LagCOC* in the analysis.

Table 7.1
One Stage Regression Results

		PreCom Effect	*Quantity* Effect	*Quality* Effect	Incremental Effects
Variable	Expected Sign	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)
Intercept	+/-	0.1086 13.21***	0.0996 15.65***	0.1086 12.74***	0.1067 12.42***
PreCom	-	0.0005 0.87			0.0010 1.54
Quantity	+/-		0.0006 1.87*		0.0008 2.04**
Quality	-			0.0037 0.31	0.0093 0.78
LagCOC	+	0.2066 7.47***	0.2149 10.21***	0.2180 7.37***	0.2016 7.31***
LTG	+	0.0005 6.41***	0.0006 8.64***	0.0004 5.05***	0.005 6.53***
Beta	+	0.0027 3.18***	0.0027 3.79***	0.0024 2.79***	0.0029 3.40***
Size	-	-0.0033 -3.23***	-0.0028 -3.64***	-0.0032 -3.03***	-0.0039 -3.67***
LnBM	+	0.0141 5.82***	0.0126 6.76***	0.0129 5.03***	0.0109 4.27***
LEV	+	0.0255 2.94***	0.0208 3.06***	0.0145 1.65**	0.0216 2.48***
Adj. R^2		0.1614	0.1718	0.1515	0.1598
N[a]		1,216	1,667	1,105	1,110

*, **, and *** indicate statistical significance at $p<0.1$, $p<0.05$ and $p<0.01$, respectively using one-tailed tests or two-tailed tests if no clear sign prediction.

Where; *PreCom* is the value of β_1 from equation (4); *Quantity* is the number of quarterly management earnings forecasts issued by each firm in 2001&2002; *Quality* is the value of β_1 from equation (5); *LagCOC* is COC at January 18, 2001; *LTG* is long-term growth factor from IBES Summary Statistic file; *BETA* is estimated using the market model with a minimum of 30 out of 60 monthly returns and a market index equal to the value weighted NYSE/AMEX return; *Size* is the natural log of the market value of equity at December 31, 2002; *LnBM* is the natural log of the book-to-market ratio measured as book value of equity divided by common shares outstanding multiplied by end of year stock price; *LEV* is leverage calculated as long-term debt plus any debt in current liabilities divided by total assets.

[a]Regressions using *PreCom*, *Quantity*, and *Quality* have 1,281, 1,759, and 1,173 observations, respectively. The N shown here is the result of influential observations being deleted using Cook's d statistic.

Table 7.2
Second Stage Regression Results with Other Disclosure Types

		PreCom Effect	*Quantity* Effect	*Quality* Effect	Incremental Effects
Variable	Expected Sign	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)
Intercept	+/-	0.1757 12.76***	0.1505 15.66***	0.2667 5.83***	0.2308 3.68***
PreCom	-	-0.0856 -5.85***			-0.0650 -1.81**
Quantity	+/-		-0.0492 -6.45***		-0.0299 -1.34
Quality	-			-0.2262 -3.38***	-0.0398 -0.44
Annual	+/-	-0.0018 -5.10***	-0.0019 -5.40***	-0.0018 -4.40***	-0.0020 -4.66***
Other	+/-	-0.0082 -2.26**	-0.0086 -2.37**	-0.0045 -1.76*	-0.0123 -1.86*
LagCOC	+	0.2241 10.02***	0.2194 10.23***	0.2048 6.70***	0.1938 6.60***
LTG	+	0.0005 7.52***	0.0005 7.52***	0.0005 5.96***	0.0004 5.33***
Beta	+	0.0018 2.35***	0.0018 2.49***	0.0020 2.18**	0.0012 1.32*
Size	-	-0.0050 -5.64***	-0.0046 -5.43***	-0.0031 -2.84***	-0.0074 -5.59***
LnBM	+	0.0132 6.81***	0.0134 7.06***	0.0124 4.75***	0.0117 4.44***
LEV	+	0.0376 5.21***	0.0332 4.73***	0.0258 2.87***	0.0353 3.66***
Adj. R^2		0.1954	0.2042	0.1810	0.1966
N[a]		1,676	1,676	1,114	1,114

*, **, and *** indicate statistical significance at $p<0.1$, $p<0.05$ and $p<0.01$, respectively using one-tailed tests or two-tailed tests if no clear sign prediction.

Where; *PreCom* is the fitted probability from equation (1); *Quantity* is the fitted probability from equation (2); *Quality* is the fitted probability from equation (3); *Annual* is the number of annual management earnings forecasts issued by each firm in 2001 and 2002; *Other* is the number of other disclosures issued by each firm in 2001 and 2002; *LagCOC* is COC at January 18, 2001; *LTG* is long-term growth factor from IBES Summary Statistic file; *BETA* is estimated using the market model with a minimum of 30 out of 60 monthly returns and a market index equal to the value weighted NYSE/AMEX return; *Size* is the natural log of the market value of equity at December 31, 2002; *LnBM* is the natural log of the book-to-market ratio measured as book value of equity divided by common shares outstanding multiplied by end of year stock price; *LEV* is leverage calculated as long-term debt plus any debt in current liabilities divided by total assets.

[a]Regressions using *PreCom* and *Quantity* have 1,759 observations, and the regressions including *Quality* have 1,173 observations. The N shown here is the result of influential observations being deleted using Cook's d statistic.

Table 7.3
First Stage Results – December 31 Fiscal Year End Firms

This table summarizes first stage probit results of the following equations:

$$\Pr(PreCom_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \varepsilon_i) \quad (1)$$

$$\Pr(Quantity_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \beta_7 Offer_i + \varepsilon_i) \quad (2)$$

$$\Pr(Quality_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \beta_7 Offer_i + \varepsilon_i) \quad (3)$$

	Equation 1 Pr(*PreCom$_i$*=1)	**Equation 2** Pr(*Quantity$_i$*=1)	**Equation 3** Pr(*Quality$_i$*=1)
Variable	Coefficient Chi-Square	Coefficient Chi-Square	Coefficient Chi-Square
Intercept	0.8173 70.62***	1.4819 178.18***	0.6751 20.52***
CapIntensity	0.2806 3.03*	-0.4339 7.00***	-0.1716 0.65
ROA_VAR	-0.0020 0.27	-0.0049 1.51	0.0046 0.58
Analyst	-0.0274 22.42***	-0.0254 18.71***	-0.0011 0.02
InstOwner	-0.4291 8.08***	-1.3626 71.83***	-0.3248 2.41
HIGHTECH	-0.1130 1.22	-0.2594 6.12**	-0.0223 0.03
REGULATE	0.1694 1.47	0.3276 4.86**	0.0411 0.04
Offer		0.1233 2.96*	-0.0231 0.04
Pseudo R^2	0.5518	0.5335	0.5577

*, **, and *** indicate chi-square statistical significance at $p<0.1$, $p<0.05$ and $p<0.01$.
PreCom is 1 if the firm's precommitment level is above the sample median and 0 otherwise; *Quantity* is1 if the firm issued more management earnings forecasts than the average during 2001 and 2002 and 0 otherwise; *Quality* is 1 if the firm's quality level is above the sample average and 0 otherwise; *CapIntensity* is measured as total assets less current assets all divided by total assets at the end of 2000; *ROA_VAR* is the variability of return on assets is measured by taking the highest ROA less the lowest ROA over a five year period (years 1995-2000) and dividing by the five year average of ROA, where ROA is measured as Income before Extraordinary Items divided by total assets; *Analyst* is the number of financial analysts following each firm at the end of 2000; *InstOwner* represents the percentage of shares held by institutional owners on December 31, 2000; *HIGHTECH* is 1 if the firm is in a high tech industry and 0 otherwise; *REGULATE* is 1 if the firm is in a regulated industry and 0 otherwise; and *Offer* is measured as ending (end of 2002) common shares outstanding less beginning (end of 2000) common shares outstanding divided by beginning common shares outstanding (all net of treasury stock).

Table 7.4
Second Stage Regression Results - December 31 Fiscal Year End Firms

		PreCom Effect	*Quantity* Effect	*Quality* Effect	Incremental Effects
Variable	Expected Sign	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)
Intercept	+/-	0.1376 8.49***	0.1300 11.74***	0.2172 5.40***	0.1344 1.78*
PreCom	-	-0.0566 -3.40***			0.0035 0.08
Quantity	+/-		-0.0433 -4.84***		-0.0603 -1.68*
Quality	-			-0.1810 -3.35***	0.0144 0.13
LagCOC	+	0.2213 8.93***	0.2121 8.56***	0.2406 6.86***	0.2350 6.99***
LTG	+	0.0009 9.36***	0.0008 9.11***	0.0009 6.47***	0.0008 6.95***
Beta	+	0.0020 2.25**	0.0022 2.48***	0.0017 1.48*	0.0018 1.56*
Size	-	-0.0037 -3.60***	-0.0035 -3.81***	-0.0033 -2.56***	-0.0047 -2.98***
LnBM	+	0.0108 5.04***	0.0103 4.85***	0.0083 2.72***	0.0089 2.93***
LEV	+	0.0221 2.74***	0.0180 2.26***	0.0129 1.21	0.0129 1.15
Adj. R^2		0.1910	0.1947	0.1755	0.1942
N[a]		1,147	1,149	709	710

*, **, and *** indicate statistical significance at $p<0.1$, $p<0.05$ and $p<0.01$, respectively using one-tailed tests or two-tailed tests if no clear sign prediction.

Where; *PreCom* is the fitted probability from equation (1); *Quantity* is the fitted probability from equation (2); *Quality* is the fitted probability from equation (3); *Annual* is the number of annual management earnings forecasts issued by each firm in 2001 and 2002; *Other* is the number of other disclosures issued by each firm in 2001 and 2002; *LagCOC* is COC at January 18, 2001; *LTG* is long-term growth factor from IBES Summary Statistic file; *BETA* is estimated using the market model with a minimum of 30 out of 60 monthly returns and a market index equal to the value weighted NYSE/AMEX return; *Size* is the natural log of the market value of equity at December 31, 2002; *LnBM* is the natural log of the book-to-market ratio measured as book value of equity divided by common shares outstanding multiplied by end of year stock price; *LEV* is leverage calculated as long-term debt plus any debt in current liabilities divided by total assets.

[a]Regressions using *PreCom* and *Quantity* have 1,215 observations, and the regressions including *Quality* have 754 observations. The N shown here is the result of influential observations being deleted using Cook's d statistic.

Table 7.5
First Stage Results – Alternative Quality Specifications

This table summarizes first stage probit results of the following equations:

$$\Pr(Quality_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \beta_7 Offer_i + \varepsilon_i) \quad (3)$$

	AltQuality Pr(*Quality*$_i$=1)
Variable	Coefficient Chi-Square
Intercept	0.0103 0.01
CapIntensity	-0.3442 4.29**
ROA_VAR	-0.0015 0.71
Analyst	0.0064 1.52
InstOwner	-0.0575 0.14
HIGHTECH	0.1414 2.47
REGULATE	-0.0990 0.39
Offer	-0.0296 0.19
Pseudo R^2	0.5790

*, **, and *** indicate chi-square statistical significance at p<0.1, p<0.05 and p<0.01.

Quality is 1 if the firm's quality level is above the sample average and 0 otherwise where *AltQuality* comes from equation(8); *CapIntensity* is measured as total assets less current assets all divided by total assets at the end of 2000; *ROA_VAR* is the variability of return on assets is measured by taking the highest ROA less the lowest ROA over a five year period (years 1995-2000) and dividing by the five year average of ROA, where ROA is measured as Income before Extraordinary Items divided by total assets; *Analyst* is the number of financial analysts following each firm at the end of 2000; *InstOwner* represents the percentage of shares held by institutional owners on December 31, 2000; *HIGHTECH* is 1 if the firm is in a high tech industry and 0 otherwise; *REGULATE* is 1 if the firm is in a regulated industry and 0 otherwise; and *Offer* is measured as ending (end of 2002) common shares outstanding less beginning (end of 2000) common shares outstanding divided by beginning common shares outstanding (all net of treasury stock).

Table 7.6
Second Stage Regression Results – Alternative Quality Specifications

		AltQuality Effect	Incremental Effects
Variable	Expected Sign	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)
Intercept	+/-	0.0872 5.13***	0.3935 9.06***
PreCom	-		-0.1883 -5.60***
Quantity	+/-		-0.1143 -8.15***
AltQuality	-	0.0421 1.28	-0.1987 -4.27***
LagCOC	+	0.2156 8.02***	0.2381 8.28***
LTG	+	0.0005 6.78***	0.0004 5.78***
Beta	+	0.0026 3.09***	0.0022 2.63***
Size	-	-0.0036 -3.61***	-0.0087 -7.56***
LnBM	+	0.0121 5.13***	0.0115 4.79***
LEV	+	0.0278 3.06***	0.0246 2.70***
Adj. R^2		0.1624	0.2179
N[a]		1,212	1,212

*, **, and *** indicate statistical significance at p<0.1, p<0.05 and p<0.01, respectively using one-tailed tests or two-tailed tests if no clear sign prediction.
Where: *PreCom* is the fitted probability from equation (1); *Quantity* is the fitted probability from equation (2); *Quality* is the fitted probability from equation (3) where *AltQuality* comes from equation(8); *LagCOC* is COC at January 18, 2001; *LTG* is long-term growth factor from IBES Summary Statistic file; *BETA* is estimated using the market model with a minimum of 30 out of 60 monthly returns and a market index equal to the value weighted NYSE/AMEX return; *Size* is the natural log of the market value of equity at December 31, 2002; *LnBM* is the natural log of the book-to-market ratio measured as book value of equity divided by common shares outstanding multiplied by end of year stock price; *LEV* is leverage calculated as long-term debt plus any debt in current liabilities divided by total assets.
[a]Regressions have 1,281 observations. The N shown here is the result of influential observations being deleted using Cook's d statistic.

Table 7.7
First Stage Results – Omitting Financial Firms

This table summarizes first stage probit results of the following equations:

$$\Pr(PreCom_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \varepsilon_i) \quad (1)$$

$$\Pr(Quantity_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \beta_7 Offer_i + \varepsilon_i) \quad (2)$$

$$\Pr(Quality_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \beta_7 Offer_i + \varepsilon_i) \quad (3)$$

	Equation 1 Pr(*PreCom$_i$*=1)	**Equation 2** Pr(*Quantity$_i$*=1)	**Equation 3** Pr(*Quality$_i$*=1)
Variable	Coefficient Chi-Square	Coefficient Chi-Square	Coefficient Chi-Square
Intercept	0.7439 78.02***	1.4293 227.46***	0.5434 19.45***
CapIntensity	0.1743 1.43	-0.2497 2.84*	-0.1572 0.72
ROA_VAR	-0.0027 0.95	-0.0034 1.01	0.0035 0.55
Analyst	-0.0230 22.16***	-0.0299 36.18***	0.0022 0.15
InstOwner	-0.3445 7.26***	-1.4358 111.17***	-0.1159 0.45
HIGHTECH	-0.2314 8.17***	-0.2115 6.41**	-0.0623 0.41
REGULATE	0.2379 1.72	0.2963 2.54	-0.2494 1.15
Offer		0.0459 0.65	-0.0505 0.52
Pseudo R^2	0.5584	0.5429	0.5588

*, **, and *** indicate chi-square statistical significance at p<0.1, p<0.05 and p<0.01.
PreCom is 1 if the firm's precommitment level is above the sample median and 0 otherwise; *Quantity* is1 if the firm issued more management earnings forecasts than the average during 2001 and 2002 and 0 otherwise; *Quality* is 1 if the firm's quality level is above the sample average and 0 otherwise; *CapIntensity* is measured as total assets less current assets all divided by total assets at the end of 2000; *ROA_VAR* is the variability of return on assets is measured by taking the highest ROA less the lowest ROA over a five year period (years 1995-2000) and dividing by the five year average of ROA, where ROA is measured as Income before Extraordinary Items divided by total assets; *Analyst* is the number of financial analysts following each firm at the end of 2000; *InstOwner* represents the percentage of shares held by institutional owners on December 31, 2000; *HIGHTECH* is 1 if the firm is in a high tech industry and 0 otherwise; *REGULATE* is 1 if the firm is in a regulated industry and 0 otherwise; and *Offer* is measured as ending (end of 2002) common shares outstanding less beginning (end of 2000) common shares outstanding divided by beginning common shares outstanding (all net of treasury stock).

Table 7.8
Second Stage Regression Results – Omitting Financial Firms

		Various Multivariate Regression Specifications					
		PreCom Effect	*Quantity* Effect	*Quality* Effect	*Quality* Elements Effect	Incremental Effects	Incremental Effects
Variable	Expected Sign	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)
Intercept	+/-	0.1603 11.27***	0.1364 14.04***	0.1075 2.65***	0.1006 8.07***	0.1671 3.23***	0.1823 8.24***
PreCom	-	-0.0749 -4.82***				-0.0642 -1.78**	-0.0527 -1.56*
Quantity	+/-		-0.0384 -4.98***			-0.0317 -1.67*	-0.0356 -1.98**
Quality	-			-0.0007 -0.01		0.0359 0.56	
AvgError	+				0.0000 2.86***		0.0000 2.67***
AvgBias	+				-0.0000 -0.08		-0.0000 -0.17
AvgMFH	-				-0.0001 -1.86**		-0.0001 -2.13**
AvgMFS	-				-0.0012 -0.37		-0.0020 -0.62
LagCOC	+	0.2287 9.68***	0.2117 9.72***	0.2244 7.42***	0.2020 6.05***	0.2319 7.69***	0.2111 6.40***
LTG	+	0.0005 7.36***	0.0005 7.36***	0.0004 4.62***	0.0005 5.37***	0.0004 5.15***	0.0004 4.58***
Beta	+	0.0022 2.94***	0.0022 3.07***	0.0023 2.57***	0.0034 3.59***	0.0019 2.12**	0.0022 2.33**
Size	-	-0.0045 -5.00***	-0.0042 -4.75***	-0.0029 -2.71***	-0.0027 -2.34***	-0.0070 -5.56***	-0.0063 -4.80***
LnBM	+	0.0134 6.73***	0.0137 7.02***	0.0134 5.19***	0.0095 3.49***	0.0123 4.78***	0.0097 3.60***
LEV	+	0.0320 4.44***	0.0274 3.88***	0.0196 2.17**	0.0239 2.53***	0.0285 3.05***	0.0302 3.07***
Adj. R^2		0.1767	0.1760	0.1515	0.1725	0.1842	0.1947
N[a]		1,604	1,605	1,082	901	1,082	897

*, **, and *** indicate statistical significance at p<0.1, p<0.05 and p<0.01, respectively using one-tailed tests or two-tailed tests if no clear sign prediction.

Where; *PreCom* is the fitted probability from equation (1); *Quantity* is the fitted probability from equation (2); *Quality* is the fitted probability from equation (3); *AvgError* is the rank-ordered average accuracy of all forecasts for each firm in 2001&2002; *AvgBias* is the rank-ordered average bias of all forecasts issued by a firm in 2001&2002; *AvgMFH* is the average forecast horizon of all forecasts issued by each firm in 2001&2002; *AvgMFS* is the average specificity of each forecast in 2001&2002; *LagCOC* is COC at January 18, 2001; *LTG* is long-term growth factor from IBES Summary Statistic file; *BETA* is estimated using the market model with a minimum of 30 out of 60 monthly returns and a market index equal to the value weighted NYSE/AMEX return; *Size* is the natural log of the market value of equity at December 31, 2002; *LnBM* is the natural log of the book-to-market ratio measured as book value of equity divided by common shares outstanding multiplied by end of year stock price; *LEV* is leverage calculated as long-term debt plus any debt in current liabilities divided by total assets.

[a]Regressions using *PreCom* and *Quantity*, *Quality*, and the quality elements had 1,696, 1,150, and 955 observations, respectively. The N shown here is the result of influential observations being deleted using Cook's d statistic.

Table 7.9
First Stage Results – Alternative Quantity Specifications

This table summarizes first stage probit results of the following equations:

$$\Pr(Quantity_i = 1) = f(\alpha_0 + \beta_1 CapIntensity_i + \beta_2 ROA\_VAR_i + \beta_3 Analyst_i + \beta_4 InstOwner_i + \beta_5 HIGHTECH_i + \beta_6 REGULATE_i + \beta_7 Offer_i + \varepsilon_i) \quad (2)$$

	AltQuantity1 Pr(*Quantity1$_i$*=1)	**AltQuantity2** Pr(*Quantity2$_i$*=1)	**AltQuantity3** Pr(*Quantity3$_i$*=1)
Variable	Coefficient Chi-Square	Coefficient Chi-Square	Coefficient Chi-Square
Intercept	1.3087 208.02***	-0.0252 0.04	1.3816 18.85***
CapIntensity	-0.3933 7.82***	0.0880 0.22	0.2270 0.20
ROA_VAR	-0.0058 3.11*	0.0046 0.84	-0.0004 0.01
Analyst	-0.0266 29.66***	0.0161 7.28***	-0.1005 19.61***
InstOwner	-1.4637 122.75***	0.4443 6.25**	-1.3125 7.79***
HIGHTECH	-0.2790 11.34***	0.1100 1.19	-0.2939 0.89
REGULATE	0.4590 11.75***	-0.2227 1.55	-0.3685 0.64
Offer	0.0750 1.87	-0.1143 2.08	-0.2164 1.01
Pseudo R^2	0.5480	0.5576	0.5108

*, **, and *** indicate chi-square statistical significance at p<0.1, p<0.05 and p<0.01.

Quantity is 1 if the firm's quantity level is above the sample average and 0 otherwise where *AltQuantity1* is based on the number of quarters in which the firm issued a forecast in 2001 and 2002, *AltQuantity2* is based on the average number of days between each forecast for each firm between 2001 and 2002, and *AltQuantity3* is based on the percentage of non-zero return days in 2001 and 2002; *CapIntensity* is measured as total assets less current assets all divided by total assets at the end of 2000; *ROA_VAR* is the variability of return on assets is measured by taking the highest ROA less the lowest ROA over a five year period (years 1995-2000) and dividing by the five year average of ROA, where ROA is measured as Income before Extraordinary Items divided by total assets; *Analyst* is the number of financial analysts following each firm at the end of 2000; *InstOwner* represents the percentage of shares held by institutional owners on December 31, 2000; *HIGHTECH* is 1 if the firm is in a high tech industry and 0 otherwise; *REGULATE* is 1 if the firm is in a regulated industry and 0 otherwise; and *Offer* is measured as ending (end of 2002) common shares outstanding less beginning (end of 2000) common shares outstanding divided by beginning common shares outstanding (all net of treasury stock).

Table 7.10
Second Stage Regression Results – Alternative Quantity Specifications

		AltQuantity1 Effect	Incremental Effects	*AltQuantity2* Effect	Incremental Effects	*AltQuantity3* Effect	Incremental Effects
Variable	Expected Sign	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)
Intercept	+/-	0.1314 15.26***	0.2546 4.18***	0.0471 3.07***	0.1877 3.82***	0.1276 14.45***	0.2591 5.18***
PreCom	-		-0.0886 -2.64***		0.0198 0.90		-0.0800 -2.57***
AltQuantity1	+/-	-0.0366 -5.41***	-0.0129 -0.66				
AltQuantity2	+/-			0.1169 4.75***	0.1670 5.75***		
AltQuantity3	+/-					-0.0250 -4.48***	-0.0140 -0.98
Quality	-		-0.0844 -0.97		-0.2639 -3.31***		-0.0991 -1.34*
LagCOC	+	0.2158 9.76***	0.2280 7.63***	0.2177 7.53***	0.2144 6.97***	0.2253 9.63***	0.2388 7.93***
LTG	+	0.0005 7.94***	0.0004 5.58***	0.0005 5.91***	0.0005 5.77***	0.0006 7.99***	0.0004 5.66***
Beta	+	0.0023 3.22***	0.0018 2.00**	0.0026 2.96***	0.0023 2.44***	0.0025 3.47***	0.0019 2.08**
Size	-	-0.0039 -4.80***	-0.0074 -5.80***	-0.0056 -4.57***	-0.0066 -4.95***	-0.0050 -5.37***	-0.0078 -5.25***
LnBM	+	0.0138 7.36***	0.0121 4.70***	0.0139 5.23***	0.0143 5.15***	0.0137 7.14***	0.0118 4.54***
LEV	+	0.0221 3.26***	0.0258 2.76***	0.0292 3.21***	0.0287 2.85***	0.0269 3.94***	0.0270 2.96***
Adj. R^2		0.1809	0.1873	0.1954	0.1999	0.1827	0.1869
N[a]		1,665	1,107	1,013	946	1,663	1,107

*, **, and *** indicate statistical significance at p<0.1, p<0.05 and p<0.01, respectively using one-tailed tests or two-tailed tests if no clear sign prediction.

Where: *PreCom* is the fitted probability from equation (1); *Quantity* is the fitted probability from equation (1) where *AltQuantity1* is based on the number of quarters in which the firm issued a forecast in 2001 and 2002, *AltQuantity2* is based on the average number of days between each forecast for each firm between 2001 and 2002, and *AltQuantity3* is based on the percentage of non-zero return days in 2001 and 2002; *Quality* is the fitted probability from equation (3); *LagCOC* is COC at January 18, 2001; *LTG* is long-term growth factor from IBES Summary Statistic file; *BETA* is estimated using the market model with a minimum of 30 out of 60 monthly returns and a market index equal to the value weighted NYSE/AMEX return; *Size* is the natural log of the market value of equity at December 31, 2002; *LnBM* is the natural log of the book-to-market ratio measured as book value of equity divided by common shares outstanding multiplied by end of year stock price; *LEV* is leverage calculated as long-term debt plus any debt in current liabilities divided by total assets.

[a]Regressions using *AltQuantity1* (with *PreCom* and *Quality*), *AltQuantity2* (with *PreCom* and *Quality*), and *AltQuantity3* (with *PreCom* and *Quality*) have 1,759 (1,173), 1,074 (1,002) , and 1,759 (1,173) observations, respectively. The N shown here is the result of influential observations being deleted using Cook's d statistic.

Table 7.11
Second Stage Regression Results – Precommitted Firms

		Quantity Effect	*Quality* Effect	*Quality* Elements Effect	*AltQuality* Effect
Variable	Expected Sign	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)
Intercept	+/-	0.0952 7.19***	0.2876 7.12***	0.0798 4.05***	0.1959 7.11***
Quantity	+/-	0.0975 5.17***			
Quality	-		-0.2515 -4.78***		
AltQuality	-				-0.1123 -3.60***
AvgError	+			0.0000 1.72*	
AvgBias	+			-0.0000 -0.27	
AvgMFH	-			-0.0000 -0.40	
AvgMFS	-			0.0032 0.61	
LagCOC	+	0.2417 5.61***	0.2887 6.10***	0.3533 6.48***	0.2604 5.92***
LTG	+	0.0002 2.74***	0.0002 2.80***	0.0002 2.56***	0.0002 3.15***
Beta	+	0.0038 2.97***	0.0030 2.35***	0.0051 3.83***	0.0032 2.58***
Size	-	-0.0080 -4.37***	-0.0052 -3.09***	-0.0024 -1.29*	-0.0058 -3.37***
LnBM	+	0.0147 3.86***	0.0115 2.87***	0.0099 2.14**	0.0135 3.63***
LEV	+	0.0436 3.04***	0.0277 1.96**	0.0083 0.51	0.0446 3.04***
Adj. R^2		0.1820	0.1768	0.1910	0.1575
N[a]		586	528	439	582

*, **, and *** indicate statistical significance at p<0.1, p<0.05 and p<0.01, respectively using one-tailed tests or two-tailed tests if no clear sign prediction.

Where: *Quantity* is the fitted probability from equation (2); *Quality* is the fitted probability from equation (3) where *Quality* comes from equation(5), and *AltQuality* comes from equation (8); *AvgError* is the rank-ordered average accuracy of all forecasts for each firm in 2001&2002; *AvgBias* is the rank-ordered average bias of all forecasts issued by a firm in 2001&2002; *AvgMFH* is the average forecast horizon of all forecasts issued by each firm in 2001&2002; *AvgMFS* is the average specificity of each forecast in 2001&2002; *LagCOC* is COC at January 18, 2001; *LTG* is long-term growth factor from IBES Summary Statistic file; *BETA* is estimated using the market model with a minimum of 30 out of 60 monthly returns and a market index equal to the value weighted NYSE/AMEX return; *Size* is the natural log of the market value of equity at December 31, 2002; *LnBM* is the natural log of the book-to-market ratio measured as book value of equity divided by common shares outstanding multiplied by end of year stock price; *LEV* is leverage calculated as long-term debt plus any debt in current liabilities divided by total assets.

[a]Regressions using *Quantity* and *Quality*, *Quality* subelements, and *AltQuality* have 621, 567, 472, and 621 observations, respectively. The N shown here is the result of influential observations being deleted using Cook's d statistic.

Table 7.12
Second Stage Regression Results – Omitting *LagCOC*

		Various Multivariate Regression Specifications					
		PreCom Effect	*Quantity* Effect	*Quality* Effect	*Quality* Elements Effect	Incremental Effects	Incremental Effects
Variable	Expected Sign	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)
Intercept	+/-	0.2015 15.05***	0.1760 19.82***	0.2929 5.95***	0.1317 11.35***	0.2682 4.12***	0.3562 10.37***
PreCom	-	-0.0748 -5.10***				-0.0684 -1.90**	-0.2017 -3.79***
Quantity	+/-		-0.0426 -5.60***			-0.0300 -1.32	0.0123 0.41
Quality	-			-0.2140 -2.96***		-0.0437 -0.46	
AvgError	+				0.0000 3.65***		0.0000 2.05**
AvgBias	+				-0.0000 -0.27		0.0000 0.28
AvgMFH	-				-0.0001 -2.24**		-0.0001 -2.03**
AvgMFS	-				-0.0001 -0.02		0.0035 0.66
LTG	+	0.0006 8.05***	0.0006 8.21***	0.0005 4.81***	0.0006 6.01***	0.0004 5.11***	0.0002 3.97***
Beta	+	0.0018 2.30**	0.0016 2.11**	0.0013 1.37*	0.0022 2.20**	0.0003 0.30	-0.0003 -0.19
Size	-	-0.0068 -7.72***	-0.0061 -7.21***	-0.0052 -4.78***	-0.0046 -3.96***	-0.0096 -7.24***	-0.0186 -8.72***
LnBM	+	0.0146 7.25***	0.0148 7.42***	0.0149 5.48***	0.0095 3.40***	0.0137 5.13***	0.0163 3.75***
LEV	+	0.0332 4.61***	0.0260 3.67***	0.0210 2.25**	0.0250 2.62***	0.0306 3.16***	0.0717 4.52***
Adj. R^2		0.1363	0.1351	0.1130	0.1343	0.1423	0.1752
N[a]		1,674	1,677	1,115	924	1,113	971

*, **, and *** indicate statistical significance at p<0.1, p<0.05 and p<0.01, respectively using one-tailed tests or two-tailed tests if no clear sign prediction.

Where; *PreCom* is the fitted probability from equation (1); *Quantity* is the fitted probability from equation (2); *Quality* is the fitted probability from equation (3); *AvgError* is the rank-ordered average accuracy of all forecasts for each firm in 2001&2002; *AvgBias* is the rank- ordered average bias of all forecasts issued by a firm in 2001&2002; *AvgMFH* is the average forecast horizon of all forecasts issued by each firm in 2001&2002; *AvgMFS* is the average specificity of each forecast in 2001&2002; *LTG* is long-term growth factor from IBES Summary Statistic file; *BETA* is estimated using the market model with a minimum of 30 out of 60 monthly returns and a market index equal to the value weighted NYSE/AMEX return; *Size* is the natural log of the market value of equity at December 31, 2002; *LnBM* is the natural log of the book-to-market ratio measured as book value of equity divided by common shares outstanding multiplied by end of year stock price; *LEV* is leverage calculated as long-term debt plus any debt in current liabilities divided by total assets.

[a]Regressions using *PreCom* and *Quantity*, *Quality*, and the quality elements had 1,759, 1,173, and 971 observations, respectively. The N shown here is the result of influential observations being deleted using Cook's d statistic.

CHAPTER 8

CHANGE ANALYSIS ON THE RELATION OF DISCLOSURE QUALITY AND COST OF EQUITY CAPITAL

8.1 Overview of Change Test

In this section, I provide additional evidence on the relation between disclosure quality and cost of equity capital around the time of forecast acts. Cost of equity capital is still calculated using the PEG method, and change in cost of equity capital (*ΔCOC*) is calculated by subtracting cost of equity capital measured during the 31-day window preceding the management earnings forecast from cost of equity capital measured during the 31-day window following the management earnings forecast (i.e., positive values are increases in the cost of equity capital). I divide this by cost of equity capital measured during the 31-day window preceding the management earnings forecast. Using the elements of disclosure quality from Section 2.3 and two variations of *Shock* (where *Shock* is equal to the management earnings forecast estimate less the consensus analyst forecast in the month preceding the management forecast), I run various specifications of the following forecast specific OLS model:

$$\begin{aligned} \Delta COC_i = \alpha_0 + \beta_1 Bias_i + \beta_2 Error_i + \beta_3 MFS_i + \beta_4 MFH_i \\ + \beta_5 Abs\_Shock_i + \beta_6 Sign\_Shock_i + \varepsilon_i \end{aligned} \tag{9}$$

Where:

ΔCOC_i	Change in cost of equity capital is calculated by subtracting cost of equity capital measured during the 31-day window preceding the management earnings forecast from cost of equity capital measured during the 31-day window following the management earnings forecast divided by cost of equity capital measured during the 31-day window preceding the management earnings forecast;
$Bias_i$	Forecast bias is calculated as the difference between the management earnings forecast and actual EPS for the forecast period scaled by pre-announcement share

price. For each forecast, *Bias* represents the rank order of the average of the *preceding* (2001 and 2002 forecasts only) bias measurements, excluding the current forecast's bias measurement;

$Error_i$ Forecast error is calculated as the absolute value of the difference between the management earnings forecast and actual EPS scaled by pre-announcement share price. For each forecast, *Error* represents the rank order of average of the *preceding* (2001 and 2002 forecasts only) error measurements, excluding the current forecast's error measurement;

MFS_i Forecast specificity as whether the forecast is a point, range, or open interval estimate where point, range, and open interval estimates are set equal to 3, 2, and 1, respectively;

MFH_i Forecast horizon calculated as the number of calendar days between the earnings forecast and period end;

Abs_Shock_i Absolute value of *Shock* scaled by pre-announcement share price;[29]

$Sign\_Shock_i$ Set equal to 1 for forecasts where *Shock* is greater than or equal to zero (good news forecast) and 0 otherwise (bad news forecast).

It is important to note that *Bias* and *Error* cannot be measured for a forecast until the actual earnings announcement. Therefore, the measures used here are based on the average of all preceding forecasts from November 1, 2000 until December 31, 2002. I add *Abs_Shock* to the equation to measure the amount of information asymmetry between management and analysts prior to the forecast. Larger magnitudes of *Abs_Shock* should create more uncertainty in the market leading to increases in cost of equity capital around the forecast. I include *Sign_Shock* to capture the information content of the forecast. If bad news is associated with more uncertainty about actual earnings, then I expect *Sign_Shock* to be negatively associated with the change in cost of equity capital around the forecast. I do not include the control variables used in equation (7) because I do not expect these firm-specific variables to change in the short run.

The change analysis is fundamentally different than the levels analysis described earlier. First, while testing the effects of forecast quality is easier because of the ability to focus on the horizon and specificity of the single issued forecast, the effects of precommitment on changes in

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[29] The consensus analyst forecast was taken from the First Call Summary Statistics file. While consensus data may contain stale forecasts, the First Call Summary Statistics file only contains the most recent forecast made by each broker in the consensus calculation. This should mitigate the stale forecast bias.

cost of equity capital can not be tested because precommitment is time-invariant.[30] Second, the effects of quantity can not be tested, because quantity equals one for all forecasts. A variant of quantity can be examined, however, because the act of forecasting is isolated, and the change in cost of equity capital can be measured.

8.2 Sample Selection

Table 8.1 outlines my sample selection procedures. It is important to note that the sampling unit for the changes analysis is forecast rather than firm. My sample starts with all management earnings forecasts contained in the Company Issued Guidelines file of the First Call database from November 1, 2000 to December 31, 2002. I include the last two months of 2000 to allow more post-Reg FD forecasts to enter the calculation of *Bias* and *Error*. These two months are deleted once *Bias* and *Error* are calculated. There are 9,952 forecasts issued in this twenty-six month span. I delete all forecasts issued after the period end (i.e., pre-earnings announcements) to eliminate firms with a negative forecast horizon. Because *Error*, *Bias*, and *Shock* require an actual management earnings forecast estimate, I delete all qualitative forecasts. Further, the calculation of both *Bias* and *Error* require actual EPS numbers and *Shock* requires a consensus analyst forecast in the month preceding the forecast. Missing values (mainly consensus analyst forecast data) lowers my sample size further. Firms with only one forecast are deleted because there was no prior forecast on which to base the measures of *Bias* and *Error*. Next, I calculate the change in cost of equity capital. Measuring cost of equity capital using the PEG method requires analyst expectations of earnings two periods and one period ahead. Because I am measuring cost of equity capital in the month preceding the forecast and the month

[30] Precommitment can be tested in a change analysis if the date of precommitment is identifiable (Leuz and Verrecchia 2000).

following the forecast, the calculation requires four different analyst expectations in a two-month window. Missing one or more of these analyst expectations causes a substantial loss in firms.[31] Finally, I eliminate the top and bottom 1% of, *ΔCOC, Error,* and *Bias* reducing my final sample to 724 forecasts issued by 310 different firms. Although sampling events rather than firms increases observation dependency, the diversification of forecasts across firms and time periods should yield a sample of relatively independent events.

8.3 Descriptive Statistics

Table 8.2 presents descriptive statistics for the changes analysis sample. The median cost of equity capital prior to the forecast is 10.44%, which is comparable with the levels sample median of 10.40%. Both the mean and median change in cost of equity capital are positive suggesting that cost of equity capital after the forecast is higher than cost of equity capital prior to the forecast. While this result is surprising at first, it is consistent with results from the levels test that shows that a positive relation exists between issuing management earnings forecasts and cost of equity capital for precommitted firms. The result is also consistent with Piotroski's (2002) finding of an increase in stock price variability around a management earnings forecast release. The median *Bias* is negative (conservative management forecasts), the median forecast horizon is 62 days, and the mean and median *Shock* are both negative (bad news forecasts).

8.4 Changes Analysis

Table 8.3 presents regression results for my changes analysis. The first column, labeled "Full Sample" provides results of the sub-elements of *Quality* for all 724 forecasts. The

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[31] Similar to the levels test, the use of expected EPS two periods ahead results in a sample biased toward larger firms. Thus, the results may not generalize to a sample of smaller firms.

coefficient on *Bias* is significantly positive, indicating additional increases in the cost of capital around forecasts for which managers have overestimated earnings in the past. The significant negative coefficient on *MFH* suggests that longer forecast horizons attenuate increases in cost of equity capital around forecast events. *Abs_Shock* is positively associated with the change in cost of equity capital, indicating that forecast estimates that differ greatly from the consensus analyst forecast lead to additional increases in cost of equity capital. *Sign_Shock* is negatively associated with the change in cost of equity capital, indicating that bad news forecasts create more uncertainty about future earnings leading to additional increases in cost of equity capital.

The remaining columns partition the sub-element analysis for management forecasts of different signs and horizons. A consistent finding in prior research is that bad news management forecasts appear to be more credible than good news forecasts. Note that not a single sub-element is significant for good news forecasts, but that sub-elements found significant for the full sample are also significant for the bad news partition. In addition, management forecast specificity, *MFS*, becomes significantly negative as expected, especially for shorter horizon bad news forecasts, indicating that more specific forecasts attenuate the increase in cost of equity capital around management earnings forecast events.

Table 8.1
Sample Selection – Changes Analysis

Initial sample of management earnings forecasts on First Call[a]	9,952
Less pre-earnings announcements	(2,134)
Less qualitative forecasts[b]	(664)
Less forecasts with missing consensus analyst forecasts	(3,012)
Less forecasts with miss pre-announcement share prices	(539)
Less forecasts with no prior forecasts to calculate *Bias* and *Error*	(1,136)
Less forecasts with missing pre- or post-cost of equity capital[c]	(1,720)
Less outliers[d]	(23)
Final Sample	**724**
Number of Firms	**310**

[a]The initial sample includes all management earnings forecasts from First Call between November 1, 2000 and December 31, 2002. Forecasts in November and December of 2000 are included to better estimate *Bias* and *Error*. For each forecast, *Bias* and *Error* are the average of prior (November 1, 2002 through December 31, 2002) forecasts' *Bias* and *Error*. I include these forecasts from the end of 2000 in order to provide a past *Bias* and *Error* estimate for forecasts issued early in 2001. All forecasts in 2000 are deleted once *Bias* and *Error* are estimated.
[b]Qualitative forecasts are deleted because they do not provide an explicit earnings estimate. An explicit earnings estimate is need in the calculation of *Bias*, *Error* and *Shock*.
[C]Estimating the cost of equity capital requires a consensus analyst forecast of EPS two periods ahead and one period ahead. Estimating the change in cost of equity capital requires these two forecasts in the month prior to the management earnings forecast and the month following the management earnings forecast. If any one of the four consensus analyst numbers is missing, then the change in cost of equity capital cannot be calculated for that observation.
[d]I eliminate the top and bottom 1% of ΔCOC, *Error* and *Bias*.

Table 8.2
Descriptive Statistics and Sample Distribution – Changes Analysis[a]

Variable[b]	N	Mean	Std Dev	75th pct	Median	25th pct
PreCOC	724	0.1328	0.1894	0.1491	0.1044	0.0820
ΔCOC	724	0.0460*	0.2910	0.1184	0.0082**	-0.0906
Shock	724	-0.0018	0.0112	0.0002	-0.0002	-0.0018
Bias	724	0.0004	0.0039	0.0011	-0.0002	-0.0010
Error	724	0.0027	0.0033	0.0034	0.0016	0.0007
MFS	724	2.2279	0.5199	3	2	2
MFH	724	57.883	43.364	74	62	23

[a]Table provides summary statistics for primary variables in the changes analysis.
[b]Where *PreCOC* is the cost of equity capital level in the month prior to the management earnings forecast release; *ΔCOC* is calculated by subtracting cost of equity capital measured during the 31-day window preceding the management earnings forecast from cost of equity capital measured during the 31-day window following the management earnings forecast divided by cost of equity capital measured during the 31-day window preceding the management earnings forecastwhere cost of equity capital is calculated using the PEG method outlined in equation (6); *Shock* is the current shock measured as the management earnings forecast estimate less the consensus analyst forecast in the month prior to the forecast scaled by price; *Bias* is the average of preceding (November 1, 2000 through December 31, 2002) forecasts' bias where bias is the difference between the management earnings forecast and actual EPS for the forecast period scaled by price; *Error* is the average of preceding (November 1, 2000 through December 31, 2002) forecasts' error where error is the absolute value of the difference between the management earnings forecast and actual EPS scaled by price; *MFS* is forecast specificity where point, range, or open interval estimates are set equal to 3, 2, and 1, respectively; *MFH* is forecast horizon calculated as the number of calendar days between the earnings forecast and period end.
*****Significantly different than zero ($p<.0001$).
******Significantly different than zero ($p=0.0320$).

Table 8.3
Change Analysis Regression Results

		Full Sample	Good News Forecasts	Bad News Forecasts	Short Horizon Forecasts (<= 62)	Long Horizon Forecasts (>62)	Short Horizon Bad News Forecasts	Long Horizon Bad News Forecasts
Variable	Expected Sign	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)
Intercept	+/-	0.1034 1.85*	-0.0758 -1.20	0.1934 2.08**	0.1258 1.57	0.0693 0.86	0.2273 1.60	0.1897 1.54
Bias	+	0.0001 1.63*	0.0001 1.05	0.0001 1.35*	0.0001 1.56*	0.0000 0.55	0.0002 1.54*	-0.0000 -0.17
Error	+	-0.0001 -0.97	-0.0000 -0.69	-0.0000 -0.44	-0.0000 -0.14	-0.0001 -1.37	0.0000 0.38	-0.0002 -1.51
MFS	-	-0.0014 -0.07	0.0335 1.57	-0.0478 -1.32*	-0.0147 -0.50	0.0197 0.68	-0.0809 -1.44*	-0.0105 -0.23
MFH	-	-0.0006 -2.49***	-0.0003 -1.05	-0.0007 -2.04**	-0.0015 -1.86**	-0.0004 -1.23	-0.0019 -1.50*	-0.0007 -1.46*
Abs_Shock	+	3.9531 3.98***	-1.5116 -0.46	4.2995 3.62***	3.7003 3.26***	6.1823 2.04**	3.9435 2.87***	9.8495 2.45***
Sign_Shock	-	-0.0952 -4.36***			-0.0786 -2.37***	-0.1005 -3.44***		
Adj. R^2		0.0589	0.0036	0.0378	0.0572	0.0486	0.0548	0.0165
N		724	332	392	371	353	190	202

*, **, and *** indicate statistical significance at p<0.1, p<0.05 and p<0.01, respectively using one-tailed tests or two-tailed tests if no clear sign prediction.

Where *Bias* is the rank ordered average of all prior forecast bias where bias is the difference between the management earnings forecast and actual EPS for the forecast period scaled by price; *Error* is the rank ordered average of all prior forecast errors where error is the absolute value of the difference between the management earnings forecast and actual EPS scaled by price; *MFS* is forecast specificity where point, range, or open interval estimates are set equal to 3, 2, and 1, respectively; *MFH* is forecast horizon calculated as the number of calendar days between the earnings forecast and period end; *Abs_Shock* is the absolute value of *Shock* scaled by pre-announcement share price; and Sign_*Shock* is set equal to 1 for forecasts where *Shock* is greater than or equal to zero (good news forecasts) and 0 otherwise (bad news forecasts).

CHAPTER 9

CONCLUSIONS

Research on voluntary disclosures has been a popular topic in empirical studies over the past decade. Studies have included how disclosure affects information asymmetry (Coller and Yohn 1997; Piotroski 2002), how it affects cost of equity capital (Botosan 1997; Botosan and Plumlee 2002), and how disclosure precommitment affects information asymmetry (Leuz and Verrecchia 2000). This study contributes to the literature by being the first to delineate disclosure into four separate dimensions (*type, precommitment*, *quantity*, and *quality*). I provide a framework to quantify each dimension, and empirical models that allow me to measure each dimension's affect on cost of equity capital. I also answer a call by Easley and O'hara (2004) to assess how various dimensions of disclosure affect cost of equity capital.

In levels tests, I find that, overall, a firm's maintained commitment to issue forecasts in periods of high information asymmetry, issuing a higher quantity of forecasts, and issuing forecasts of higher quality are significantly negatively related to cost of equity capital (as predicted by theory). In addition, I find that disclosure precommitment is more effective in lowering cost of equity capital than disclosure quantity or quality. Additional analysis reveals that when only assessing precommitted firms, the relation between disclosure quantity and cost of equity capital is now *positive*. When I examine changes in cost of equity capital around forecast events, I discover that cost of equity capital increases. A sub-element (of quality) analysis indicates that longer forecast horizons and forecasts which lead to lower levels of uncertainty about future earnings attenuate increases in cost of equity capital around forecast events.

Sensitivity analysis shows that the results are robust to including only December 31 year-end firms in the analysis, omitting financial firms from the analysis, and the results are improved when other public voluntary forecast disclosures are included as an additional control variable in the second stage regression. Also, the results are robust to the omission of *LagCOC* from the analysis, despite a lower adjusted R^2.

Caveats are in order. First, I only investigate one type of disclosure, so the results may not be generalizable to other types of disclosure. Second, the type of disclosure studied is voluntary, so the results may not apply to mandatory disclosures. Third, my sample period is only two years in length, so the results may not be generalizable to other time periods.

I see several opportunities for future research. My framework allows for researchers to change disclosure types and measure the effect each type's different dimensions have on cost of equity capital. Future research could also further develop the definition of precommitment to determine other disclosure strategies that affect cost of equity capital and why the relation between quantity and cost of equity capital is positive for precommitted firms. Future research could also expand the time period of the sample and investigate how the different dimensions affected cost of equity capital during different reporting periods (i.e., pre- and post-Reg FD). Lastly, future research could extend the disclosure quality framework to better define exactly what makes a disclosure a quality disclosure.

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APPENDIX A

ENDOGENEITY OF THE DISCLOSURE DIMENSIONS

Healy and Palepu (2001, 427) identify endogeneity as a ‘potentially serious problem’ in disclosure studies. Endogeneity bias is generally a result of an omitted variable problem in empirical models. The omitted variable problem can be 1) observable variables that are omitted from the model or 2) unobservable differences in firm characteristics in the cross-sectional sample.

To illustrate consider the following equation:

$$\mathrm{Y_i} = \alpha_0 + \beta_1 Dimension_i + \gamma' X_i + \varepsilon_1$$

where $\mathrm{Y_i}$ is cost of equity capital, $Dimension_i$ represents either precommitment, quantity, or quality and $\mathrm{X_i}$ is any vector of control variables. Because $Dimension_i$ is endogenous, it may be correlated with the error term, ε_i, causing the least squares estimators to be inconsistent (Greene 2000). Without controlling for the endogenous choice of the different disclosure dimensions, the inconsistent least squares estimators would lead to spurious inferences being drawn about the relation between the different dimensions of disclosure and the cost of equity capital.

To mitigate the endogeneity concern, I use a two-step approach following Wooldridge (2002) and Cohen (2003). This method, as discussed in Section 3, uses a probit model to model the disclosure dimension choice in the first stage. The second stage uses the fitted probabilities of the disclosure dimension from the first stage as an instrumental variable in determining cost of equity capital effects. This approach yields consistent least squares estimators in the second stage, and thus, mitigates the endogeneity problem.