Disclosure Quality in Capital Markets from the Perspective of Analysts

by

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ABSTRACT

Regulators and the general public frequently advocate for higher-quality disclosure policies to reduce information asymmetry. Research and anecdotal evidence documents sizable benefits to firms that maintain high quality disclosure. This thesis explores the costs and benefits of changing disclosure quality from the perspective of the financial analysts, a sophisticated user group.

This thesis presents a comprehensive view of analysts' evaluations of disclosure quality. I investigate capital market reaction when firms experience a sustained decrease in analyst disclosure ratings. The results demonstrate that firms with deteriorating disclosure experience negative consequences, consistent with increasing information asymmetry. However, the magnitude is not as large as expected given the benefits enjoyed when disclosure quality improves. Given that firms that allow their disclosure quality to decline give up benefits they previously enjoy, I investigate why they allow this decline to occur. The deterioration is negatively associated with the interaction between capital demand and expected earnings performance implying that when firms require capital, but are expecting poor future earnings, they are more likely to permit a deterioration to occur. Declines are also associated with the occurrence of various disruptive events that imply greater uncertainty about the firm. These firms have a strong demand for external capital which they satisfy by accessing private and public debt markets. Overall, firms that experience disclosure ratings declines are not a mirror image of firms that experience ratings increases. Finally, I investigate the association between the disclosure ratings and quantitative disclosure characteristics. The results indicate significant associations, consistent with the assumption that easily accessible and quantifiable disclosure measures are captured in analysts' ratings of disclosure quality.

This thesis adds to the literature by providing insight into how analysts evaluate disclosure quality and what managers are willing and able to deliver. The research documents attributes of disclosure quality that are regarded as important by financial analysts. While analysts are a key set of financial statement users, there are many other types of users. By understanding disclosure quality from a user's perspective, regulators and researchers are more able to anticipate the implications of a proposed change in disclosure rules.

TABLE OF CONTENTS

LISTS OF TABLES

LISTS OF FIGURES

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CHAPTER 1

INTRODUCTION

Corporate disclosure of financial and nonfinancial information is considered a way to reduce information asymmetry between companies and investors. Conventional wisdom has it that disclosure is good for business since lower information asymmetry implies a lower cost of capital. As a consequence, regulators and the general public have long advocated for a more transparent information environment. Yet, within the marketplace, firms exhibit a broad range of disclosure quality. The fact that not all firms choose the highest level of disclosure reflects that the costs of disclosure may outweigh the benefits. The questions of what these costs could be, and to what extent they matter, have not been fully explained in the literature on disclosure quality.

It is important to emphasize that disclosure quality matters in the presence of financial statement users. Under rational expectations, managers make optimal disclosure decisions in expectation of the actions information recipients will take. Without considering the reaction from possible information users, any mandated regulation on disclosure quality can have unintended consequences. As a group of sophisticated financial statement users, analysts rely heavily on corporate disclosures and they value disclosure quality (e.g., Lang and Lundholm 1993, 1996; Botosan 1997;

Barron, Harris, and Stanford 2005). In a survey by members of the Association for Investment Management and Research (AIMR), 73% of portfolio managers and analysts agreed that disclosure practices and financial reporting quality are "very" or "extremely" important in their investment decisions and recommendations (AIMR Member Survey of Global Corporate Financial Reporting Quality and Corporate Communications and Disclosure Practices 2003, page 1).

This thesis provides a comprehensive study on disclosure-related issues from analysts' perspectives. The paper looks first at firms with deteriorated disclosure quality and investigates what causes analysts to view these firms as having inferior disclosure quality. Taking analysts as the targeted users, this thesis investigates the situations in which disclosure is costly, causing companies to allow their disclosure quality to deteriorate and forgo the benefits of disclosure. The research also investigates what disclosure characteristics are embedded in analysts' evaluations of disclosure quality. The findings are used to construct an empirical model that predicts analysts' disclosure ratings.

These issues are studied in the following chapters.[1] The next two chapters focus on disclosure quality deteriorations from the perspective of analysts. Analysts' perceptions of disclosure quality are measured using the ratings from AIMR. Chapter 2 examines the capital market consequences of a sustained decrease in the disclosure ratings, and Chapter 3 explores the potential factors that drive the changes in analysts' perceptions of disclosure quality. Given that disclosure quality is measured from an analyst point of view, Chapter 4 discusses whether and how quantifiable disclosure

[1] This thesis also includes an appendix (Appendix A) that outlines an approach for calculating accruals and cash flow from operations. This approach is applied for related measures in Chapter 2 to 4.

characteristics, company fundamentals, earnings attributes, and indicators of company popularity among analysts affect disclosure ratings. The objective is to use these characteristics to predict the AIMR analyst ratings. Chapter 5 concludes and discusses future research. The following subsections outline the main components of the thesis.

Overview of Chapter 2

Regulators and the general public have long supported minimum standards for corporate disclosure quality through laws such as the Regulation Fair Disclosure (Reg FD) and the Sarbanes-Oxley Act. A desire for higher quality disclosure is backed by empirical evidence that reporting quality is negatively correlated with the level of information asymmetry. For example, Healy, Hutton, and Palepu (1999) examine the capital market consequences of a sustained increase in disclosure quality. They find an increase in disclosure quality ratings is associated with a positive stock returns, an increase in institutional ownership and analyst following, and a decrease in analyst forecast dispersions. Botosan (1997) and Leuz and Verrecchia (2000) also obtain results consistent with the notion that high disclosure quality is good for capital markets by showing that firms with better disclosure quality enjoy benefits such as a lower cost of capital or a smaller bid-ask spread.

These studies do not examine whether deteriorating disclosure quality leads to negative consequences. If the consequences of disclosure quality increases and decreases are symmetric, we should expect firms to always be striving to improve their disclosure quality. However, this is not the case in reality. For example, a number of firms have decided to stop providing earnings guidance to analysts, which has prompted

recent studies by Chen, Matsumoto, and Rajgopal (2006) and Houston, Lev, and Tucker (2008). In addition, theoretical and empirical studies suggest that public disclosure can trigger disagreement among investors, which works against a lower cost of capital (e.g., Kim and Verrecchia 1997; Holthausen and Verrecchia 1990; Barron et al. 2005; Botosan, Plumlee, and Xie 2004).

These pieces of evidence suggest that we should be careful in extrapolating from the prior literature that documents the benefits of good disclosure quality. Healy et al. (1999) examine changes in disclosure quality, but they leave out firms with disclosure quality declines, arguing that this type of firm is more complicated, making comparison difficult. Rather than avoiding these firms, Chapter 2 compares firms with improved and deteriorated disclosure quality. The purpose is to examine directly the degree to which the two sets of firms show symmetry in the consequences. In doing so, this study also relaxes the assumption of a linear relationship between disclosure ratings and firm characteristics in prior studies such as Lang and Lundholm (1993, 1996). These prior studies examine disclosure quality in levels and document a negative association between disclosure quality and common measures of information asymmetry. The underlying assumption of linearity forces one to infer that bad disclosure quality is associated with negative capital market consequences.

Capital market consequences of disclosure changes are examined using an approach similar to Healy et al. (1999) but incorporating firms with both increases and decreases in financial analysts' disclosure ratings. In contrast to recent studies by Chen et al. (2006) and Houston et al. (2008), which look at firms that stopped earnings

guidance, this chapter uses a more comprehensive disclosure measure and a sample period when exogenous constraints on disclosure quality were much less restrictive.

Results show that firms experiencing a decrease in disclosure ratings experience lower returns, higher bid-ask spreads, and higher analyst forecast dispersions, relative to firms experiencing an increase in the ratings. Nevertheless, while disclosure improvement attracts analysts to follow a firm, analysts do not appear to drop a firm when its disclosure quality deteriorates. Furthermore, the consequences of disclosure increases are more striking than disclosure decreases when one compares the significance of coefficients and the explanatory power of regression models. The evidence suggests that the consequences of disclosure quality increases and decreases are generally in opposite directions, but the consequences of a disclosure decline are not as consistent as those of a disclosure increase.

Chapter 2 contributes to the literature by providing a triangulation to the prior research on improved disclosure quality.[2] By comparing disclosure-increasing and disclosure-decreasing firms, this chapter examines directly whether the consequences of disclosure increases and disclosure decreases are symmetric. The results suggest that disclosure decreases are not simply a mirror image of disclosure increases. This naturally leads to the following question: are the causes of disclosure quality decreases the opposite of what is expected to motivate disclosure quality increases? This issue is addressed in Chapter 3.

[2] The sample period for this study predates Reg FD, therefore it reflects a period when managers had more control over their disclosure policy. The earnings guidance studies (e.g., Chen et al. 2006; Houston et al. 2008) focus on the period after the regulation changes.

Overview of Chapter 3

This chapter explores the potential causes of what analysts perceive to be a deterioration in disclosure quality, drawing heavily on the theoretical literature regarding the costs of disclosure. The hypothesized costs include the cost of raising capital, product market competition, and direct out-of-pocket disclosure cost, etc. (e.g., Verrecchia 1983, Dye 1985). Beyond these, I provide a profile of the disclosure-increasing and disclosure -decreasing firms by examining the economic circumstances surrounding the changes in disclosure quality. The exploration allows us to identify which theoretical forces are most influential, and whether there are explanations beyond those suggested by the theoretical literature. The purpose of this study is to learn more about possible limitations of disclosure and highlight cases in which disclosure appears to be particularly costly.

Contrary to the conjecture that the disclosure-decreasing firms do not need capital, I find that the disclosure-decreasing firms have a strong demand for external funding. Furthermore, while the disclosure-increasing firms tend to access capital through new equity issues, the decreasing firms tend to rely on both private financing and public debt issuances, suggesting that public debt markets are not as sensitive to changes in disclosure quality as public equity markets. Consistent with theory, I find that disclosure deterioration is most strongly and negatively associated with the interaction between demand for equity and expected earnings news, implying that firms with bad news and a high demand for equity are more likely to be disclosure-decreasing firms. The finding reflects a situation in which disclosing information to the capital markets is more costly than nondisclosure. Regarding *concurrent* earnings performance that is

already known to the market, disclosure improvement is most strongly associated with improving earnings performance, while poor performance alone does not lead to disclosure decreases.

This study further considers the possibility that increased demand for information due to a change in a firm's circumstances determine analysts' views of disclosure quality. I document the concurrent events that occur around the time of the sustained disclosure rating change and find that a higher percentage of the disclosure-decreasing firms are facing disruptive events such as union strikes and proxy battles. I interpret this as evidence that disclosure-decreasing firms face an environment of greater general uncertainty. The implication is that these firms may not be able to "turn on" their disclosures, even though potential benefits of increasing disclosure provides an incentive for these firms to do so.

Overview of Chapter 4

Chapters 2 and 3 use the AIMR scores to discuss the consequences and causes of disclosure quality deteriorations. Whereas Chapters 2 and 3, for the most part, assume that disclosure scores capture latent disclosure quality, this chapter attempts to more directly understand what the disclosure scores are measuring. To explore what disclosure attributes analysts regard as important, this chapter examines the association between the AIMR scores and certain quantifiable disclosure characteristics. Finding an association between the scores and the disclosure characteristics raises the possibility of

developing a disclosure rating prediction model that could be used beyond the end of the AIMR rating series.[3]

I hypothesize that three quantitative disclosure characteristics are related to the scores: timeliness, quantity, and frequency. I use ordinary least squares and latent variable regressions to examine the extent to which these quantitative disclosure characteristics explain a firm's AIMR scores. The quantitative characteristics include timeliness of a firm's 10-K and 10-Q filings, the length of various sections of the financial reports (e.g., the Business section, the Selected Financial Highlight section, the Management Discussion and Analysis, and the Notes to Financial Statements), and the frequency of press releases. I further control for factors that may affect disclosure quality and analysts' perception of a firm. These factors include firm size, performance, earnings attributes, and company popularity among analysts.

Empirical results suggest significant associations between the disclosure scores and the quantitative measures of disclosure quality. More timely annual reports and longer discussions in the Business section and the Management Discussion and Analysis (MD&A) section are associated with higher scores. The scores are also positively associated with indicators of company popularity such as analysts' stock recommendations and whether a firm has positive earnings. The estimated disclosure ratings model is applied to a holdout sample. In a test that compares a firm's estimated annual report score to the sample medians, the results show that the estimation reaches the same conclusion as using the actual scores for 69% of the observations.

[3] The ratings ceased after 1996.

This part of the thesis contributes to the literature in three respects. First, it adds to the prior research using the AIMR scores by finding a connection between the scores and specific disclosure characteristics that can be objectively quantified. Second, the chapter adds to the literature on financial statement readability. Contrary to the contention that lengthier text lowers readability, I find that firms with longer Business and MD&A sections are awarded higher scores by analysts. Since analysts are sophisticated financial statement users, longer statements may have less of a negative impact on analysts than on unsophisticated investors. Third, this chapter shows associations between analysts' disclosure ratings and disclosure characteristics that are readily accessible and require minimal personal judgment. This allows the use of these measures to predict what AIMR ratings would be in settings where they are not available. Overall, the findings suggest that observable disclosure characteristics are captured in the AIMR disclosure scores.

Concluding remarks

This thesis contributes to the literature on disclosure quality in several ways. First, it presents direct comparative evidence on the consequences of disclosure improvements and declines. It further provides evidence on forces that lead to disclosure quality deteriorations (e.g., labor issues). By understanding how the underlying economic circumstances of a firm affect analysts' evaluations, we can better understand why some firms are not able to costlessly improve disclosure and may suffer negative consequences of a mandated change in disclosure policy. In addition, this thesis documents that certain quantifiable disclosure characteristics are reflected in analysts' disclosure ratings.

It implies that these easily accessible characteristics can be useful in predicting analysts' disclosure ratings. Other findings in this thesis also have important implications for future research. Issues worth exploring further include disclosure quality in public debt markets, and the association between the reporting of special items and analysts' information precision.

CHAPTER 2

CAPITAL MARKET CONSEQUENCES OF A SUSTAINED DETERIORATION OF DISCLOSURE QUALITY

2.1 INTRODUCTION

Regulators and the general public have long advocated for more disclosure from public companies, particularly since the corporate and accounting scandals (e.g., Enron, Tyco, and Worldcom) leading to the Sarbanes-Oxley Act. In theory, good disclosure reduces the information asymmetry between firm management and outside investors. For firms with truly good prospects, credible reporting of firm events can reduce the cost of raising capital. Consistent with this theory, empirical research has found cross-sectional evidence that higher-quality reporting is negatively correlated with measures of information asymmetry (e.g., Lang and Lundholm 1996; Leuz and Verrecchia 2000).

The idea that a high-quality disclosure policy is good for business has captured the imagination of the public and academics. For example, Healy, Hutton, and Palepu (1999) extend the cross-sectional work pioneered by Lang and Lundholm (1993, 1996) highlighting the benefits of increasing disclosure quality. In particular, they examine the capital market characteristics of firms that experience an increase in disclosure quality, measured by the AIMR (Association for Investment Management and Research)

disclosure ratings. Their results confirm that firms with improved disclosure quality show reductions in common measures of information asymmetry. That is, the increasing disclosure quality is associated with an increase in stock returns, institutional ownership, and analyst following, and a decrease in analyst forecast dispersions. The notion that high disclosure quality is good for capital markets has led some researchers to establish theoretical links between information quality and systematic risk (e.g., Easley and O'Hara 2002, 2004). These theoretical studies have spawned further empirical research that associates measures of accounting quality with cost of capital (e.g., Roulstone 2003; Dhaliwal, Chen, and Xie 2007).

While research to date has done a great job of documenting the benefits experienced by firms that increase their disclosure quality, the literature has paid less attention to the costs of disclosure that might lead a firm to reduce disclosure. The causes and consequences of disclosure quality deteriorations have remained relatively under-explored until recent years (e.g., Chen, Matsumoto, and Rajgopal 2006; Houston, Lev, and Tucker 2008). One explanation for the apparent oversight is that, given the well-documented benefits of high disclosure quality, it is tempting to extrapolate that the circumstances of firms with low disclosure quality are simply the flip side of firms with good disclosure quality.

Such a conjecture remains unverified empirically. In fact, there have been anecdotal cases that go against the conventional wisdom. For example, a *New York Times* article in 2005 accuses Allied Capital of shutting down communication with investors while maintaining a higher than expected stock price, suggesting that providing

less transparent information does not always lead to a lower stock price.[4] In addition, prior studies show that public announcements (e.g., earnings) can trigger the creation of private information, which leads to *disagreement* among investors (e.g., Kim and Verrecchia 1997; Holthausen and Verrecchia 1990; Barron et al. 2005).

Such evidence gives us reason to question whether increasing disclosure is always beneficial to a firm, or whether in some situations it could reduce firm value. Before making any attempt to mandate disclosure improvement, we should look at both ends of the disclosure spectrum where firm disclosure has either improved or deteriorated. As mentioned earlier, Healy et al. (1999) show that firms with a sustained improvement in analysts' ratings experience higher stock returns and better capital market intermediation (e.g., more analyst coverage). However, that study leaves out firms experiencing a decline in analysts' ratings. They claim that the firms with declining disclosure quality are complicated and comparison may be difficult.[5] My study addresses their claim by examining the degree to which the two sets of firms are symmetric. By doing so, this study also relaxes the assumption in prior studies which assumes a linear relationship between disclosure ratings and firm characteristics (e.g., Lang and Lundholm 1993, 1996). Such an assumption implicitly forces symmetry between high-disclosure and low-disclosure firms.

I focus on this issue by asking two critical questions. First, what are the capital market consequences, if any, of a decline in disclosure quality? Second, if the

[4] Source: "Keeping Shareholders in the Dark," by Floyd Norris. *The New York Times,* July 15, 2005. Allied Capital was under a criminal investigation and its stock plunged. According to the article, "First, it blamed short sellers for prompting the investigation. Then it added a politician to its board and declared that henceforth it would provide less information than ever to its investors." … "More than six months later, Allied Capital's stock is back above where it was…" (Section C; Column 1; Business/ Financial Desk; Page 1)

[5] In a commentary, Lang (1999) questions whether this claim is valid.

consequences of decreasing disclosure quality are symmetric to the capital market benefits from improving disclosure quality, why would a firm choose to forgo those benefits? In other words, what are the costs that stop these firms from improving disclosure quality? This chapter investigates the first question.

The capital market consequences of changing disclosure are examined, using the same approach as Healy et al. (1999) but expanding their sample to incorporate both firms with improved analyst disclosure ratings (disclosure-increasing firms hereafter) and firms with decreased disclosure ratings (disclosure-decreasing firms hereafter). Results show that, in general, the disclosure-decreasing firms experience negative consequences. While some of the consequences are symmetric to the benefits enjoyed by firms with increasing disclosure ratings, there are also some differences.

This chapter contributes to the literature by complementing the prior research on improved disclosure quality. It attempts to provoke deeper thinking about disclosures. Although the popular press almost always advocates for high-quality disclosures, disclosure practice has its limitations and is a result of trading off costs and benefits. Recent studies by Chen et al. (2006) and Houston et al. (2008) address a similar issue, looking at firms that stop providing earnings guidance and using the situation as an indicator of disclosure deterioration. This chapter, like the earnings guidance studies, finds a positive association between disclosure deterioration and increasing information asymmetry. More importantly, the research design in this chapter provides the opportunity to compare disclosure-increasing and disclosure-decreasing firms directly, which is beyond the scope of Chen et al. (2006) and Houston et al. (2008).

The remainder of this chapter is organized as follows. The following section discusses prior research and develops research hypotheses. Measurement of variables is discussed in Section 2.3. The sample is described in Section 2.4. Section 2.5 tests for capital market consequences of disclosure changes. Section 2.6 concludes the chapter.

2.2 RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

When potential investors have less information than firm managers about the firms in which they are considering investing, they face adverse selection problems. Managers' incentives to misrepresent firm value can cause the market to break down and lead to the "lemons problem" (Akerlof 1970). Knowing this, managers can voluntarily provide disclosures to alleviate the information asymmetry problems.

The benefit of alleviating information asymmetry comes from the correct valuation that a firm can obtain by distinguishing itself from inferior firms. For a firm with a demand for capital and with good news that is not yet reflected in its stock price, releasing this good news helps raise the selling price for its new capital (Grossman 1981, Milgrom 1981). Using self-constructed disclosure measures, Botosan (1997) provides evidence consistent with this view, showing that among firms with low analyst coverage, higher disclosure scores are associated with a lower cost of capital. Lang and Lundholm (1996) find that firms with higher disclosure ratings have greater analyst following, a smaller dispersion in analysts' forecasts, and less volatility in analyst forecast revisions. Healy et al. (1999) find that sustained increases in disclosure ratings are positively associated with stock returns, institutional ownership, and analyst coverage, and are negatively associated with bid-ask spreads and analyst forecast dispersions. In addition,

Leuz and Verrecchia (2000) find that firms that switch from the German to an international financial reporting regime with higher disclosure requirements enjoy lower bid-ask spreads and higher trading volume. All these findings suggest that better disclosure quality is associated with a lower cost of raising capital.

A question not examined in these studies is whether the reverse consequences hold when disclosure quality decreases. Little empirical evidence has been provided regarding whether a sustained deterioration of disclosure quality leads to a stock price decline, lower stock liquidity, and less stock intermediation by analysts. Studies that assume a linear relationship between disclosure ratings and firm characteristics (e.g., Lang and Lundholm 1993, 1996) implicitly force symmetric consequences between disclosure expansions and disclosure declines. In contrast, Healy et al. (1999) only examine firms with disclosure quality increases. They speculate that disclosure deterioration does not necessarily result in consequences symmetric to that of disclosure improvement.

Recent studies such as Houston et al. (2008) and Chen et al. (2006) investigate disclosure declines by examining firms that stopped quarterly earnings guidance in recent years. They find evidence consistent with increased information asymmetry (e.g., increased analyst forecast error) after quarterly guidance stops. This chapter differs from these studies in a number of ways. First, earnings guidance is a single-dimension, forward-looking disclosure practice, while the AIMR scores are more comprehensive in measuring retrospective and forward-looking disclosures.[6] Second, the sample period

[6] Chen et al. (2006) study firms that publicly announced between 2000 and 2006 that they would stop giving guidance. Houston et al. (2008) study firms that either publicly announced or privately stopped guidance between 2002 and the first quarter of 2005. Houston et al. (2008) also indicate that most firms

used in this chapter spans over a decade, while the studies of ceasing earnings guidance are based on a shorter, more recent time period. During their sample period, the litigation environment has changed following a series of accounting scandals and new laws such as the Sarbanes-Oxley Act. These new regulations are likely to have leveled the playing field, in terms of access to information, faced by capital market participants. In addition, legal penalties associated with making fraudulent disclosures in financial statements (Sarbanes Oxley Act) and disclosing information directly to individual analysts (Reg FD), may have made managers less willing to provide voluntary disclosures. Third, I provide a direct comparison between firms with deteriorated disclosure quality and their counterparts, i.e., firms with improving disclosure quality.

My null hypothesis is that the capital market consequences of disclosure deterioration are symmetric to the previously documented benefits of disclosure enhancement. That is, while firms enjoy capital market "benefits" when their disclosure quality improves, firms lose those benefits when their disclosure quality decreases. The hypotheses are stated as follows, using measures of capital market benefits that were used in Healy et al. (1999).

H2.1a: Firms experiencing a sustained increase in their disclosure ratings experience higher stock returns, lower bid-ask spreads, more analyst coverage, and lower analyst forecast dispersions.

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that stopped quarterly earnings guidance still maintain the annual earnings guidance and forward-looking non-earnings disclosures in MD&A.

H2.1b: Firms experiencing a sustained decline in their disclosure ratings experience lower stock returns, higher bid-ask spreads, less analyst coverage, and higher analyst forecast dispersions.

Examining whether the consequences of disclosure changes are symmetric has important policy implications for disclosure. If firms with declined disclosures do not experience the exactly opposite consequences to those of disclosure improvement, it might suggest that disclosure quality does not matter as much as we thought. On the other hand, if the benefits disappear when disclosure quality declines, it justifies the motivation for firms to strive toward disclosure improvement.

Finding symmetry between the consequences of declining and increasing disclosure quality would raise another question regarding disclosure behavior: in expectation of the upcoming consequences, why would a firm ever choose not to improve its disclosure quality? To study this question, I discuss in the next chapter the tradeoffs managers face between disclosing and withholding information. Drawing from theoretical models, just as disclosure can be an optimal response to a firm's information environment, so too can nondisclosure be optimal in some settings.

2.3 VARIABLE MEASUREMENT

2.3.1 Disclosure quality

Disclosure quality is measured by analysts' ratings in the AIMR Corporate Information Committee Reports during 1978-1996. The AIMR ratings are gathered from annual surveys of financial analysts specializing in specific industries. The analysts are asked

to evaluate firms' disclosure quality based on their annual reports, other corporate publications (including quarterly reports), and investor relations (such as accessibility to annual meetings). The AIMR ratings have been used in prior studies and are viewed as a reasonably reliable proxy for disclosure quality. Examples include Lang and Lundholm (1993, 1996), Healy et al. (1999), Bushee and Noe (2000), and Botosan and Plumlee (2002).[7]

Disclosure changes are measured by the change in a firm's relative industry rankings (RIR) within its industry. RIR is defined as ((N - Rank)/ (N - 1))*100, where Rank is the disclosure rank for the firm within its industry and N is the number of firms ranked in the same industry (see Lang and Lundholm 1993, 1996; Healy et al. 1999). Industries are restricted to those with five or more firms to exclude firms with a small change in disclosure scores but a large change in RIR. Industries with less than seven years of AIMR coverage are also excluded to ensure the availability of a time-series to identify sustained disclosure changes. The sample then consists of 765 firms in thirty-three AIMR industries.

Like Healy et al. (1999), I measure sustained disclosure changes over a rolling five-year window, by taking the percentage change from the average RIR during years -2 and -1 to the average RIR during years 0, 1, and 2. I then identify the most extreme negative and positive changes for each firm. Firms with a positive (negative) change of at least 30% are identified as disclosure-increasing (disclosure-decreasing) firms. The

[7] Nevertheless, commentary on prior research raises concerns that the analysts themselves may incorporate bias into their ratings (e.g., Healy and Palepu, 2001). This chapter interprets the bias, if any, as incorporating analysts' satisfaction driven by analysts' extremely high or low expectations for the disclosure quality of a specific firm.

beginning year of the sustained change is defined as year 0.[8] If a firm experiences more than one sustained disclosure increase, only the event period with the largest increase is selected, and the procedure is the same for identifying the disclosure-decreasing sample. Among the 765 firms, 145 firms in 29 industries are identified as disclosure-decreasing firms, and 151 firms in 28 industries are identified as disclosure-increasing firms with year 0 ranging from 1980 to 1994.[9]

Note that the selection method is subject to a survivorship bias. Firms covered by the AIMR report are likely to be those that attract attention from analysts. Firms that are dropped by the report either cease to exist or are no longer of interest to analysts. If, for example, a disclosure-decreasing firm is no longer evaluated by the analysts due to the poor disclosure quality, the current sample selection systematically excludes this type of firm. Caution should be exercised in interpreting the results.

2.3.2 Capital market consequences and other variables

Healy et al. (1999) measure capital market consequences in terms of stock returns, institutional ownership, analyst coverage, bid-ask spread and analyst forecast dispersion.[10] Like Healy et al., returns are defined as the 12-month stock returns starting three months into the fiscal year, obtained from the Center for Research in Security Prices (CRSP). Daily bid-ask spread is the difference between the closing bid and ask prices,

[8] For the disclosure-decreasing firms, the median RIRs from years -2 to 2 are 75.0, 67.2, 28.2, 25.0, and 23.1, respectively. For the disclosure-increasing firms, the median RIRs for the five years are 20.0, 27.3, 66.7, 70.4, and 75.8, respectively. Since industries are restricted to those with five or more firms, a change of the RIR from 75 in year -2 to 23.1 in year 2 implies a drop in the industry rankings of at least two places, and the drop becomes larger as the number of firms in the same industry increases.

[9] The sample period is longer than in Healy et al. (1999), which focuses on 97 firms with sustained disclosure increases during 1980-1991.

[10] Due to data availability, I am unable to explore the effect of disclosure changes on institutional ownership.

scaled by the average of the two. For each firm, I use the median value of the daily bid-ask spreads during a fiscal year. Due to data availability, the bid and ask prices are obtained first from CRSP and if unavailable then from the Institute for the Study of Security Markets (ISSM).[11] Analyst coverage is the number of analysts providing annual earnings forecasts in the last month of the fiscal year. Analyst forecast dispersion is the standard deviation of analysts' earnings forecasts at fiscal year-end, divided by the mean value of the earnings forecasts. Both analyst coverage and analyst forecast dispersion are obtained from the I/B/E/S summary tape. All variables are adjusted by removing their industry medians.[12]

To facilitate comparisons between the disclosure-increasing and disclosure-decreasing groups, I apply the models in Healy et al. (1999) first for the disclosure-increasing group and then for the decreasing group:

$$RET_{it} = \beta_0 + \beta_1 D_{it} + \beta_2 E_{it} + \beta_3 \Delta E_{it} + \beta_4 E_{it} * SG_{it} + \beta_5 \Delta E_{it} * SG_{it} + \beta_6 BETA_{it} + \beta_7 SIZE_{it} + \varepsilon_{it} \quad (2.1)$$

$$SPREAD_{it} = \alpha_0 + \alpha_1 D_{it} + \alpha_2 SIZE_{it} + \alpha_3 VOLUME_{it} + \alpha_4 PRICE_{it} + \upsilon_{it} \quad (2.2)$$

$$\Pr(COVERAGE_{it} > 0) = \delta_0 + \delta_1 D_{it} + \delta_2 E_{it} + \delta_3 \Delta E_{it} + \delta_4 SG_{it} + \delta_5 SIZE_{it} + \delta_6 PRICE_{it} + \nu_{it} \quad (2.3)$$

$$\Pr(DISPERSION_{it} > 0) = \gamma_0 + \gamma_1 D_{it} + \gamma_2 E_{it} + \gamma_3 \Delta E_{it} + \gamma_4 SG_{it} + \gamma_5 BETA_{it} + \gamma_6 SIZE_{it} + \varsigma_{it} \quad (2.4)$$

The first two regressions are OLS regressions where RET is stock return and SPREAD is bid-ask spread. The latter two are logistic regressions where

[11] Healy et al. (1999) use data from the ISSM from 1982 to 1991. However, I have access to this data only for the period 1986-1991. To maintain consistency of the measure, I use the CRSP as the primary source of bids and asks, supplemented by the ISSM data when CRSP values are missing (as CRSP values are not consistently available prior to 1992).

[12] The industry-adjusted approach ignores the industry-related difference among firms. To allow for potential variations across industries, I alternatively test stock returns, bid-ask spread, analyst coverage, analyst forecast dispersion, and trading volume without industry adjustments. The results remain qualitatively and statistically the same. The trading volume for the disclosure-decreasing firms is significantly larger between year 0 and year 2.

Pr(COVERAGE) takes the value of one if the number of analysts following is greater than the industry median in the same year, and Pr(DISPERSION) equals one if the firm's analyst forecast dispersion is higher than the industry median in the industry, and zero otherwise. D is a dichotomous variable that equals zero for observations in years -2 and -1 and one for years 0 to 2. Healy et al. (1999) obtained positive and strongly significant coefficients on D for the regression of stock return ($\beta_1 > 0$) and analyst following ($\delta_1 > 0$), and a negative and weakly significant coefficient for the regression of bid-ask spread ($\alpha_1 < 0$; t = 1.9). If the reverse holds for disclosure deterioration, the coefficients β_1 and δ_1 are expected to be negative, while the coefficients α_1 are expected to be positive for the disclosure-decreasing firms. Although in Healy et al. the coefficient γ_1 is not significant, I hypothesize it to be positive for the disclosure-decreasing firms.

The control variables earnings levels (E) and earnings changes (ΔE) are the level and change of earnings before extraordinary items, deflated by market value of equity three months into the fiscal year. SG is the three-year sales growth rate. BETA represents firms' beta obtained from CRSP and SIZE is the log of total assets. VOLUME is the log of average daily trading volume deflated by total shares outstanding, and PRICE is the log of stock price three months before the fiscal year end, both obtained from CRSP. All variables are industry-adjusted.

2.4 SAMPLE

Panel A of Table 2.2 shows the sample distributions. The disclosure-decreasing firms appear with slightly higher frequencies in the Environmental Control (7.6%) and Machinery (9.0%) industries. The disclosure-increasing firms appear with slightly higher frequencies in the Retail industry (7.3%). The industry distributions of the two groups are similar, with the exception of the Airline industry, in which eight out of 27 firms are categorized as disclosure-decreasing firms and only one as a disclosure-increasing firm. Panel B provides the distribution of event years (year 0) for both samples. The disclosure increases occur more frequently in 1985, 1990, 1991, and 1992. This is consistent with what Healy et al. (1999) report. Disclosure decreases also occur more frequently in 1985, 1990, and 1992.

2.4.1 Underlying disclosure rating changes and evidence related to changes in the length of sample firms' annual reports

Since disclosure quality is measured in a relative sense, one may contend that a decrease in a firm's ranking could be the result of other firms' improving, instead of the firm reducing its disclosure quality. It is unknown whether there is an absolute change in the amount of disclosures being made by firms that experience a disclosure ranking change. My research design assumes that disclosure quality is relative by nature. Even if a firm maintains or improves disclosure quality, it could still be viewed by analysts as the weakest in the industry if other firms are improving more.

To shed light on this issue, I examine the original disclosure *scores* for the disclosure change firms. Panel A of Table 2.3 reports the variation of the AIMR total

rating scores during years -2 to 2 for a subset of the disclosure-increasing and -decreasing firms with available data.[13] The panel shows that for the disclosure-decreasing firms, the median total scores drop from 74.5 in year -2 to 65.8 in year 0 and maintain at similar levels for the following years. The drops from the pre-event period (years -2 and -1) to the event period (years 0 to 2) are significant (t = -5.94 for means; z = -5.35 for medians). For the disclosure-increasing firms, the median total scores increase from 65.1 in year -2 to 75.2 in year 0. The increases are also significant (t = 8.69; z = 7.89). Overall, Panel A provides evidence that the changes in relative industry rankings (RIR) are not simply due to improvements by the disclosure-increasing firms. The decreases in RIR for the disclosure-decreasing firms reflect that these firms are receiving lower disclosure *scores* from analysts.

I also explore whether the disclosure-decreasing firms do disclose less, and whether the disclosure-increasing firms do disclose more, quantitatively. Specifically, I collected from ProQuest the annual reports of 55 disclosure-decreasing firms and 61 disclosure-increasing firms. The number of pages of these reports is shown in Panel B. While number of pages is only one of the many other ways we could assess the quantity of information, it gives us a rough idea regarding whether and how the changes in disclosure ratings reflect corresponding changes in disclosure practices.

For the disclosure-increasing firms, the mean number of pages increases significantly over the disclosure change period from 47.8 in year -2 to 57.4 in year 2, while the disclosure-decreasing firms show a slight, but insignificant, decline in number of pages. Nevertheless, the disclosure-decreasing firms have significantly shorter

[13] The original scores that I have access to are for 1986 onwards.

annual reports than the increasing firms during years 0 to 2 (t = -2.04). Unreported result shows that the changes for the disclosure-decreasing firms during years 0 to 2 are significantly more negative than the increasing firms (t = -2.58). Since annual reports tend to get longer over time, the significant difference indicates that the disclosure-decreasing firms are not as forthcoming with information in their annual reporting as the disclosure-increasing firms.[14] The results suggest that the disclosure-decreasing firms are probably not reducing the total amount of information they produce, but that they are not keeping up with the other firms in their industries in expanding their disclosures.

2.4.2 Descriptive statistics

Table 2.4 provides descriptive information for both samples regarding their total assets, sales, debt ratios, and ROA (earnings before extraordinary items scaled by ending total assets). Statistics are provided for both year 0 and the average change from the pre-event period (years -2 and -1) to the event period (year 0 to year 2). The disclosure-increasing and disclosure-decreasing firms have similar sales and total assets. Both groups grow in their sales and total assets over the five-year period. However, the disclosure-increasing group grows at a significantly faster rate.

Interestingly, both groups experience deterioration in profitability between the two periods. However, the deterioration for the disclosure-decreasing sample is significantly larger than for the disclosure-increasing firms. The disclosure-increasing firms do not change their debt ratios between the two periods, while the

[14] Throughout the thesis it is assumed that when a firm produces a long annual report or long sections in the annual report, the firm is incorporating additional information in the additional pages.

disclosure-decreasing firms experience a slight increase in their leverage (the median increase of 0.45% is significant at the 10% level).

In general, Table 2.4 suggests that the decreasing and increasing groups are similar in size and capital structures. However, the disclosure-increasing firms are expanding their total assets and sales more quickly. These firms are relatively more profitable compared to the disclosure-decreasing firms, although both samples suffer a decline in their earnings performance. Note that the above comparison does not consider the sample firms' characteristics and performance relative to their particular industries. Since the disclosure changes are measured by relative industry rankings, in the following analysis each variable is industry-adjusted by deducting the median value of nonsample firms in the same AIMR industry and year.

2.5 EMPIRICAL RESULTS

2.5.1 Univariate analysis

In the following analysis, I report the means and medians for the measures of capital market consequences from year -2 to year 2. Two-tailed t-tests and Wilcoxon rank sum tests are used to examine whether the mean and median differences between the pre-event period and the event period are significantly different from zero.

Stock return

In Table 2.5, the mean and median industry-adjusted returns of the disclosure-increasing firms are significantly positive during years 0 to 2. In year 0, the mean industry-adjusted return for disclosure-increasing firms is 7.86 %, and the strong

performance continues for the following two years. The pattern is consistent with Healy et al. (1999), who find returns are significantly positive for years 0 and +1, indicating a positive association between stock performance and disclosure improvement. On the other hand, the stock returns for the disclosure-decreasing group start to decline even before the maximum decrease in disclosure quality (year 0). In year -1, the industry-adjusted returns are significantly negative (mean = -3.36 %). These firms experience an even larger drop in returns during year 0 (mean = -7.17 %). However, by years 1 and 2 stock returns are no longer significantly different from zero.

Bid-ask spread

The medians of the industry-adjusted bid-ask spread behave quite symmetrically for the two groups. For the disclosure-decreasing group, the medians are significantly negative in years -1 and -2, while for the increasing group they are significantly negative in years 1 and 2. Tests for the difference between the event and pre-event periods indicate that bid-ask spread increases significantly for the disclosure-decreasing firms and decreases significantly for the disclosure-increasing firms. The patterns are consistent with the tendency toward increasing information asymmetry when disclosure quality declines.[15]

Analyst coverage

In Table 2.5, the disclosure-increasing and -decreasing firms have positive industry-adjusted analyst coverage in all the years, indicating that both sets of firms are more popular among analysts than their industry peers. Changes in analyst following

[15] As bid-ask spread indicates stock liquidity, I also examine the changes in trading volume (turnover) during the five-year window. The mean and median industry-adjusted trading volumes of both groups are significantly positive during the five years, indicating that these firms are traded more frequently than their industry peers. The changes in trading volume between the event and pre-event periods are insignificant for both groups.

between the pre-event and event periods are not statistically significant for either set of firms.

Analyst forecast dispersion

While analysts do not appear to drop disclosure-decreasing firms in an economically significant way, the dispersion in their forecasts increases for these firms. For the disclosure-decreasing group, the mean and median values of the industry-adjusted analyst forecast dispersions are significantly positive during the event years (0, 1, and 2) but not in earlier years. This reflects a significantly positive change from the pre-event to the event period. On the other hand, the mean and median dispersions are relatively volatile for the disclosure-increasing firms, but in general they are not significantly different from the industry medians.

Earnings performance

Recall from Table 2.4 that both the increasing and decreasing groups have deteriorated earnings during the event period. After industry adjustment, however, there is some weak evidence of changes in earnings performance associated with the disclosure change. Unlike Healy et al. (1999), who find no significant earnings changes during disclosure increases, Table 2.5 shows that the median level of industry-adjusted earnings increases significantly from the pre-event to the event period for the disclosure-increasing firms, and median industry-adjusted earnings decline significantly for the disclosure-decreasing firms. This suggests that disclosure changes are related to relative earnings performance.

2.5.2 Regression analysis

Stock return

The regressions in equations (2.1), (2.2), (2.3), and (2.4) are reported in Table 2.6. Recall that in those regressions, D is a dichotomous variable that equals zero for observations in the pre-event period (years -2 and -1) and one for the event period (years 0 to 2). The coefficient on D in the first equation, β_1, tests if returns in the event period are different from their level in the pre-event period.

As expected, β_1 is significantly positive for the disclosure-increasing sample (β_1 = 0.0499; p = 0.03), indicating that improving disclosure is associated with positive stock returns. For the disclosure-decreasing firms, β_1 is negative but does not quite attain significance based on a two-tailed test (β_1 = -0.0348; p = 0.11). However, as we have a directional prediction, we can apply a one-tailed test. Based on a one-tailed test, the result shows evidence that firms with deteriorating disclosures experience a drop in stock returns. The regression for the disclosure-increasing firms has significantly positive coefficients on earnings, earnings changes, earnings-growth interaction, and beta, which are largely consistent with Healy et al. (1999). On the other hand, the same regression for the disclosure-decreasing group has very low explanatory power (adjusted R-squared = 0.51%) and none of the control variables are significant. This suggests that the drop in stock returns during the event period is driven by factors beyond firm performance and risk. I explore this issue further in Chapter 3.

Bid-ask spread

Healy et al. (1999) find a negative but marginally significant coefficient on the disclosure change dummy variable (D) in their bid-ask spread regression, weakly suggesting that a

sustained increase in disclosure reduces bid-ask spread.[16] However, the regression result in Table 2.6 for the disclosure-increasing sample does not provide evidence consistent with their finding since α_1 is insignificant (p = 0.9). For the disclosure-decreasing sample, the coefficient on D is positive but does not quite attain significance (p = 0.13).

Certain measurement issues may drive the insignificance for the disclosure-increasing firms. First, I use the median values during a year to measure annual bid-ask spreads. If the events related to disclosure improvement happened during a short window, means instead of medians are more likely to capture market reactions. Second, while Healy et al. (1999) use ISSM data from 1982-1991 for bid-ask spread and obtain weakly significant results, I use the CRSP data supplemented by the ISSM data that I have access to (1986-1991). To further reconcile the findings, I restrict the sample period to be consistent with Healy et al. (1999) for selecting the disclosure-increasing firms. When I apply only the ISSM data to this sample during 1986-1991, the coefficient on D remains negative but insignificant (p = 0.56). Additional attempts to winsorize or delete the top or bottom of the sample do not change the results. Again, note that the ISSM data period that I have access to is shorter than in their study.

In another attempt, I restrict the observations to be those after 1992 and use only the CRSP data. The coefficient for the disclosure-increasing sample is negative (-0.0942) and significant based on a one-tailed test (p = 0.13), while the coefficient for the disclosure-decreasing firms is positive (0.1179) and significant (p = 0.05). The

[16] In their study, the t statistic for the coefficient is 1.9. The number of observations is 322 for 97 firms with expanded disclosure during 1980-1990.

results from this sub-period suggest some degree of symmetry between disclosure increases and decreases.

Analyst coverage

In the analyst coverage regression, the coefficient on D is significantly positive for the disclosure-increasing firms, consistent with Healy et al. (1999). However, the coefficient for the disclosure-decreasing firms is insignificant (δ_1 = -0.088; p = 0.66), indicating that analysts do not appear to abandon a firm when its disclosure ranking falls. The results are consistent with Chen et al. (2006) but inconsistent with Houston et al. (2008), who find analyst coverage decreases when firms stop providing earnings guidance. The mixed evidence can be driven by sample selection, model specification, and/or measures of disclosure quality.

Overall, the asymmetric finding suggests that analysts are more willing to pick up a firm for coverage than to drop one. Once the analysts start to provide forecasts for a firm, they continue to provide forecasts, even when the firm is not providing as much disclosure as the analysts desire. On the other hand, an alternative explanation is that AIMR selects firms based on their popularity with analysts. (Note that the two explanations are not mutually exclusive.) The finding that analysts maintain their interest in following the disclosure-decreasing firms is possibly predetermined by the fact that the AIMR report selects firms that analysts are interested in following. The sample selection in this study excludes firms that reduce disclosure quality and do not survive and those that reduce disclosure quality and lose the attention from analysts. If this is the case, then we are unable to determine whether or not the consequences, in terms of analyst coverage, are symmetric between the disclosure-increasing and -decreasing firms.

Analyst forecast dispersion

The results for regression (2.4) indicate that analyst forecast dispersion decreases when disclosure increases (γ_1 = -0.2689; p = 0.097), and it increases when disclosure declines (γ_1 = 0.3720; p = 0.03). The coefficient for the disclosure-increasing firms in Healy et al. (1999) was also negative but it was insignificant. The results are consistent with Chen et al. (2006) and Houston et al. (2008) that find analyst forecast dispersion increases after firms stop providing quarterly earnings guidance.

2.5.3 Are the effects of increasing versus decreasing disclosure symmetric?

To further test whether the benefits from disclosure increases and the loss of benefits from disclosure decreases are symmetric, I use a pooled regression to test whether the coefficients on D have opposite signs and the same magnitude for the two groups. I use an additional intercept dummy to control for the difference between the two groups during the pre-event period. As shown at the bottom of Table 2.6, the results do not provide sufficient cause to reject the null hypothesis that the signs of the coefficients for stock return, bid-ask spread, and analyst forecast dispersion are opposite and the magnitudes the same. The only asymmetric result is analyst coverage (p = 0.01), which is consistent with my earlier findings that analyst following increases with disclosure improvement but does not decrease with disclosure deterioration. Overall, the results in Table 2.6 suggest that it is hard to reject symmetry between disclosure increases and decreases except for in the case of analyst coverage. Again, readers should be cautious in generalizing the results of analyst coverage to other firms that are not selected by the AIMR report.

Note that the evidence of market consequences seems to be slightly stronger for the disclosure-increasing group, where three out of four regressions show significant coefficients on D. The results for the disclosure-decreasing sample differ from those of the increasing sample in two major ways: 1) the coefficients on D for the regressions of stock return and analyst forecast dispersion are less significant, and 2) the model fit for stock return is low. The relatively weaker results for the disclosure-decreasing group imply that there may be factors in addition to disclosure changes occurring during the disclosure-decreasing period. The next chapter addresses this issue.

2.6 CONCLUSION

This chapter examines sustained changes in disclosure quality ratings, with a focus on cases of disclosure quality deterioration. The study extends work conducted by Healy et al. (1999) by examining the capital market consequences, if any, of disclosure quality declines.

The results show that the capital market reacts positively to a sustained disclosure ranking increase and negatively to a sustained decrease, where market reaction is measured by stock return, bid-ask spread, and analyst forecast dispersion. The symmetry between the increasing and decreasing firms suggests that firms forgo non-trivial benefits when they allow their disclosure quality to decline. Nevertheless, while firms with a sustained increase in disclosure quality ratings enjoyed an increase in analyst following, I do not find a drop of analyst coverage with the sustained decrease in disclosure quality ratings. In addition, while the stock returns for the two sets of firms

are moving in opposite directions, the drops in stock returns for the disclosure-decreasing firms are more concentrated at the event year, while the increase in stock returns for the disclosure-increasing firms continues for the following two years. These distinctions indicate that the consequences of disclosure quality decreases are not simply a mirror image of the consequences of disclosure quality increases. Although the disclosure-increasing firms appear to enjoy capital market benefits, the disclosure-decreasing firms do not seem to forgo as many benefits as what the disclosure-increasing firms are able to enjoy.

The findings in this chapter prompt a further investigation for the disclosure-decreasing group. Given the benefits of improving disclosure quality, why would firms allow their disclosure quality to deteriorate? To what extent do the disclosure-decreasing firms differ from the disclosure-increasing firms in terms of capital demand, earnings news, market competition, and their information environment? I attempt to answer these questions in the next chapter.

Table 2.1 Variable Description

The following variables are industry-adjusted by deducting the median values of firms in the same AIMR industry and year	
RET	12-month stock returns starting 3 months into the fiscal year, obtained from CRSP.
SPREAD	Bid-ask spread, measured as the median value of bid-ask spread deflated by the average of bid and ask prices during the fiscal year. CRSP is used as the primary source of bids and asks, supplemented by data from the Institute for the Study of Security Markets (ISSM) during 1986-1991 when a CRSP value is not available.
COVERAGE	Analyst coverage obtained from I/B/E/S, measured as the number of analysts issuing an annual earnings forecast for the sample firm in the fiscal-year-end month.
DISPERSION	Analyst forecast dispersion, measured as the standard deviation of analysts' annual earnings forecasts at fiscal year end scaled by the mean forecasts of annual earnings.
E	Income before extraordinary items (Compustat data #18), deflated by market value of equity 3 months into the fiscal year.
ΔE	Changes in income before extraordinary items, deflated by market value of equity 3 months into the fiscal year.
SG	3-year growth rate of sales (Compustat data #12).
BETA	Firms' year-end beta value obtained from CRSP Indices and Deciles.
SIZE	Log of total assets (Compustat data #6).
VOLUME	Annual average of share volume (VOL) divided by total shares outstanding, obtained from CRSP.
PRICE	Log of stock price 3 months before the fiscal year end, obtained from CRSP.

Table 2.2 Sample Distribution in Industries and Event Years for Firms with Sustained Disclosure Changes [a]

Panel A Industry composition

	Firms selected from the AIMR Reports		Firms with decreased disclosure ratings		Firms with improved disclosure ratings	
Industry	No. of firms	Percent	No. of firms	Percent	No. of firms	Percent
Aerospace	13	1.7%	4	2.8%	4	2.6%
Airline	27	3.5%	8	5.5%	1	0.7%
Apparel	22	2.9%	6	4.1%	7	4.6%
Textiles	15	2.0%	4	2.8%	3	2.0%
Chemical	25	3.3%	4	2.8%	3	2.0%
Construction	21	2.7%	1	0.7%	0	0.0%
Container & Packaging	16	2.1%	1	0.7%	2	1.3%
Diversified Companies	20	2.6%	1	0.7%	3	2.0%
Electrical Equipment	19	2.5%	7	4.8%	7	4.6%
Environmental Control	41	5.4%	11	7.6%	8	5.3%
Financial Services	22	2.9%	3	2.1%	6	4.0%
Food	13	1.7%	3	2.1%	0	0.0%
Health Care	27	3.5%	9	6.2%	10	6.6%
Insurance	49	6.4%	10	6.9%	8	5.3%
Machinery	41	5.4%	13	9.0%	9	6.0%
Motor Carrier	24	3.1%	5	3.4%	5	3.3%
Natural Gas	16	2.1%	3	2.1%	6	4.0%
Pipelines	22	2.9%	5	3.4%	10	6.6%
Paper & Forest Products	35	4.6%	5	3.4%	7	4.6%
International-Petroleum	7	0.9%	4	2.8%	5	3.3%
Domestic-Petroleum	15	2.0%	3	2.1%	6	4.0%
Independent-Petroleum	13	1.7%	0	0.0%	1	0.7%
Petroleum Services	13	1.7%	5	3.4%	2	1.3%
Contract Drilling-Petroleum	11	1.4%	2	1.4%	2	1.3%
Exploration & Production	12	1.6%	0	0.0%	0	0.0%
Refining & Marketing	9	1.2%	1	0.7%	0	0.0%
Media	33	4.3%	3	2.1%	9	6.0%
Railroad	17	2.2%	5	3.4%	5	3.3%
Retail	64	8.4%	9	6.2%	11	7.3%
Specialty Chemicals	33	4.3%	8	5.5%	5	3.3%
Nonferrous Metals	14	1.8%	0	0.0%	0	0.0%
Precious Metals Mining	20	2.6%	2	1.4%	2	1.3%
Food, Beverage & Tobacco	36	4.7%	0	0.0%	4	2.6%
Total number of firms	765	100.0%	145	100.0%	151	100.0%

Table 2.2 (Continued)

Panel B Event year distribution

	Firms with decreased disclosure ratings		Firms with improved disclosure ratings	
Year	No. of firms	Percent	No. of firms	Percent
1980	9	6.2%	5	3.3%
1981	9	6.2%	9	6.0%
1982	9	6.2%	8	5.3%
1983	4	2.8%	5	3.3%
1984	10	6.9%	12	7.9%
1985	12	8.3%	13	8.6%
1986	8	5.5%	7	4.6%
1987	10	6.9%	7	4.6%
1988	5	3.4%	12	7.9%
1989	11	7.6%	10	6.6%
1990	12	8.3%	15	9.9%
1991	11	7.6%	17	11.3%
1992	15	10.3%	15	9.9%
1993	10	6.9%	8	5.3%
1994	10	6.9%	8	5.3%
Total number of firms	145	100.0%	151	100.0%

[a] The selected AIMR industries have 5 or more firms in their industries and are covered for at least 8 years. The samples are identified by the changes in the relative industry rankings: $RIR_{it} = (N_{it} - Rank_{it})/(N_{it} - 1) * 100$, where N_{it} is the number of firms ranked by analysts in industry i in year t and $Rank_{it}$ is the firm's disclosure ranking in year t in its industry. Firms with a negative change of at least 30% are identified as disclosure-decreasing firms, and firms with a positive change of at least 30% are identified as disclosure-increasing firms. The beginning year of the sustained change is defined as the event year (year 0).

Table 2.3 Underlying Disclosure Rating Changes and the Length of Annual Reports Across the Five Years Surrounding a Sustained Increase or Decrease in Disclosure Rankings (RIR)

Relative Year	-2	-1	0	1	2	$t_{(Event-preEvent)}$ [c] $z_{(Event-preEvent)}$
Panel A Original total scores used to form ranking [a]						
Disclosure-decreasing firms$_{(DEC)}$						
Mean	75.3	74.6	66.5	64.7	67.7	**-5.94*****
Median	74.5	73.5	65.8	65.0	66.9	**-5.35*****
N	55	60	68	79	62	
Disclosure-increasing firms $_{(INC)}$						
Mean	64.4	66.7	74.6	75.4	77.2	**8.69*****
Median	65.1	67.0	75.2	77.7	78.0	**7.89*****
N	63	69	78	88	77	
$t_{(DEC-INC)}$ [c]	**6.69*****			**-8.36*****		
$z_{(DEC-INC)}$	**5.76*****			**-7.45*****		
Panel B Number of pages in annual reports [b]						
Disclosure-decreasing firms$_{(DEC)}$						
Mean	49.7	50.2	49.1	49	48.4	-0.56
Median	48	50	48	48	48	-0.40
N	55	52	55	51	53	
Disclosure-increasing firms $_{(INC)}$						
Mean	47.8	49.4	52.7	54.0	57.4	**1.83***
Median	48	48	49	50	52	**1.65***
N	61	61	60	61	53	
$t_{(DEC-INC)}$ [b]	0.58			**-2.04****		
$z_{(DEC-INC)}$	0.71			-1.40		

[a] Original scores available to the author are limited to observations after 1985.

[b] Annual reports are obtained from ProQuest in PDF format. The identification of firms is based on company names.

[c] T and z values are the statistics for t tests and Wilcoxon tests. DEC denotes disclosure-decreasing firms. INC denotes disclosure-increasing firms. The subscript "Event-preEvent" represents the differences between the observations in the event period (years 0, 1, 2) and the observations in the pre-event period (years -2 and -1). The subscript "DEC-INC" represents the differences between the observations for the disclosure-decreasing group and the observations for the disclosure-increasing group. *, **, *** represent significance at 10%, 5%, and 1% levels, respectively.

Table 2.4 Descriptive Statistics for Firms with Sustained Disclosure Changes [a]

	Mean (t-value) [d]	Lower quartile	Median (z-statistic) [d]	Upper quartile
Panel A Event year (year 0) statistics [b]				
Total assets				
DEC	7,681.9***	699.9	2,190.4***	6,048.9
INC	7,384.2***	739.0	2,030.0***	8,109.1
	(0.16)		(0.49)	
Sales				
DEC	5,184.2***	679.7	2,080.2***	5,163.2
INC	5,661.9***	688.0	2,376.0***	5,465.0
	(-0.36)		(-0.23)	
ROA (%)				
DEC	3.60***	1.18	4.18***	6.69
INC	5.19***	2.58	5.01***	7.77
	(-2.07**)		(-2.25**)	
Debt ratio (%)				
DEC	18.41***	6.08	18.50***	26.78
INC	20.05***	9.17	19.42***	28.41
	(-1.01)		(-0.97)	
Panel B Changes between the event and pre-event periods [c]				
Percentage growth in total assets (%)				
DEC	19.81***	3.66	15.08***	30.10
INC	29.51***	6.81	21.54***	41.43
	(-2.35**)		(-2.29**)	
Percentage growth in sales (%)				
DEC	15.47***	-0.62	11.55***	28.56
INC	26.10***	3.35	18.29***	34.97
	(-1.95*)		(-2.12**)	
Changes in ROA (%)				
DEC	-2.60***	-3.90	-1.54***	0.18
INC	-0.62*	-2.70	-0.21**	1.22
	(-3.25***)		(-3.21***)	
Changes in debt ratio (%)				
DEC	0.57	-2.30	0.45*	4.41
INC	-0.55	-4.01	-0.31	2.37
	(1.16)		(2.07**)	

[a] DEC denotes disclosure-decreasing firms. INC denotes disclosure-increasing firms.

[b] Total assets and net sales are in millions. ROA is income before extraordinary items scaled by total assets at year t. Debt ratio is total long-term debt divided by total assets.

[c] Changes between the event and pre-event periods are the average of the event period (years 0 to 2) minus the average of the pre-event period (years -2 and -1.) Percentage growth in total assets (sales) is the average of total assets (sales) of years 0 to 2 minus the average of years -2 and -1, scaled by the average of years -2 and -1. Changes in ROA (debt ratio) are the average ROA (debt ratio) of years 0 to 2 minus the average of years -2 and -1.

[d] T and z statistics are reported in parentheses for the differences in means and medians, respectively. The differences are calculated as the values of disclosure-decreasing firms minus those of disclosure-increasing firms. *, **, and *** indicate significance at 10%, 5%, and 1% levels in a two-tailed test, respectively.

Table 2.5 Univariate Analysis of Industry-adjusted Returns, Bid-ask Spread, Analyst Following, Analyst Forecast Dispersion, and Earnings Performance for Firms with Sustained Disclosure Changes [a]

Relative Year	-2	-1	0	1	2	$t_{(Event-preEvent)}$ [b] $z_{(Event-preEvent)}$
Industry-adjusted stock returns						
Mean $_{(DEC)}$ (%)	2.83	-3.36	-7.17	-2.48	-0.85	-1.48
p-value	(0.21)	(0.06)	(0.00)	(0.31)	(0.76)	
Median (%)	-0.22	-3.11	-8.57	-3.82	-5.11	-2.26**
p-value	(0.59)	(0.04)	(0.00)	(0.07)	(0.14)	
N	134	135	137	137	135	
Mean $_{(INC)}$ (%)	0.11	2.05	7.86	5.60	5.78	2.42**
p-value	(0.97)	(0.34)	(0.01)	(0.01)	(0.01)	
Median (%)	-3.79	0.05	4.10	4.40	4.41	2.55**
p-value	(0.42)	(0.36)	(0.05)	(0.00)	(0.01)	
N	139	142	143	143	143	
Industry-adjusted bid-ask spread						
Mean $_{(DEC)}$ (%)	-0.10	-0.11	0.06	0.21	0.37	2.82**
p-value	(0.17)	(0.18)	(0.63)	(0.06)	(0.01)	
Median (%)	-0.08	-0.10	-0.16	-0.03	0.06	2.36**
p-value	(0.02)	(0.02)	(0.30)	(0.91)	(0.16)	
N	55	65	79	90	100	
Mean $_{(INC)}$ (%)	0.03	0.09	0.00	-0.06	-0.10	-1.73*
p-value	(0.69)	(0.24)	(0.95)	(0.37)	(0.20)	
Median (%)	-0.05	-0.03	-0.04	-0.09	-0.12	-1.77*
p-value	(0.49)	(0.64)	(0.57)	(0.07)	(0.01)	
N	63	72	80	93	107	
Industry-adjusted analyst coverage						
Mean $_{(DEC)}$ (%)	3.19	3.91	4.22	3.85	3.04	0.34
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Median (%)	3.50	4.00	4.00	3.00	2.50	-0.21
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
N	135	135	137	137	136	
Mean $_{(INC)}$ (%)	1.71	1.52	2.00	2.56	2.60	1.48
p-value	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	
Median (%)	2.50	1.50	2.00	2.25	2.00	1.21
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
N	140	143	143	144	144	

Table 2.5 (Continued)

Relative Year	-2	-1	0	1	2	$t_{(Event-preEvent)}$ [b] $z_{(Event-preEvent)}$
Industry-adjusted analyst forecast dispersion						
Mean $_{(DEC)}$ (%)	1.59	2.46	11.54	12.45	9.59	3.08***
p-value	(0.38)	(0.14)	(0.00)	(0.01)	(0.00)	
Median (%)	-0.53	-0.52	0.78	0.40	0.63	3.09***
p-value	(0.48)	(0.89)	(0.00)	(0.03)	(0.01)	
N	134	134	137	136	134	
Mean $_{(INC)}$ (%)	2.33	15.49	1.34	0.28	15.08	-0.64
p-value	(0.09)	(0.13)	(0.30)	(0.85)	(0.05)	
Median (%)	-0.25	-0.18	-0.59	-0.91	-0.94	-1.37
p-value	(0.82)	(0.70)	(0.62)	(0.05)	(0.61)	
N	140	143	143	144	144	
Industry-adjusted earnings						
Mean $_{(DEC)}$ (%)	0.30	-1.13	-3.86	-10.99	-8.39	-2.90***
p-value	(0.56)	(0.14)	(0.01)	(0.03)	(0.01)	
Median (%)	0.49	-0.28	-0.65	-0.71	-0.70	-3.81***
p-value	(0.13)	(0.23)	(0.00)	(0.00)	(0.00)	
N	129	131	131	131	132	
Mean $_{(INC)}$ (%)	-0.19	-1.05	-2.29	-0.13	2.98	0.39
p-value	(0.80)	(0.28)	(0.53)	(0.96)	(0.09)	
Median (%)	0.37	0.05	1.14	0.78	1.05	2.86***
p-value	(0.51)	(0.87)	(0.00)	(0.01)	(0.00)	
N	133	138	141	140	139	
Industry-adjusted earnings changes						
Mean $_{(DEC)}$ (%)	0.18	-1.26	-2.44	-7.29	3.42	-0.59
p-value	(0.81)	(0.14)	(0.11)	(0.06)	(0.46)	
Median (%)	0.16	-0.40	-0.21	-0.62	0.17	-0.06
p-value	(0.51)	(0.13)	(0.29)	(0.10)	(0.27)	
N	123	128	129	129	130	
Mean $_{(INC)}$ (%)	-0.47	-0.77	-1.20	2.39	3.21	1.10
p-value	(0.60)	(0.37)	(0.70)	(0.24)	(0.15)	
Median (%)	-0.13	0.39	0.61	-0.20	-0.27	0.77
p-value	(0.62)	(0.70)	(0.03)	(0.68)	(0.81)	
N	124	133	137	140	138	

[a] DEC and INC denote disclosure-decreasing and -increasing firms, respectively. All variables are adjusted by deducting the values of the median firm in the same AIMR industry and year.

[b] T and z statistics are for t tests and Wilcoxon tests. The subscript "Event-preEvent" represents the differences between the observations in the event period (years 0, 1, 2) and the observations in the pre-event period (years -2 and -1). *, **, and *** indicate significance at 10%, 5%, and 1% levels in a two-tailed test, respectively.

Table 2.6 Regression Analysis of Industry-adjusted Returns, Bid-ask Spread, Analyst Following, and Analyst Forecast Dispersion for Firms with Sustained Disclosure Changes[ab]

$$RET_{it} = \beta_0 + \beta_1 D_{it} + \beta_2 E_{it} + \beta_3 \Delta E_{it} + \beta_4 E_{it} * SG_{it} + \beta_5 \Delta E_{it} * SG_{it} + \beta_6 BETA_{it} + \beta_7 SIZE_{it} + \varepsilon_{it} \quad (2.1)$$

$$SPREAD_{it} = \alpha_0 + \alpha_1 D_{it} + \alpha_2 SIZE_{it} + \alpha_3 VOLUME_{it} + \alpha_4 PRICE_{it} + \upsilon_{it} \quad (2.2)$$

$$\Pr(COVERAGE_{it} > 0) = \delta_0 + \delta_1 D_{it} + \delta_2 E_{it} + \delta_3 \Delta E_{it} + \delta_4 SG_{it} + \delta_5 SIZE_{it} + \delta_6 PRICE_{it} + v_{it} \quad (2.3)$$

$$\Pr(DISPERSION_{it} > 0) = \gamma_0 + \gamma_1 D_{it} + \gamma_2 E_{it} + \gamma_3 \Delta E_{it} + \gamma_4 SG_{it} + \gamma_5 BETA_{it} + \gamma_6 SIZE_{it} + \varsigma_{it} \quad (2.4)$$

Disclosure-increasing firms	Dependent variables			
	RET	SPREAD	Pr(Coverage>0)	Pr(Dispersion>0)
Intercept	0.0021	-0.0346	0.1710	-0.0757
	(0.91)	(0.17)	(0.26)	(0.56)
D_{INC}	0.0499**	-0.0039	0.3633*	-0.2689 *
	(0.03)	(0.90)	(0.06)	(0.097)
Earnings level	0.1165*		1.1340**	-1.4897*
	(0.05)		(0.03)	(0.096)
Earnings change	0.1200**		0.0714	1.6953
	(0.04)		(0.90)	(0.10)
Earnings*sales growth	0.6268**			
	(0.01)			
Earnings change*sales growth	-0.5661**			
	(0.02)			
Beta	0.0681**			0.0518
	(0.02)			(0.82)
Size	-0.0028	-0.1234***	1.3837***	-0.0234
	(0.79)	(0.00)	(0.00)	(0.76)
Trading volume		-0.0659***		
		(0.00)		
Price		-0.5434***		
		(0.00)		
Stock return			-0.2425	
			(0.48)	
Sales growth			-0.1710	-0.7836***
			(0.46)	(0.00)
Adjusted R^2	5.08%	62.80%		
Max-rescaled R^2			34.83%	4.28%
Number of observations	669	414	669	671

Table 2.6 (Continued)

	Dependent variables			
Decreasing-decreasing firms	RET	SPREAD	Pr(Coverage>0)	Pr(Dispersion>0)
Intercept	-0.0019	-0.0183	0.8644	-0.1443
	(0.91)	(0.49)	(0.00)	(0.28)
D_{DEC}	-0.0348	0.0470	-0.0880	0.3720**
	(0.11)	(0.13)	(0.66)	(0.03)
Earnings level	-0.0253		1.2677	0.3239
	(0.75)		(0.01)	(0.41)
Earnings change	0.1108		-0.5191	-0.6763
	(0.24)		(0.26)	(0.12)
Earnings*sales growth	-0.4050			
	(0.23)			
Earnings change*sales growth	0.5256			
	(0.10)			
Beta	0.0218			0.0922
	(0.45)			(0.69)
Size	0.0007	-0.1412***	1.0011***	-0.0653
	(0.94)	(0.00)	(0.00)	(0.39)
Trading volume		-0.0947***		
		(0.00)		
Price		-0.5217***		
		(0.00)		
Stock return			-0.2180	
			(0.55)	
Sales growth			-0.2510	-2.2055***
			(0.47)	(0.00)
Adjusted R^2	0.51%	70.25%		
Max-rescaled R^2			25.19%	10.48%
Number of observations	635	384	635	631
Test for Coeff.(D_{DEC})+ Coeff.(D_{INC}) = 0				
F-value	0.10	0.97		
Wald Chi-Square			**7.56**	0.01
P-value	(0.76)	(0.33)	**(0.01)**	(0.92)

[a] p-value in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% levels in a two-tailed test, respectively.

[b] Pr (COVERAGE) equals one if the number of analysts providing annual earnings forecasts in the fiscal-year-end month is larger than the value of the median firm in the same AIMR industry, zero otherwise. Pr (DISPERSION) equals one if the industry-adjusted analyst forecast dispersion is larger than the value of the median firm in the same AIMR industry, and zero otherwise. D is a dummy variable for disclosure period that takes the value of one for years 0 to 2 and zero for years -2 and -1.

CHAPTER 3

CAUSES OF PERCEIVED DETERIORATIONS OF DISCLOSURE QUALITY

3.1 INTRODUCTION

Chapter 2 examines the capital market consequences of a sustained decrease in disclosure quality, where disclosure quality is measured by analyst disclosure ratings. Specifically, I compare disclosure-decreasing firms with disclosure-increasing firms in terms of stock returns, bid-ask spreads, number of analyst following, and analyst forecast dispersions. The results show that firms with deteriorating disclosure ratings experience negative stock returns, increasing bid-ask spreads, and higher analyst forecast dispersions. The magnitude and direction of these changes are roughly symmetric to the benefits enjoyed by disclosure-increasing firms. To the extent that these measures are correlated with firms' costs of capital, the results indicate that firms that allow their disclosure quality to decline forgo non-trivial benefits that could be enjoyed by improving disclosure quality. Nevertheless, I do uncover some differences between the two sets of firms. For example, the disclosure-increasing firms have higher stock returns during the three-year event period, while the disclosure-decreasing firms experience a drop in the stock returns at the beginning of the disclosure decline period. In addition, while firms with

improved disclosure ratings enjoyed increased analyst coverage, analysts maintain their interest in covering the disclosure-decreasing firms. In other words, once analysts start their coverage of a firm, they do not drop it easily when the firm's disclosure quality deteriorates.

The findings in the previous chapter generally indicate that firms with deteriorated disclosure ratings suffer negative market consequences, compared to the benefits enjoyed by firms with improved disclosure ratings. Given these findings, the next question is why the disclosure-decreasing firms allow their disclosure quality to deteriorate. Theoretical research on the quality of voluntary disclosure has proposed the likely costs (e.g., proprietary costs) that prevent firms from disclosing more (e.g., Verrecchia 1983; Dye 1985; Trueman 1997). These suggested costs provide a starting point for exploring the potential causes of the decreases in the disclosure ratings.

As this chapter draws heavily on theoretical literature in examining the costs of disclosure, there is an important distinction between this study and prior empirical studies on similar topics. A great amount of empirical research addresses disclosure incentives and disincentives in settings where the costs for firms are known.[17] While the findings *verify* the impact of an existing cost on disclosure quality, this chapter takes a different angle that *explores* the potential causes of perceived disclosure quality deteriorations. Certainly, this kind of investigation will not be exhaustive, but my research will allow for the exploration of which theoretical forces are most influential, and whether there are explanations for the disclosure downgrading beyond those suggested in prior models. The exploration reveals how analysts evaluate disclosure quality. Such an

[17] For example, Harris (1998) studies the association between the levels of industry competition and segment reporting quality. Skinner (1997) investigates pre-disclosing of poor earnings news by firms facing litigation risk.

understanding is critical, as attempts to mandate improved disclosure quality can have unintended consequences for firms that do not benefit sufficiently from the changes.[18]

Disclosure models in the information economics literature typically start with a setting in which firms make disclosure choices when raising new equity capital, I therefore examine whether the disclosure-increasing and disclosure-decreasing firms have different demands for new capital. If the disclosure-increasing firms are firms with a strong demand for external capital, then we would expect that the disclosure-decreasing firms are likely to not require new capital. On the contrary, I find that the disclosure-decreasing firms have a strong demand for external capital as well. I investigate this surprising finding by looking at where these firms raise their capital. I find that the disclosure-increasing and disclosure-decreasing firms raise new capital in different segments of the capital markets. Compared to a matched sample of firms, the disclosure-increasing firms tend to access capital through public and private equity, while the decreasing firms tend to rely more on public debt plus private debt and equity. The use of public debt is surprising since disclosure quality declines are likely to have a negative impact on the pricing of both public debt and public equity issues. The finding that disclosure-decreasing firms access public debt markets more frequently suggests that public debt markets are less sensitive to disclosure quality changes than public equity markets.

Since both sets of firms have similar demands for external capital, theoretical models predict that the disclosure-increasing firms are those with good news to report

[18] For example, the costs imposed by the Sarbanes-Oxley Act are alleged to have driven some firms to privatize and may have prevented other firms from going public at all. An example is SmartDisk Corporation. The data storage company chose to deregister from the SEC in 2003, pointing out several factors leading to the decision to privatize, one of which was the increasing requirements for disclosures.

and the disclosure-decreasing firms are those with bad news (e.g., Verrecchia 1983; Dye 1985). Therefore, I hypothesize that the interaction between earnings news and demand for capital differentiates the two sets of firms. Drawing from theories, I also hypothesize that changes in firm size, realized earnings performance, and industry competitiveness are factors that contribute to the likelihood of a firm experiencing disclosure quality deterioration. I analyze these incentives and disincentives by comparing firms experiencing disclosure quality changes with a matched sample of firms experiencing no changes.

Regression results show that firms with good earnings performance are more likely to be disclosure-increasing firms. However, I do not find strong evidence that poor earnings alone leads to disclosure decreases. Instead, I find that disclosure deterioration is most strongly and negatively associated with the interaction between demand for equity and expected earnings news. This suggests that firms with either good news and low demand for equity, or bad news and high demand for equity, are more likely to be disclosure-decreasing firms. Both scenarios represent situations where the theory suggests disclosing information to the capital markets is likely to be more costly.

This chapter also considers the possibility that a firm's information environment determine analysts' perceptions of disclosure quality. Rather than managers actively determining disclose quality, firms with naturally high information asymmetry may receive lower disclosure ratings because analysts have a high demand for disclosure to resolve their uncertainty. If analysts are unsure about whether managers are withholding information in an uncertain environment, they are more likely to view

management disclosure as inadequate. This prompts a deeper investigation of the surrounding circumstances faced by the disclosure-decreasing firms.

The prior literature indicates that firms reporting nonrecurring earnings implies either high uncertainty about a firm's future performance or a high probability of earnings management (e.g., Elliott and Hanna 1996; Dechow and Ge 2006). Therefore, I conjecture that when firms report nonrecurring earnings, analyst demand for information is increased. Consistent with this conjecture, I find that the disclosure-increasing and -decreasing firms differ more in the direction and magnitude of their special items than their operating income. I document concurrent events occurring around the sustained changes in disclosure ratings, and find that a higher percentage of the disclosure-decreasing firms face disruptive events such as union strikes and proxy battles. This is consistent with disclosure-decreasing firms facing an environment of increasing general uncertainty. These firms may not be able to "turn on" their disclosures, even though they would benefit if they could achieve a higher level of disclosure. The existence of these firms in the disclosure-decreasing group suggests that firms withholding bad news are indistinguishable from those facing greater uncertainty and unable to provide useful disclosure to resolve the uncertainty. This is the typical pooling equilibrium situation.

This chapter adds an important perspective to prior research on disclosure incentives; it discusses disclosure quality changes from a user's (i.e., analyst's) point of view. By adopting the perspective, this study considers disclosure quality deterioration that results from an enlarged gap between the supply of and demand for information. An enlarged gap can result from changes in supply or demand. The majority of the

prior literature, however, focuses only on the issue of information supply. From the supply side, there are a variety of costs that may cause managers to disclose less. From the demand side, growing uncertainty about a firm's future performance may increase analyst demand for information. This chapter makes an effort to explore both scenarios.

While this study attempts to control for the potential endogeneity problem, it should be noted that looking at causes of disclosure quality declines is a difficult task since there is no exact event date for the disclosure-increasing and -decreasing firms. To mitigate the concern, I motivate the causes based on theoretical literature. In addition, the variables for potential causes are measured as the changes between the period prior to the observed consequences and the first year of the disclosure change period, removing observations that are in the latter two years of the event. However, endogeneity could still exist. Instead of relying only on regressions, readers should view the descriptive results and the regression results all together as depicting the characteristics of these firms.

The remainder of the chapter is organized as follows. Section 3.2 discusses related literature and research hypotheses. Section 3.3 discusses methodology and reviews the sample used in Chapter 2. Section 3.4 reports empirical results, including corporate financing behavior, earnings composition, the sample firms' economic circumstances, and regression analysis. Section 3.5 concludes.

3.2 RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

3.2.1 Incentives that prevent firms from disclosing more

Theoretical research shows that when a firm has a demand for new capital and the manager has good news about the firm not currently reflected in the stock price (e.g., next period earnings will be higher than expected), managers have incentives to disclose their private information to get a better price when they sell their new capital. Early theoretical papers such as those of Grossman (1981) and Milgrom (1981) assume a perfect market, where disclosure is costless and managers can choose freely to truthfully disclose information or withhold it. Because disclosures are assumed costless, firms that are better than average benefit from disclosing information to distinguish themselves from inferior firms. Only firms with the worst news would choose not to disclose. This is a situation in which nondisclosure perfectly reveals that a firm has the worst news. Since all firm types are fully revealed, there exists no information asymmetry, and therefore investors price each firm correctly.

In the real world, direct and indirect costs differ across firms and can be increasing or decreasing in disclosure benefits, causing a tradeoff between disclosing and withholding information. Theoretical studies consider tensions that result in a "partial disclosure equilibrium." This means that for the entire set of possible information, there exists a subset or subsets of information that managers choose not to disclose (e.g., Verrecchia 1983). If the costs of disclosure exceed the benefits, it is optimal for managers not to disclose.

Demand for external capital

An endogenous cost that prevents firms from disclosing more arises when disclosing information that managers have would reduce the stock price relative to not disclosing such news. Firms that intend to raise external capital and have good news will disclose the information to distinguish themselves from other, more poorly performing firms in order to obtain a higher selling price for their stock, while firms with bad news are better off not to disclose, and to thereby pool themselves with the average firms. When it is common knowledge between managers and investors that there exists positive probability that managers might receive no information, firms with bad news can be better off pretending to be uninformed (Dye 1985; Jung and Kwon 1988).[19]

It is worthwhile to emphasize that disclosure strategy is determined jointly by demand for external capital and the type of news managers hold (e.g., expected earnings performance). The tenor of news is crucial in disclosure decisions, because it is the signal that affects investor valuation when firms attempt to raise capital. Empirical research generally finds a strong association between disclosure quality and the demand for equity (e.g., Frankel et al. 1995; Lang and Lundholm 1993; Healy et al. 1999) and between disclosure quality and earnings performance (e.g., Miller 2002).[20] Theory therefore implies that one reason for a firm not to disclose more is that the firm has a demand for capital but has bad news which, if disclosed, would increase the cost of

[19] This of course assumes that they are not concerned about their reputation for honest reporting, presumably because they are not intending to return to capital markets again after the current equity or debt issuance.

[20] Healy et al. (1999) find no association between earnings performance and sustained disclosure increases, but they descriptively report an increase in public security issuances following disclosure increases. Miller (2002) examines managers' disclosure in news releases for a set of firms that experience continued increase in earnings. He explicitly excludes the events of security issuance. He documents disclosure improvement in association with the increase in earnings. As the earnings increase comes to an end, managers' disclosure shifts to focus on optimistic short-term results.

raising capital. Since the intention to raise external capital is viewed as a strong motivation for firms to disclose more, then the lack of such an intention can be a reason for firms not to improve disclosure quality. Therefore, I hypothesize the following:

H3.1: The disclosure-increasing firms have increasing demand for external capital; the disclosure-decreasing firms have decreasing demand for external capital.

H3.2: Among firms with a high demand for capital, the disclosure-decreasing firms are more likely to be those that expect a decline in future earnings performance, while the disclosure-increasing firms are more likely to be those that expect an increase in future earnings performance.

Direct (out-of-pocket) costs

The direct costs of disclosure are likely to be largely fixed. Examples include the cost of producing financial reports and the cost of holding press conferences. In this sense, larger firms are more likely to generate sufficient benefits to offset these costs through, for example, their larger volume of shareholders. In fact, Lang and Lundholm (1993) find that larger firm size is associated with higher AIMR disclosure ratings. I conjecture that the net benefits from increasing disclosure quality are greater for firms experiencing an increase in firm size.[21] I hypothesize that disclosure quality improvements are associated with a growth in firm size, and that the opposite holds for disclosure quality declines.

[21] In fact, costs of compliance are one of the main objections raised regarding implementing Section 404 of the Sarbanes-Oxley Act, and are considered a major reason for the recent trend of privatizations (Block, 2004).

H3.3: Compared to disclosure-increasing firms, the disclosure-decreasing firms are less likely to have experienced a growth in firm size.

Competition intensity

Another cost of disclosure is proprietary costs. Revealing good news about earnings could be harmful if it attracts new entrants that could compete in the same market. In this case, managers are more likely to withhold good news in order to deter entry (e.g., Darrough and Stoughton 1990; Wagenhofer 1990; Feltham and Xie 1992). Harris (1998) investigates segment reporting and finds that firms that enjoy more market power are less likely to disclose detailed segment information. They do this to keep from disclosing the size of the monopoly rents they enjoy within each line of business. In contrast, Clarkson et al. (1994) explore managers' forecasting behavior in the MD&A section of annual reports. They find that firms with lower barriers to entry are less likely to provide forecasts when they have good news. Botosan and Harris (2000) and Berger and Hann (2007) generally find no evidence consistent with associations between proprietary costs and managers' segment reporting decisions. Due to the mixed evidence, the hypothesis is stated as follows with no conjectured direction of association.

H3.4: The sustained changes in disclosure quality ratings are associated with changes in the intensity of the product market.

Litigation costs

Trueman (1997) assumes that nondisclosure will result in a lawsuit from investors if the expected benefit from the lawsuit is higher than the cost of undertaking it. In his model, litigation risk works to prevent managers from withholding bad news, while the demand

for equity motivates them to disclose good news. The tension results in a partial disclosure equilibrium, in which managers disclose good news and extremely bad news and withhold signals of intermediate values. Empirical findings are mixed. Skinner (1994, 1997) finds that firms with poor performance are more likely to pre-disclose in order to preempt possible lawsuits, although such disclosures do not always reduce litigation risk. Francis et al. (1994) show that early disclosure does not preclude litigation risk. Kasznik and Lev (1995) find that although some firms with negative earnings surprises are more likely to provide early warnings, the percentage of firms providing such warnings is low. These findings indicate that the threat of litigation does not necessarily induce improved disclosure. Given that litigation risk may depend on industry- and firm-specific factors, it remains an empirical question to examine whether there is any change in the frequency of lawsuits before or following the disclosure changes.[22]

3.2.2 Changes in the information environment and analysts' demand for disclosures

The above discussion treats observed changes in the disclosure ratings as if managers have actively decided to change their disclosure strategies. One should also consider the possibility that these firms are being upgraded or downgraded by analysts, not because these firms actively choose to change their disclosure quality, but because the occurrence of some events simultaneously change analysts' demand for information and managers' ability to provide good disclosures. For example, while the changes in bid-ask spreads

[22] Note that litigation risk may enhance managers' incentives to disclose. It is possible that a firm facing lawsuits intends to make more timely disclosures, but analysts slash its disclosure ratings because their demand for information is higher than what the manager could supply given the uncertain future. As the ratings depict disclosure quality from a user's perspective, it is possible that the decrease in the disclosure ratings reflects a drop in analysts' satisfaction. This issue is addressed in subsection 3.2.2.

might reflect changes of information asymmetry due to disclosure changes, one cannot preclude the possibility that a change in a firm's environment leads to both the change in its bid-ask spread and the change in the AIMR disclosure ratings.

I investigate various changes in a firm's underlying circumstances and their connection with disclosure changes. I start with earnings composition, separating recurring items from nonrecurring items (i.e., special charges, discontinued operations, and extraordinary items), and make two main observations. For a given amount of total earnings, recurring and nonrecurring items imply different levels of uncertainty, since the latter reflect unusual changes of economic circumstances. The classification of earnings may influence investor evaluation of a firm's future cash flows. Elliott and Hanna (1996) find that firms currently reporting write-offs are more likely to report write-offs in the future, suggesting increased probability of financial default. As the information environment becomes noisier with events such as asset disposals, restructurings, and material lawsuits, it is reasonable to conjecture that analysts' demand for disclosures will increase.

Second, firms with poor recurring earnings may attempt to hide the bad news in nonrecurring items to encourage analysts to treat them as unusual and infrequent.[23] The possibility that managers could be manipulating earnings by moving earnings between recurring and nonrecurring items increases financial statement users' demand for disclosures. As a consequence, it is more difficult for managers to provide satisfying disclosures for nonrecurring earnings than for recurring earnings.

[23] Financial analysts usually focus on recurring items since nonrecurring items are transitory and hard to predict (Black et al. 2000). However, they can be value relevant and forecast relevant (Christensen and Feltham 2003).

Since analysts' demand for information is expected to increase in both of the above situations, I hypothesize that the occurrence of negative nonrecurring items is associated with the deterioration of disclosure quality ratings.

H3.5: Holding earnings news constant, the disclosure-decreasing firms are likely to have reported more negative nonrecurring items during the disclosure-decreasing period than the disclosure-increasing firms during the disclosure-increasing period.

I further explore the possible changes in economic circumstances by documenting the occurrence of unusual and infrequent events. This investigation provides direct evidence of contemporaneous changes surrounding the change in disclosure ratings. A higher frequency of these events likely indicates increased uncertainty regarding a firm's future performance, which simultaneously increases analysts' demand for disclosure and increases the difficulty managers face in satisfying that demand.

H3.6: Compared to disclosure-increasing firms, the disclosure-decreasing firms are more likely to have experienced unusual events that imply an increased likelihood of future corporate failure.

3.3 SAMPLE AND METHODOLOGY

The sample of disclosure-increasing and disclosure-decreasing firms is the same as in Chapter 2. As described in Chapter 2, disclosure quality is measured by the AIMR

disclosure ratings and disclosure changes are measured by a firm's relative industry rankings (RIR) within its industry. RIR is defined as ((N - Rank)/(N - 1))*100, where Rank is the disclosure rank for the firm within its industry and N is the number of firms ranked in the same industry. Industries are restricted to those with five or more firms, so that firms with a small change in their scores but a large change in RIR are excluded. Industries with less than seven years of AIMR coverage are also excluded to ensure the availability of time-series data.

Sustained disclosure changes are measured over a rolling five-year window as the difference between the average RIR during years -2 and -1 and the average RIR during years 0, 1, and 2. Firms with a minimum of 30% of increase (decrease) are identified as disclosure-increasing (disclosure-decreasing) firms. The beginning year of the sustained change is defined as year 0. The final sample includes 145 disclosure-decreasing firms in 29 industries and 151 disclosure-increasing firms in 28 industries. The event year (year 0) ranges from 1980 to 1994. See Table 2.1 for the industry and year composition.

Some of the variables of interest, such as security issuances and the frequencies of unusual events, are manually identified or hand-collected. Obtaining industry-adjusted values for these variables is impractical, because that would require collecting data for all the firms in the same industry. When industry-adjusted measures are unavailable, I use a control firm approach to control for other confounding factors. Specifically, the sample firms are matched with other firms in the same industry and year. These firms do not experience a sustained change in the disclosure ratings. Firms with size closest to the sample firms at year -1 are selected.[24]

[24] In the regression analysis (subsection 3.4.4), I also use all the AIMR non-event firm-years as a control sample. The results are similar to those obtained from the control sample approach described above.

3.4 EMPIRICAL RESULTS

3.4.1 Financing behavior

The prior chapter suggests that disclosure-decreasing firms experience decreasing stock returns, increasing bid-ask spreads, and increasing analyst forecast dispersion, implying a high cost of raising capital. If managers anticipate that the cost of raising capital is likely to be higher, why would they choose not to improve their disclosure quality? Prior research has shown that high-quality disclosures are positively associated with the frequency of accessing external capital markets (e.g., Frankel et al. 1995; Healy et al. 1999). I hypothesize that firms with decreased disclosure quality either 1) have low demand for external funds, or 2) have access to capital through other channels (e.g., Myers 1984, Myers and Majluf 1984). I explore these two potential scenarios separately.

Do disclosure-decreasing firms have a low demand for external funds?

To measure whether firms with decreased disclosure quality have low demand for external capital, I use an *ex ante* measure of free cash flow from Dechow et al. (1996) to assess the sufficiency of their internal funds:

$$\text{FreeC}_t = \frac{\text{Cash from operations}_t - \text{Average capital expenditures}_{\text{t-3 to t-1}}}{\text{Current assets}_{\text{t-1}}}.$$

Cash flow from operations is available from Compustat from 1987 onwards after the adoption of SFAS No. 95. Prior to this date, companies reported in the format of "Working Capital Statement," "Cash Statement by Source and Use of Funds," or "Cash Statement by Activity." When a study includes pre-1987 years, researchers must

estimate accruals and cash flow from operations. The typical way is to estimate working capital accruals using changes in balance sheet working capital accounts.[25] Estimated accruals is typically defined in these studies as working capital accruals minus depreciation and amortization expense. Cash flow from operations is then defined as net income before extraordinary items minus estimated accruals. This approach (often referred to as the balance sheet approach) is commonly used in the literature, including in the Dechow et al. (1996) study.

However, this standard estimation procedure is subject to two problems. First, estimated accruals defined in this way systematically exclude all non-current accruals other than depreciation and amortization. Second, working capital accruals are likely to contain measurement errors when a firm has been engaging in corporate acquisitions and has grown its working capital through investing in other firms rather than internally (Hribar and Collins, 2002). In this situation, the growth should be treated as an investment cash flow rather than a working capital accrual. In this study, I define cash flow from operations prior to 1987 as funds from operations (Compustat data item #110) minus increases in working capital accruals. This approach deals with the first problem of missing non-current accruals because funds from operations is defined as earnings before extraordinary items adjusting non-current accruals.[26] But my cash flow measure is still subject to the second problem when corporate acquisitions occur. Appendix A

[25] Changes in working capital = change in current assets (Compustat data item #4) – change in cash and cash equivalents (data #1) – change in current liabilities (data #5) + change in debt in current liabilities (data #34).

[26] Funds from operations is income before extraordinary items (Compustat data item #213) plus depreciation and amortization (data #125), extraordinary items and discontinued operations (data #124), deferred taxes (data #126), equity in net loss (data #106), loss of sale of property, plant, and equipment and sale of investment (data #213), and other funds from operations (data #217).

provides a detailed discussion about the balance sheet approach and the approach used here.

Capital expenditures are obtained from Compustat data item #128. A positive (negative) numerator in FreeC implies that the expected investment will be less than (greater than) the cash flow generated from operations. By assuming that current assets is the source of internal funds that can be used to cover the cash shortfall, FreeC measures the speed with which a firm is expected to use up its internal capital and demand external funds. For example, if FreeC = -0.5, it implies that the firm's current assets can cover its cash flow shortfall for only two years. The demand for external capital increases as the measure becomes more negative. Note that in the definition, firms' ability to generate cash flow internally is crucial in determining whether they demand external capital or not. Based on the assumption that higher earnings are associated with greater cash flow from operations, FreeC implies a negative association between demand for capital and profitability. Firms with poor earnings are likely to have lower FreeC that indicates stronger demand for capital.

FreeC is industry-adjusted, measuring a firm's relative demand for external capital compared to other firms in the same industry. Table 3.2 reports the means and medians of FreeCs. FreeCs are significantly negative for the disclosure-decreasing firms in years 0 and 1, suggesting that these firms' internally generated funds and cash reserves are lower than their industry peers. The differences between the increasing and decreasing firms during the event period are significant ($t = -3.21$; $z = -3.18$).[27] Overall, the disclosure-decreasing firms appear to face a much stronger demand for external capital than the disclosure-increasing firms. Disclosure-increasing firms, on the other

[27] Using unadjusted FreeCs also produces consistent results.

hand, do not have a higher demand for external financing than their industry peers. These results reject hypothesis H3.1 that the disclosure-increasing firms have increasing demand for external capital and the contrary for the disclosure-decreasing firms.

As mentioned above, the results of Table 3.2 should be interpreted carefully. Since the demand for capital measure is expected to be positively related to profitability, the results imply that the disclosure-decreasing firms are those that are less profitable and are in need of capital. In addition, while the results for the disclosure-increasing firms indicate that they do not have strong demand for external capital, it does not necessarily mean that they do not raise capital. Whether a firm goes to capital markets or not also depends on the opportunity it has in the markets. Therefore, I further investigate whether the two sets of firms raise capital *ex post*. If the disclosure-decreasing firms are able to do so, then this raises a further question regarding whether they are raising this capital in public or private markets.

Do disclosure-decreasing firms access public or private capital markets ex post?

Table 3.3 reports the dollar value and frequency of the issuance of public equity, public debt, private equity, and private debt by the sample firms. The issuance data is obtained from the Security Data Corp (SDC). Identification of all security issues by each sample firm is performed manually, therefore obtaining an industry-adjusted measure is not practical, since that would require collecting data for all of the AIMR firms. Instead, I adopt a control firm approach for benchmarking. Each firm is matched with a control firm in the same AIMR industry based on total assets at year -1. These control firms do not experience sustained disclosure increases or decreases.

Panels A and B report the mean dollar amount of security issuances (scaled by total assets at year t) for the disclosure-decreasing and -increasing firms, respectively. In both panels, the differences between sample and control firms are all insignificant during the pre-event period. During the event period (years 0 to 2), Panel A shows the disclosure-decreasing firms issued significantly less public equity and significantly more public and private debt, compared to their control firms. Untabulated results also show that the median private equity issuances are significantly higher for this group ($z = 2.20$). In Panel B, during the event period there is no significant difference for any type of security issuance between the disclosure-increasing firms and their control firms. However, unreported results of median values do show that the disclosure-increasing firms issue significantly more public equity ($z = 2.63$).[28]

The differences between the increasing and decreasing firms are more striking when we consider the frequency of issuance. Panel C shows the percentage of security-issuing firm-years during years 0 to 2. During the three-year event period, the disclosure-decreasing firms issue public and private debt, and private equity, more frequently than their control firms, while the disclosure-increasing firms issue public and private debt, and public equity, more frequently than their control peers. Combined with Panels A and B, these results indicate that disclosure-decreasing firms relative to control firms raise less public equity during the disclosure-decreasing period. Instead, they rely on more public debt and private debt and equity to meet cash needs. In

[28] I also use cash flow statements to examine the net cash flows from equity and debt issuances (unreported). Cash flow from equity issuance is defined as sale of common and preferred stock (Compustat data item #108) net of purchase of common and preferred stock (data #115), and cash flow from debt issuance is defined as long-term debt issuances (data #111) less long-term debt reduction (data #114). Both variables are industry-adjusted and scaled by total assets. Tests do not show any significant difference between the two groups or across periods. This data source does not distinguish public from private issuances.

contrast, disclosure-increasing firms are more likely than control firms to access public equity markets during the disclosure-increasing period. Yet, like the decreasing firms they also make more use of public and private debt.

It is perhaps not surprising that the two groups differ significantly in the frequency of public equity issuance (10% for disclosure-increasing and 6% for decreasing). The pecking order theory of Myers (1984) and Myers and Majluf (1984) suggests that information asymmetry should lead firms to prefer internal firms or debt over public financing. It is possible that firms that wish to use public equity markets choose high disclosure policies to lessen the cost associated with information asymmetry. However, it is intriguing that the percentages of public debt issuances are about the same for the two groups (21% for increasing and 22% for decreasing; Chi-square = 0.37). The high frequency of public debt issuance for both the increasing and decreasing groups suggests that public debt markets seem to be less sensitive to disclosure changes. In other words, the disclosure-decreasing firms are not being shut out of public debt markets by their disclosure quality deterioration. This raises the following question for future study: is disclosure quality as critical to public debt markets as it seems to be in public equity markets?

3.4.2 The reporting of nonrecurring items

Table 3.4 reports sample firms' earnings composition during the pre-event period and their changes from that period to year 0. Earnings composition consists of operating income after depreciation, non-operating income, special items, discontinued operations,

and extraordinary items.[29] I scaled the earnings components both by the average market value of equity and by beginning total assets. Table 3.4 reports the former and the numbers are industry-adjusted. The table shows that the difference between the decreasing and increasing groups' change in earnings performance is primarily due to a change in special items. Panel A shows that the change in special items from the pre-event period to year 0 is significantly more negative for the disclosure-decreasing firms than for the disclosure-increasing firms ($t = -1.93$; $z = -2.34$). Given the negative change in special items for the disclosure-decreasing firms, it is not surprising that they also report lower income before extraordinary items. The two groups do not differ significantly in the change in recurring items, discontinued operations, and extraordinary items.

Panel B of Table 3.4 shows the percentage of firms reporting nonrecurring items. For the decreasing group, 13% (7%) of the firms that report no special items (discontinued operations) in the pre-event period initiate such items in year 0. These percentages are higher than those of the increasing group, however the differences are not statistically significant.

3.4.3 Documentation of concurrent events surrounding disclosure changes

The fact that a large part of the difference in earnings performance between the increasing and decreasing firms comes from changes in special items suggests that the disclosure-decreasing firms may be more subject to large-scale economic disruptions

[29] In Compustat, the relationships between these items are defined as follows: operating income after depreciation – interest expense + non-operating income + special items – income taxes = income before extraordinary items. Then extraordinary items and discontinued operations are added to IBEI to give net income.

during the event period. I therefore examined news articles to better understand what is happening to these firms in conjunction with their disclosure rating changes.

I performed a keyword search in LexisNexis on all the sample firms from year -2 to year 2. I searched for and coded seven specific types of events using dichotomous variables: 1) SEC investigation, which usually involves accounting misconduct or insider trading; 2) accounting scandals or other allegations that firms provided misleading information; 3) class actions or shareholder lawsuits against the firm;[30] 4) union strikes; 5) significant industrial accidents; 6) corporate control problems (e.g., proxy battles, leverage/management buyouts, whether the firm is a takeover target, and sale of assets/subsidiaries/divisions); and 7) restructurings.

The choice of these seven event types was determined by a review of news articles for two arbitrarily selected AIMR industries.[31] This process showed that the above events have occurred more than once across the sample firms during years 0 and 1. The search may not be exhaustive, but provides a starting point for profiling a firm.

Panel A of Table 3.5 documents the occurrence rate for these events. The two groups show no significant difference during the pre-event period, although the average number of occurrences is, in general, higher for the disclosure-decreasing firms except for restructurings. During the event period, however, the numbers of union strikes and corporate control events are significantly higher for the disclosure-decreasing group compared to the increasing group. In addition, 21% of the disclosure-decreasing sample experiences multiple events concurrently, compared to only 14% of the increasing sample,

[30] As lawsuits are quite common among firms, especially regarding patent infringement, only class actions and shareholder lawsuits were included in the keyword search.

[31] The two industries are Environmental Control and Airlines. There are 11 disclosure-increasing firms and 19 disclosure-decreasing firms in total.

an indication that disclosure-decreasing firms are more likely to be troubled by multiple disruptive events (Chi-square = 2.85). Panel B shows that class action lawsuits are highly correlated with all of the other events.

3.4.4 Regression analysis

In this section, I use logistic regressions to investigate whether theory-suggested disclosure costs (e.g., changes in demand for capital, current and future earnings performance, firm size, and competition) affect the likelihood of a firm experiencing declining disclosure quality.[32] I compare the sample firms to industry- and size-matched firms that do not experience sustained disclosure changes.[33] I estimate the following logistic regressions. The regression is estimated separately for the increasing and decreasing groups.

$$D_i = \phi_0 + \phi_1 \Delta \ln TA_i + \phi_2 \Delta IBEI_i + \phi_3 \Delta D\_Capital_i + \phi_4 (\Delta EN_i * \Delta D\_Capital_i) + \phi_5 \Delta D\_Equity_i + \phi_6 (\Delta EN_i * \Delta D\_Equity_i) + \phi_7 \Delta HHI_i + \xi_i \quad (3.1)$$

$$D_i = \eta_0 + \eta_1 \Delta \ln TA_i + \eta_2 \Delta OI_i + \eta_3 \Delta NonOpI_i + \eta_4 \Delta SI_i + \eta_5 \Delta DO_i + \eta_6 \Delta EI_i + \eta_7 \Delta D\_Capital_i + \eta_8 (\Delta EN_i * \Delta D\_Capital_i) + \eta_9 \Delta D\_Equity_i + \eta_{10} (\Delta EN_i * \Delta D\_Equity_i) + \eta_{11} \Delta HHI_i + \xi_i \quad (3.2)$$

i = sample firms, control firms.

Regression (3.1) includes only one income variable (income before extraordinary items, IBEI), while regression (3.2) considers earnings components, including operating income after depreciation (OI), non-operating income (NonOpI), special items (SI),

[32] Note that the regression models do not include variables that measure the events described in Table 3.5 since I do not have the data for the matched firms. Including the event variables should improve the explanatory power of the models.

[33] I obtained similar implications when using all the AIMR non-event firm-years as a control sample (results not reported). Using this control sample expands the sample size to 3,002 observations. This regression includes industry and year dummies to control for industry and year effects.

discontinued operations (DO), and extraordinary items (EI), all scaled by total assets at time t. D is a dichotomous variable that equals one for the sample firms (i.e., disclosure-decreasing or -increasing) and zero for the control firms.

Because a change in disclosure ranking must be sustained over three years, it is difficult to identify an exact event date. As a consequence, including years 1 and 2 could capture consequences of a disclosure change rather than the factors driving the change. To mitigate this concern, the explanatory variables measure the difference (represented by Δ) between the average values in the pre-event period and their values in year 0. Excluding the latter two years allows us to better separate the potential causes from the consequences, but it also works against finding significant results.

For the interaction between earnings news and demand for capital, I assume that at year 0 managers have perfect foresight of the earnings performance in the following two years. Therefore, I use the average IBEI of years 1 and 2 as the expected earnings news (EN) in year 0. Demand for capital is measured by the variables D_Capital and D_Equity. D_Capital is defined as a dichotomous variable that equals one if FreeC < -0.5, and zero otherwise. D_Equity equals one if the estimated probability of equity issuance is at least 50%, and zero otherwise The probability of equity issuance is estimated using a probit model in which the explanatory variables capture equity demand under Myers and Majluf's (1984) pecking order theory and its alternative tradeoff theories (e.g., Frank and Goyal 2003; Leary and Roberts 2007). See Table 3.1 for the construction of this variable.[34] Both demand for capital and demand for equity are then

[34] Leary and Roberts (2007) use a censored bivariate probit model that requires two stages of estimation for capital demand, the first for external funds demand and the second for equity demand. In this paper I directly use the variables they included in the second stage for a probit estimation, since D_Capital is conceptually similar to demand for external funds in their paper. The estimation uses all equity- or

interacted with expected future earnings (EN). Firm size is measured by the log of total assets (lnTA). Industry competition (HHI) is the Herfindahl Index calculated based on four-digit SIC codes.[35]

Table 3.6 reports the regression results for the two specifications, equations (3.1) and (3.2). The disclosure-decreasing firms are compared to their control firms in columns (A) for equation (3.1) and column (C) for equation (3.2). In the regression in column (A), none of the coefficients are significant at the 10% level in a two-tailed test, but the interaction between changes in earnings news and demand for capital ($\Delta EN*\Delta D\_Equity$) is negative and very close to significance ($p = 0.11$). In column (C), where earnings is decomposed, the coefficient on $\Delta EN*\Delta D\_Equity$ is negative and significant. This is consistent with the hypothesis that firms are more likely to allow their disclosure quality to decline when 1) they have a growing demand for equity capital and they expect bad news, or 2) they have a declining demand for equity capital although they expect good news. For the second situation, note that in theory, a low demand for external funding is sufficient for firms not to disclose more. In this situation earnings news becomes irrelevant to disclosure decisions.[36] There is no indication in either column that *current* earnings performance (e.g., $\Delta IBEI$) is a direct determinant of disclosure deterioration.

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debt-demanding firm-years between 1978-1996 from the disclosure-increasing, -decreasing, and control firms.

[35] Note that the sample and control firms are already matched by AIMR industries. The Herfindahl Index is calculated based on four-digit SIC codes, which is assumed here as a finer partition of the AIMR industries.

[36] When all the AIMR non-event firm-years are used as a control sample, the coefficient on ΔD_Equity is significantly negative. This implies that the decreasing firms in general are expected to have a lower demand for equity based on their firm characteristics. In this regression, the interaction between expected earnings and demand for equity ($\Delta EN*\Delta D\_Equity$) becomes insignificant. Instead, it is the interaction between expected earnings and demand for capital ($\Delta EN*\Delta D\_Capital$) that is significantly negative.

Columns (B) and (D) compare the disclosure-increasing firms with their control firms. In these regressions, current earnings performance is an important explanatory factor. In column (B), the coefficient on ΔIBEI is positive and significant, indicating that firms are more likely to increase disclosures when earnings performance is improving. When earnings are decomposed in column (D), the coefficient on the change in special items (ΔSI) and the change in extraordinary items (ΔEI) are significant, while the coefficients on the recurring components of earnings (ΔOI, ΔNonOpI) are insignificant. This suggests that the disclosure increases are driven by increasing profits from special items and extraordinary items. It is possible that these firms are recovering from losses in previous years. The coefficients on ΔD_Capital are close to significance in both columns (B) and (D) ($p = 0.11$), weakly suggesting that firms with a demand for external capital improve their disclosures.

In general, the coefficients on changes in firm size (ΔlnTA) are insignificant, which does not support the hypothesis that disclosure is subject to increasing returns to scale. This result is inconsistent with the findings in Lang and Lundholm (1993) that firm size is positively associated with disclosure ratings. However, the difference is probably due to the fact that they examine the levels of firm size, while I look at changes in firm size. There is a weak indication that disclosure increases when industry competition (ΔHHI) becomes less intense ($p = 0.06$).

The regression results can be summarized as follows. First, improved *current* earnings performance is an important determinant of disclosure *improvement*. Second, it is the interaction between expected future earnings and demand for equity that has an impact on disclosure quality *deterioration*. Third, the potential factors driving

disclosure declines are much less prominent in a regression analysis than those driving disclosure increases. In theory, disclosure-decreasing firms are likely to be a mix of two types of firms: one type faces too much uncertainty to provide any useful information (the uncertainty type) and the other withholds information by pretending to be the uncertainty type. Firms withholding information take advantage of the fact that firms with no information to disclose are unable to credibly communicate that they are uninformed (e.g., Dye 1985). The results in Table 3.6 likely reflect the pooling of the two types of firms in the disclosure-decreasing group. This is clearly different from the makeup of the disclosure-increasing group, in which all firms are motivated to differentiate themselves by enhancing disclosure quality.

Combined with the results in Table 3.5, the weak regression results for the disclosure-decreasing group further reflects that disclosure quality declines are caused by various reasons. Incorporating variables measuring the potential events may improve the performance of the regression models. Future research that constructs event variables for the control firms, in addition to the disclosure-increasing and disclosure-decreasing firms, should improve the performance of the models.

3.5 CONCLUSION

This chapter studies firms experiencing a sustained decrease in analyst disclosure ratings. It focuses on why analysts perceive these firms as having inferior disclosure quality. By studying the characteristics of firms experiencing such a decrease and contrasting them with firms experiencing an increase, this paper sheds light on the cases in which

improving disclosure is particularly costly. The tests begin by examining disclosure disincentives suggested by theoretical models of disclosure quality. The chapter then considers the possibility that users' perceptions of disclosure deterioration stem from an increasing gap between users' demands for disclosure and managements' ability to supply the information.

Consistent with theory, I find that the likelihood of disclosure deterioration is negatively associated with the interaction between expected earnings news and changes in capital demand, identifying situations where disclosure improvement is endogenously costly. Furthermore, deteriorating earnings performance alone does not have a decisive effect on the likelihood of disclosure quality decline. Finally, I do not find that changes in competition intensity or firm size affect the likelihood of a firm experiencing sustained decreases in its disclosure ratings.

I explore the possibility that changes in a firm's information environment determine analysts' assessment of disclosure quality. Evidence indicates that the disclosure-decreasing firms are more likely to have faced disruptive events implying greater uncertainty about their futures. The disclosure-increasing firms are subject to a positive change in special items while the disclosure-decreasing firms are subject to a negative change in special items, suggesting more one-time losses for the disclosure-decreasing firms, an indication of increased uncertainty amongst these firms.

Overall, the results in this chapter show that factors driving disclosure declines are more complicated than those motivating disclosure improvements. The disclosure-decreasing group is not the mirror image of the disclosure-increasing group. The finding that a higher percentage of the disclosure-decreasing group faces concurrent

changes in economic circumstances suggests that analysts seem to be unable to distinguish firms withholding information from those with naturally greater information uncertainty. When advocating for more disclosures, it is also important to realize that the notion of good disclosure quality is built, at least partially, on the assumption that managers are in fact able to satisfy users' demand for information.

Table 3.1 Variable Description

lnTA	Natural log of total assets
IBEI	Income before extraordinary items (Compustat data item #18)
OI	Operating income after depreciation (data #178)
NonOpI	Non-operating income (data #61)
SI	Special items (data #17)
DO	Discontinued operations (data #66)
EI	Extraordinary income (data #192)
HHI	Herfindahl index, defined as the sum of squared market shares for all firms in the market.
EN	Expected earnings news. Based on the assumption of perfect foresight, earnings expectation at year 0 is measured as the average IBEI in years 1 and 2. Change variable is obtained by deducting pre-event period average earnings.
FreeC	$\text{FreeC}_t = \frac{\text{Cash from operations}_t - \text{Average capital expenditures}_{t-3 \text{ to } t-1}}{\text{Current assets}_{t-1}}$, where Cash from operations = Funds from operations – ΔWorking capital, where Funds from operations (data item #110 before 1987) = Income before extraordinary item (data #123) + Depreciation and amortization (data #125) + Extraordinary items and discontinued operations (data #124) + Deferred taxes (data #126) + Equity in net loss (data #106) + Sale of property, plant, and equipment and sale of investments—loss (data #213) + funds from operations—other (data #217) after 1987; ΔWorking capital = ΔCurrent assets (data #4) –ΔCash and cash equivalents (data #1) –ΔCurrent liabilities (data #5) + ΔDebt in current liabilities (data #34); Capital expenditures = Data #128.
D_Capital	A dummy variable that equals one if FreeC is lower than -0.5, and zero otherwise.

Table 3.1 (Continued)

D_Equity	A dummy variable that equals one if the predicted probability of issuing equity is at least 50%, estimated using the following probit model. The estimation uses all firm-years demanding external funds (ExternalIssue = 1) during 1978-1996 from the disclosure-increasing, -decreasing, and control firms. Pr(EquityIssue = 1| ExternalIssue = 1) = f(Year, IND, Age, PPETA, lnTA, MTB, Leverage, Zscore, RET, WC, Dep, SG&A, R&D, RDD, OLC, MTR, Slack, AnticCap, AnticCF, CFVol, Dividend), where EquityIssue = 1if the product of average stock price and increase in outstanding shares is at least 1% of lagged total assets, and 0 otherwise; ExternalIssue = 1if EquityIssue = 1 or DebtIssue = 1. DebtIssue = 1 if the increase in long-term debt is at least 1% of lagged total assets; Year = year dummy; IND = industry dummy based on one-digit SIC code; Age = firm age; PPETA = property, plant, and equipment (PPE)/total assets (TA); lnTA = natural log of total assets MTB = market value of equity/TA; Leverage = industry median of total leverage based on one-digit SIC code; Zscore = Altman's Z; RET = annual stock return; WC = working capital; Dep = depreciation and amortization expense/net sales; SG&A = selling, general, and administrative expense/net sales; R&D = R&D expense/net sales; RDD = 1 if R&D is missing, and 0 otherwise; OLC = net operating loss carry forward/net sales; MTR = marginal tax rate before financing (estimated by John Graham 1996, obtained from http://faculty.fuqua.duke.edu/jgraham/taxform.html); Slack = capital investment – internal fund + lagged debt = (capital expenditure + increase in investments + acquisitions + other use of funds – sale of PPE– sale of common and preferred stock) – (beginning cash + pretax income – cash dividend – income taxes – increase in working capital) + (beginning debt in current liabilities + beginning total long term debt); AnticCap = total capital expenditure in the previous 2 years; AnticCF = increase in cash – interest expense – total income taxes; CFVol = standard deviation of IBEI over 10 years; Dividend = 1 if a firm pays a dividend, and 0 otherwise.

Table 3.2 Industry-adjusted Demand for Capital for Firms with Sustained Disclosure Changes[ab]

Relative Year	-2	-1	0	1	2	$t(z)_{Event-preEvent}$
Industry-adjusted FreeC$_t$						
Mean $_{(DEC)}$ (%)	1.54	0.70	**-6.44**	**-7.70**	-3.33	**-2.67*****
p-value	(0.50)	(0.80)	(0.02)	(0.02)	(0.29)	
Median (%)	-1.32	-1.44	**-1.70**	**-3.61**	1.62	-0.75
p-value	(0.75)	(0.31)	(0.07)	(0.04)	(0.95)	
N	123	122	123	121	119	
Mean $_{(INC)}$ (%)	**4.73**	1.12	1.91	1.02	0.99	-0.75
p-value	(0.07)	(0.61)	(0.39)	(0.64)	(0.70)	
Median (%)	0.53	1.05	0.97	0.42	2.10	-0.22
p-value	(0.17)	(0.39)	(0.25)	(0.75)	(0.14)	
N	118	121	121	124	123	
$t_{DEC-INC}$	-0.36			**-3.21*****		
$z_{DEC-INC}$	-1.22			**-3.18*****		

[a] Reported in percentage. All variables are industry-adjusted by deducting median values of firms in the same AIMR industry and year. *, **, and *** indicate significance at 10%, 5%, and 1% levels in a two-tailed test, respectively.

[b] DEC denotes disclosure-decreasing firms. INC denotes disclosure-increasing firms. The subscript "Event-preEvent" represents the differences between the observations in the event period (years 0, 1, 2) and the observations in the pre-event period (years -2 and -1). The subscript "DEC-INC" represents the differences between the observations for the disclosure-decreasing group and the observations for the disclosure-increasing group.

Table 3.3 Security Issues for Firms with Sustained Disclosure Changes, Compared to Firms without Sustained Disclosure Changes, Matched by the AIMR Industry and Total Assets at Year -1 [a]

Panel A Total dollars of new issues relative to firm size (Disclosure-decreasing firms vs. matched firms)

Relative Year	-2	-1	0	1	2	$t_{Event - preEvent}$
Public equity$_t$ /Total assets$_t$						
Mean $_{(DEC)}$ (%)	1.34	0.79	0.37	0.27	0.28	**-2.90*****
p-value	(0.01)	(0.01)	(0.03)	(0.11)	(0.02)	
N	129	129	129	128	126	
Mean $_{(CTRL)}$ (%)	1.68	1.42	1.09	0.81	0.47	-1.25
p-value	(0.04)	(0.10)	(0.02)	(0.17)	(0.08)	
N	127	129	125	121	111	
$t_{DEC-CTRL}$	-0.73			**-1.80***		
Public debt$_t$/Total assets$_t$						
Mean $_{(DEC)}$ (%)	1.89	0.97	0.88	1.38	1.26	-0.89
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
N	129	129	129	128	126	
Mean $_{(CTRL)}$ (%)	1.16	1.68	0.60	1.06	0.56	**-2.22****
p-value	(0.01)	(0.00)	(0.03)	(0.00)	(0.00)	
N	127	129	125	121	111	
$t_{DEC-CTRL}$	0.02			**1.99****		
Private equity$_t$/Total assets$_t$						
Mean $_{(DEC)}$ (%)	0.03	0.60	0.03	0.11	0.06	-1.04
p-value	(0.19)	(0.30)	(0.30)	(0.20)	(0.08)	
N	129	129	129	128	126	
Mean $_{(CTRL)}$ (%)	0.11	0.09	0.06	0.00	0.00	-1.24
p-value	(0.32)	(0.28)	(0.29)			
N	127	129	125	121	111	
$t_{DEC-CTRL}$	0.73			1.18		
Private debt$_t$/Total assets$_t$						
Mean $_{(DEC)}$ (%)	0.33	1.60	0.58	0.68	0.93	-0.63
p-value	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)	
N	129	129	129	128	126	
Mean $_{(CTRL)}$ (%)	0.78	1.57	0.46	0.29	0.46	**-2.65*****
p-value	(0.02)	(0.00)	(0.00)	(0.02)	(0.09)	
N	127	129	125	121	111	
$t_{DEC-CTRL}$	-0.44			**1.69***		

Table 3.3 (Continued)

Panel B Total dollars of new issues relative to firm size (Disclosure-increasing firms vs. matched firms)

Relative Year	-2	-1	0	1	2	$t_{Event - preEvent}$
Public equity$_t$ /Total assets$_t$						
Mean $_{(INC)}$ (%)	0.19	0.81	0.94	0.78	0.41	0.74
p-value	(0.10)	(0.08)	(0.00)	(0.03)	(0.01)	
N	133	133	133	131	130	
Mean $_{(CTRL)}$ (%)	0.19	0.37	1.15	1.26	0.50	**1.84***
p-value	(0.05)	(0.02)	(0.05)	(0.07)	(0.01)	
N	128	133	130	122	119	
$t_{INC-CTRL}$		0.85		-0.77		
Public debt$_t$/Total assets$_t$						
Mean $_{(INC)}$ (%)	1.63	1.52	0.97	0.86	1.52	-1.14
p-value	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	
N	133	133	133	131	130	
Mean $_{(CTRL)}$ (%)	1.28	1.59	0.76	1.06	1.43	-1.09
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
N	128	133	130	122	119	
$t_{INC-CTRL}$		0.26		0.16		
Private equity$_t$/Total assets$_t$						
Mean $_{(INC)}$ (%)	0.09	0.01	0.04	0.00	0.00	-1.21
p-value	(0.18)	(0.31)	(0.13)	(0.32)	(0.32)	
N	133	133	133	131	130	
Mean $_{(CTRL)}$ (%)	0.12	0.07	0.00	0.00	0.01	**-1.79***
p-value	(0.28)	(0.10)		(0.32)	(0.32)	
N	128	133	130	122	119	
$t_{INC-CTRL}$		-0.62		0.97		
Private debt$_t$/Total assets$_t$						
Mean $_{(INC)}$ (%)	0.69	0.64	0.39	0.41	0.98	-0.26
p-value	(0.00)	(0.00)	(0.01)	(0.03)	(0.10)	
N	133	133	133	131	130	
Mean $_{(CTRL)}$ (%)	0.83	0.75	0.56	0.85	0.81	-0.18
p-value	(0.01)	(0.04)	(0.06)	(0.06)	(0.01)	
N	128	133	130	122	119	
$t_{INC-CTRL}$		-0.45		-0.49		

Table 3.3 (Continued)

Panel C Frequency of issuance during years 0 to 2 [b]

	DEC		INC		DEC vs. INC
	Freq. (%)	Chi-square	Freq. (%)	Chi-square	Chi-square
Public equity					
Sample firms	6.04	0.18	10.49	**3.79***	**5.48****
Control firms	6.76		6.76		
Public debt					
	22.22	**13.45*****	20.51	**3.13***	0.37
	12.56		15.85		
Private equity					
	2.90	**5.50****	1.63	0.83	1.53
	0.72		0.93		
Private debt					
	17.63	**8.37*****	14.45	**3.09***	1.58
	10.63		10.49		

[a] Public equity, public debt, private equity, and private debt are collected from SDC (Security Data Corporation) based on SDC's categories. *, **, and *** indicate significance at 10%, 5%, and 1% levels in a two-tailed test, respectively. DEC denotes disclosure-decreasing firms. INC denotes disclosure-increasing firms. Control firms (CTRL) are selected from AIMR firms without sustained disclosure changes. These firms are size- and industry-matched with sample firms based on year -1 total assets. The subscript "Event-preEvent" represents the differences between the observations in the event period (years 0, 1, 2) and the observations in the pre-event period (years -2 and -1). The subscript "DEC-CTRL" represents the differences between the observations for the disclosure-decreasing group and the observations for its control group. The subscript "INC-CTRL" represents the differences between the observations for the disclosure-increasing group and the observations for its control group.

[b] Freq. is the percentage of firm-years issuing securities during years 0 to 2.

Table 3.4 Changes of Earnings Components at the Beginning of Sustained Disclosure Changes [a]

Panel A Industry-adjusted earnings components

		Average of years (-2, -1)			Change between years (-2, -1) and year 0		
		DEC	INC	$t_{DEC-INC}$ ($z_{DEC-INC}$)	DEC	INC	$t_{DEC-INC}$ ($z_{DEC-INC}$)
Operating income (%)	Mean	0.59	1.10	-0.62	-0.60	0.18	-1.31
	Median	0.02	0.25	-0.21	0.07	0.13	-1.05
Non-operating income (%)		0.32	0.17	1.05	-0.22	-0.06	-1.53
		0.07	0.00	1.24	-0.03	0.00	-1.48
Special items (%)		-0.08	-0.43	1.17	-0.88	0.12	**-1.93***
		0.00	0.00	**1.96****	0.00	0.00	**-2.34****
Income before extraordinary item (%)		0.75	0.40	0.59	-0.91	0.33	**-2.06****
		0.19	-0.21	0.88	-0.40	0.24	**-2.61*****
Discontinued operations (%)		0.06	-0.14	1.05	-0.08	0.06	-0.55
		0.00	0.00	-1.30	0.00	0.00	-0.27
Extraordinary items (%)		-0.03	0.04	-1.26	-0.04	-0.03	-0.06
		0.00	0.00	0.30	0.00	0.00	0.68

Panel B Percentage of observations reporting nonrecurring items [b]

	Year (-2, -1)			Zero amount in year (-2, -1); nonzero amount in year 0		
	DEC	INC	Chi-square	DEC	INC	Chi-square
Special items	46.48	49.66	0.29	13.38	10.20	0.70
Discontinued operations	9.86	16.33	2.65	7.04	6.08	0.01
Extraordinary items	33.10	23.13	**3.56***	7.04	9.52	0.58

[a] All items are scaled by average market value of equity. (Unreported: scaled by beginning total assets.) *, **, and *** indicate significance at 10%, 5%, and 1% levels in a two-tailed test, respectively. DEC denotes disclosure-decreasing firms. INC denotes disclosure-increasing firms. The subscript "DEC-INC" represents the differences between the observations for the disclosure-decreasing group and the observations for the disclosure-increasing group.

[b] The percentage represents the number of firm-years with nonzero nonrecurring items as a percentage of all firm-years in the group in the specific period.

Table 3.5 News Search for Firms with Sustained Disclosure Changes [a]

Panel A Percentage of event occurrence during event and pre-event periods

	Average of years (-2, -1)			Average of years (0, 1, 2)		
	DEC (N=145)	INC (N=151)	Chi-Square	DEC (N=145)	INC (N=151)	Chi-Square
SEC investigations (%)	3.45	3.31	0.004	3.45	2.65	0.16
Allegation about accounting or disclosure misconducts (%)	3.45	2.65	0.16	6.90	3.97	1.24
Industrial accidents (%)	2.76	2.65	0.003	3.45	5.96	1.04
Union strikes (%)	11.03	6.62	1.80	17.24	6.62	**8.00*****
Buyout or takeover target; Sale of subsidiaries/divisions (%)	10.34	7.95	0.51	29.66	17.88	**5.68****
Underwent restructuring plan (%)	2.76	3.97	0.33	9.66	7.95	0.27
Class action against the company (%)	4.14	3.31	0.14	15.17	11.92	0.67
Firms with more than one of the above events occurring (%)	10.34	5.96	1.91	21.38	13.91	**2.85***
No class action in year (-2, -1) and class action in year (0, 1, 2) (%)				13.10	10.60	0.45

Panel B Spearman correlation [b]

	SEC investigation	Accounting scandal	Union strikes	Takeover target	Industrial accident	Restructuring
Accounting scandal	**0.34** (0.00)					
Union strikes	**0.08** (0.05)	**0.07** (0.10)				
Takeover target	0.04 (0.29)	0.00 (0.93)	**0.08** (0.05)			
Industrial accident	0.02 (0.64)	**0.11** (0.01)	**0.16** (0.00)	0.03 (0.47)		
Restructuring	0.00 (0.98)	-0.01 (0.89)	0.00 (0.93)	**0.25** (0.00)	**0.12** (0.00)	
Class action	**0.08** (0.06)	0.06 (0.12)	**0.11** (0.01)	**0.08** (0.05)	**0.10** (0.01)	**0.12** (0.00)

[a] The events are selected using a keyword search in LexisNexis for business and finance news during year -2 to year 2. Variables are defined as one if there is any related report during that period, zero otherwise. *, **, and *** indicate significance at 10%, 5%, and 1% levels in a two-tailed test, respectively. DEC denotes disclosure-decreasing firms. INC denotes disclosure-increasing firms.

[b] p-value in parenthesis.

Table 3.6 Logistic Regressions of Disclosure Changes on the Costs of Disclosure. Firms are Matched by their AIMR Industry and Total Assets in Year -1 [a]

$$D_i = \phi_0 + \phi_1 \Delta \ln TA_i + \phi_2 \Delta IBEI_i + \phi_3 \Delta D\_Capital_i + \phi_4 (\Delta EN_i * \Delta D\_Capital_i) + \phi_5 \Delta D\_Equity_i + \phi_6 (\Delta EN_i * \Delta D\_Equity_i) + \phi_7 \Delta HHI_i + \xi_i \quad (3.1)$$

$$D_i = \eta_0 + \eta_1 \Delta \ln TA_i + \eta_2 \Delta OI_i + \eta_3 \Delta NonOpI_i + \eta_4 \Delta SI_i + \eta_5 \Delta DO_i + \eta_6 \Delta EI_i + \eta_7 \Delta D\_Capital_i + \eta_8 (\Delta EN_i * \Delta D\_Capital_i) + \eta_9 \Delta D\_Equity_i + \eta_{10} (\Delta EN_i * \Delta D\_Equity_i) + \eta_{11} \Delta HHI_i + \xi_i \quad (3.2)$$

i = sample firms, control firms.

	Eq. (3.1)		Eq. (3.2)	
	DEC = 1 CTRL = 0 (A)	INC = 1 CTRL = 0 (B)	DEC = 1 CTRL = 0 (C)	INC = 1 CTRL = 0 (D)
Intercept	0.2556	0.2629	0.2807	**0.3286***
	(0.21)	(0.17)	(0.18)	(0.09)
ΔlnTA	0.3698	0.5414	0.0974	0.5562
	(0.68)	(0.45)	(0.92)	(0.43)
ΔIBEI	-1.3493	**13.3745*****		
	(0.64)	(0.00)		
ΔOI			-3.0149	3.986
			(0.45)	(0.35)
ΔNonOpI			-16.8812	19.7654
			(0.24)	(0.33)
ΔSI			-0.4011	**16.8901****
			(0.92)	(0.01)
ΔDO			10.6867	15.0467
			(0.44)	(0.18)
ΔEI			-8.6395	**25.0822***
			(0.30)	(0.08)
ΔD_Capital	-21.0105	9.6879	-20.8097	9.688
	(0.76)	(0.11)	(0.76)	(0.11)
ΔEN*ΔD_Capital	-986.9	63.6979	-956.1	59.7054
	(0.71)	(0.33)	(0.72)	(0.36)
ΔD_Equity	-0.4644	-0.5208	-0.4284	-0.6323
	(0.37)	(0.40)	(0.41)	(0.34)
ΔEN*ΔD_Equity	-18.1186	14.572	**-21.0648***	**22.598***
	(0.11)	(0.15)	(0.08)	(0.10)
ΔHHI	-2.7303	**10.7334***	-3.1538	**11.8198***
	(0.55)	(0.08)	(0.51)	(0.06)
N	186	171	186	171
Max-rescaled R^2	13.94%	15.81%	16.19%	20.23%

[a] DEC and INC denote disclosure-decreasing and disclosure-increasing firms, respectively. CTRL denotes firms matched by the AIMR industry and total assets at year -1. P-values in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% levels in a two-tailed test, respectively.

[b] All the change variables (Δ) are the difference between the average of year (-2, -1) and year 0. D is a dichotomous variable that distinguishes sample and control firms. The components of current earnings (i.e., IBEI, OI, NonOpI, SI, DO, and EI) are scaled by total assets at year t.

CHAPTER 4

DISCLOSURE VS. DISCLOSURE RATINGS: QUANTITATIVE DISCLOSURE CHARACTERISTICS AND ANALYST RATINGS OF DISCLOSURE QUALITY

4.1 INTRODUCTION

Empirical research on firms' disclosure practices has long relied on different proxies for disclosure quality. Among these proxies, comprehensive disclosure scores constructed by researchers or third parties are frequently used. Unlike management forecasts, which represent a single dimension of voluntary disclosure, these scores attempt to comprehensively characterize a firm's disclosure quality and they often incorporate human judgment. Because of their very nature, comprehensive disclosure scores are subject to controversy regarding the extent to which they capture "real" disclosures and the extent to which they incorporate biases. "What do the scores measure?" is a question commonly asked before interpreting research results that utilize these disclosure measures.

The disclosure ratings in the AIMR reports (i.e., the Association for Investment Management and Research Corporate Information Committee Reports) are probably the most obvious example subject to such controversy, not only because of their comprehensive nature, but also because they have been used extensively (e.g., Lang and

Lundholm 1993, 1996; Bushee and Noe 2000; Botosan and Plumlee 2002). The AIMR disclosure ratings are constructed by financial analysts with industry expertise, therefore they measure disclosure quality from the perspective of a sophisticated set of financial statement users. They cover a relatively long sample period, making them a particularly attractive tool for researchers. It remains unclear, however, how the scores reflect analysts' perceptions of a firms' disclosure quality. This chapter addresses this question by asking: what are some quantifiable disclosure characteristics that are captured in the ratings? Finding (or not finding) any association between the AIMR scores and the quantitative disclosure characteristics helps us understand what the ratings capture. Investigating the association between the AIMR scores and specific elements of disclosures also allows possible replication or extension of the AIMR data.

Prior research discusses the validity of the AIMR ratings and other disclosure measures (e.g., Healy and Palepu 2001). One disadvantage of using the AIMR scores is that they have not been updated since AIMR ceased producing them in the mid 1990s. In addition, it is unclear whether the ratings are influenced by analysts' personal biases. It is possible that, in the evaluation process, analysts unintentionally incorporated judgments unrelated to disclosure, such as their opinions about firm performance. Prior research has found an association between disclosure ratings and firm characteristics (e.g., Lang and Lundholm 1993) and between disclosure ratings and analyst behavior (e.g., Lang and Lundholm 1996). Since firm performance can affect both analyst behavior and disclosure strategies, it is difficult to disentangle whether it is disclosure quality or a firm's "popularity" that is reflected in the disclosure ratings. In response to this critique,

Healy et al. (1999) examine the narrative documents created when the scores were formed. They find little evidence of bias in the ratings.

The purpose of this chapter is to examine whether there exists any association between the AIMR scores and other more direct measures of disclosure quality that are easily quantifiable from the financial reports. I begin by conjecturing that the scores are related to certain quantitative disclosure characteristics: timeliness, quantity, and frequency. Although these characteristics are probably one dimension among many others captured in the ratings, the premise is that a statistical association constitutes a benchmark useful in making comparisons to other disclosure measures constructed by researchers. I examine each firm's quantitative disclosure characteristics in terms of the timeliness of their 10-K and 10-Q filings, the length of various sections in those filings and the frequency of press releases. The sections in corporate filings examined include the Business section, Selected Financial Highlights section, Management Discussion and Analysis (MD&A), and the Notes to the Financial Statements.

Empirical results show that, after controlling for firm size and profitability, the lengths of disclosures in the Business section and MD&A section in a firm's 10-K filing are positively associated with the AIMR annual report scores. Likewise, the length of the MD&A section in 10-Q filings is positively associated with the AIMR quarterly report scores. In addition, more timely annual reports are associated with higher scores. These results suggest significant association between the AIMR scores and quantitative measurements of disclosures.

I further control for factors that may affect disclosure quality and analysts' perceptions of a firm. These factors include firm size, stock market and earnings

performance, earnings attributes, and company popularity. Consistent with the prior literature, larger firms receive higher scores in all categories. In addition, the scores are positively associated with indicators of company popularity. These indicators include analysts' stock recommendations toward a buy or strong buy position, a dichotomous variable indicating whether a firm has positive earnings, and a dichotomous variable indicating whether a firm's earnings increase from the previous year.

Given the association between the AIMR scores and the quantitative disclosure measures, this chapter tests how closely quantity-based estimations of disclosure quality approximate the AIMR scores. Using a holdout sample approach, I find that, on average, firms' estimated annual report scores are consistent with the AIMR annual report scores; the mean and median estimation errors are not significantly different from zero. In a test that compares a firm's estimated annual report score to sample medians, the results show that the quantity-based estimation reaches the same conclusion as using the actual scores for 69% of the observations. The accuracy is 19% higher than a naïve prediction, which implies an improvement of 38%.

This chapter contributes to the literature in three important ways. First, this chapter adds value to prior research using the AIMR scores by providing evidence of the association between the scores and quantitative disclosure characteristics. The findings show the connection between the scores and certain disclosure characteristics that can be objectively quantified. This helps us better understand the findings of prior research that uses the AIMR ratings.

Second, this chapter contributes to the literature on financial statement readability, which is a dimension of disclosure quality. The readability literature views text length

as an indicator, among others, of low readability (e.g., Soper and Dolphin 1964; Li 2006).[37] The evidence in this chapter, however, is inconsistent with prior findings. Contrary to the contention that the length of paragraphs is negatively associated with readability, I find that firms with longer Business or MD&A sections of their financial reports receive higher scores. The discrepancy may be driven by reader sophistication. Since analysts are sophisticated financial statement users, they can appreciate the content of a long MD&A section more, even if a longer section may imply higher complexity and lower readability.

Third, this chapter explores the feasibility of applying a quantity-based estimation model to estimate a firm's disclosure quality. Documented associations and predicted scores allow researchers the opportunity to use these quantitative measures to proxy for disclosure quality. One of the advantages of applying such an approach is that it is easily accessible and involves minimal personal judgment in setting the final scores. It is important to note, however, that this approach should not replace qualitative analysis of disclosure. Instead, it is more appropriate to view the use of quantitative measures as an approach to obtain economically efficient answers regarding disclosure quality, especially when the sample size is large. If researchers are evaluating relative disclosure quality among a large number of firms, the quantitative characteristics may work as a practical indicator for comparison.[38]

The remainder of the chapter is organized as follows. Section 4.2 reviews the previous literature on disclosure quality. Section 4.3 discusses research design and

[37] Other indicators include sentence length, number of syllables in a word, etc. Such analysis usually requires linguistic programming and is not always accessible to all researchers. As the primary purpose of this chapter is to examine disclosure features that are easily quantifiable, I focus on text length only and do not apply these analyses for my disclosure data.

[38] This assumes that quantitative disclosure measures used to estimate AIMR scores are readily available.

variable measurement. Section 4.4 explores sample selection and descriptive statistics, followed by empirical results in Section 4.5. Section 4.6 discusses the use of quantitative measures in approximating the AIMR scores. Section 4.7 concludes.

4.2 ON THE CONSTRUCTION OF DISCLOSURE MEASURES

The demand for corporate disclosure arises where there is the potential for mis-valuation of a firm, caused by information asymmetry between firms and potential investors, and when there exists moral hazard between company owners and self-interested agents (Healy and Palepu 1993). The theoretical literature has shown that high disclosure quality reduces the cost of raising equity capital (e.g., Milgrom 1981; Grossman 1981; Verrecchia 1983; Dye 1985; Feltham and Xie 1992). High disclosure quality also reduces the premium that investors ask for undiversifiable risks, and facilitates better resource allocations (e.g., Easley and O'Hara 2002; Hughes et al. 2005; Lambert et al. 2006). These theoretical results promise empirical researchers rich ground for exploring the role of disclosure quality in capital markets.

Turning the notion of "disclosure quality" into operational measures, however, is a complicated process that inevitably involves subjective judgment. The validity of a disclosure measure directly affects the effectiveness of a test and the conclusions that can be drawn. The measures commonly used in empirical research can be generally categorized into three types: disclosure measures coded by researchers based on a self-selected set of criteria, disclosure ratings constructed by a third party, and management forecasts of earnings (Healy and Palepu 2001).

Self-constructed measures frequently focus on one dimension of corporate disclosures, such as information contained in management discussion and analysis (e.g., Clarkson et al. 1994), segment information (e.g., Harris 1998), earnings guidance (e.g., Miller 2002; Chen et al. 2006; Houston et al. 2008), or warnings of possible lawsuits (e.g., Skinner 1994, 1997). They can also be an overall assessment of financial reporting quality (e.g., Botosan 1997). Researchers construct these measures by reviewing disclosures and awarding points if the disclosures meet certain criteria. Management forecasts are often evaluated based on the existence and the *ex post* precision of such forecasts.

Disclosure ratings produced by third parties tend to provide a more comprehensive measure of a firm's overall disclosure quality, and are available on a larger scale covering a large number of firm-years. AIMR produced disclosure rankings from the early 1980s to the mid 1990s. Over 1,000 firms were evaluated during the period and for many firms the rankings cover a long time series of years. The evaluation was conducted through surveys of analysts, who formed industry-specific committees based on their expertise. Three primary aspects of a firm's disclosure practice were measured: annual reports, quarterly and other reports, and investor relations. The AIMR report focuses on the completeness of information provided, the frequencies of voluntary disclosures, and the accessibility of management. A detailed checklist was provided to analysts during the evaluation process (Healy et al. 1999).

This measure is used as a proxy for disclosure quality in many empirical studies and has generated important implications. For example, Lang and Lundholm (1993) find that higher AIMR disclosure ratings are positively associated with earnings

performance, size, subsequent public offerings, etc. Lang and Lundholm (1996) find that higher disclosure ratings are also associated with more analyst coverage, lower forecast dispersion, higher forecast accuracy, and less volatility in forecast revisions. Better disclosure quality also attracts more institutional investors (e.g., Healy et al. 1999; Bushee and Noe 2000) and is associated with a lower cost of capital (e.g., Botosan and Plumlee 2002).

In this chapter, I focus on the association between the AIMR scores and quantitative disclosure measures for the following two reasons. First, the AIMR scores are widely used and the results widely referenced in empirical research. However, unlike self-constructed measures or management forecasts, it is unclear what these measures are capturing. For example, prior research reveals that larger firms tend to receive higher ratings. Although this association can be interpreted as evidence that larger firms enjoy economies of scale in providing disclosure, it might alternatively be due to analysts simply favoring large firms. The construct validity of the scores in reflecting disclosure quality is thus crucial in those studies. By exploring the association between the ratings and certain disclosure characteristics, this study attempts to investigate the extent to which the ratings are associated with specific disclosure behaviors. Second, the scores are created by analysts, who are direct recipients of corporate disclosures. Understanding these scores provides insight as to how a major group of users value disclosure quality. This is particularly important if financial statement users evaluate disclosure differently from researchers.

Before moving into the discussion of research methodology, it should be mentioned that the ratings were produced in a period that precedes Regulation Fair

Disclosure (Reg FD), which constrains firms from having private communications with individual analysts. One concern is whether Reg FD affects the generalizability of the results of this analysis beyond the year 2000. Recall that the AIMR scores are based on three main components: annual report, quarterly report and other publications, and investor relations. Reg FD possibly affects firms' disclosure behavior and analysts' evaluations of disclosure quality, particularly in relation to "investor relations." In this study, the quantitative disclosure measures capture characteristics of public disclosures, most of which are contained in annual and quarterly reports. To the extent that Reg FD does not affect the disclosure characteristics of financial statements, the main results in this study should provide implications for estimating financial reporting quality in more recent time periods.

4.3 RESEARCH DESIGN AND VARIABLE MEASUREMENT

The approach followed in this study is shown in Figure 4.1. To study the construction of the AIMR scores, I first conjecture that disclosure ratings (Y) reflect disclosure quality (X^*) plus some noise (ε):

$$Y = X^* + \varepsilon,$$

where ε represents analysts' personal biases or preferences toward a firm, regardless of a firm's actual disclosure behavior. If the bias or preference is random among analysts, we can expect that, when the number of grading analysts increases, analysts' specific preferences will be diversified and the disclosure scores will be a good proxy for disclosure quality (i.e., $X^* = E[Y]$). This is an implicit assumption in many studies

that use the scores to proxy for disclosures. On the other hand, if analysts are systematically biased, Y is no longer a good proxy for X^*. In extreme cases, the impact of bias could override disclosure quality and distort the disclosure scores. This leaves room for alternative explanations for any findings that are based on the assumption that the disclosure scores represent disclosure quality.

Disentangling X^* from ε is difficult, since both are unobservable. I conjecture that disclosure quality can be further decomposed into disclosure characteristics that are quantifiable without personal judgment (*X'*) and disclosure characteristics that are subject to personal judgment (*X''*):

$$Y = X' + X'' + \varepsilon = X' + Z .$$

From the checklist that the AIMR provides to the analysts (see Healy et al. 1999), I identify three characteristics of disclosure: timeliness, quantity, and disclosure frequency. That is, *X' = (Disclosure timeliness, Disclosure quantity, Disclosure frequency)*. *X'* is thus defined as quantifiable disclosure characteristics. By doing so, I leave out subjective, qualitative aspects in the disclosures. I call *Z* "Analysts' Perception," which represents what analysts consider important. Note that *Z* is completely a judgment call, no matter whether the perceptions are disclosure-related (*X''*) or unrelated (ε).

The nature of *Z* makes it difficult for researchers to study using conventional empirical methods. Moreover, it is unlikely that researchers will be able to separate *X''* and ε, since factors that drive analyst bias may also contribute to disclosure quality. For example, analysts may fixate on profitability and unconditionally give profitable firms a high disclosure score. At the same time, profitability also gives managers incentives to improve disclosure quality, making *X''* indistinguishable from ε. That

aside, separating objective factors from subjective ones allows us to at least examine whether or not quantitative disclosure characteristics are captured in analysts' ratings. I pose the following hypothesis in null form:

H4.1: The AIMR disclosure scores are not associated with quantitative disclosure features (X') such as disclosure timeliness, disclosure quantity, and disclosure frequencies.

In addition to *X'*, I also explore potential factors incorporated in analysts' perceptions, *Z*. Specifically, I examine whether firm fundamentals, earnings attributes, and company popularity are included in *Z*. Multiple variables are used for each construct. Despite this attempt, it should be noted that the variables might not be exhaustive. A discussion of the variables follows.

Quantitative disclosure characteristics (X')

Disclosure timeliness. Timeliness is an important characteristic of relevance, which is a key feature of good-quality accounting information. The timely release of relevant information makes a difference in decision making. For a piece of financial information to be relevant in decision making, the information has to be available to the users in a timely manner.[39] All else held constant, the earlier the quarterly reports are released, the more relevant they are for investors in evaluating and updating their current investment strategy. Reasons for listed companies to delay their filings of financial statements to the SEC usually involve complicated transactions, accounting mistakes in previous years, and disagreement with auditors in accounting policy. More timely reports are therefore

[39] See the Conceptual Framework of the IASB (International Accounting Standards Board) and FASB (Financial Accounting Standards Board).

viewed as reflecting higher disclosure quality.[40] Disclosure timeliness is measured as the number of days a firm takes to produce financial reports after the fiscal year / quarter end. The variable ARDAYS (QRDAYS) measures the number of days between the fiscal period end and the 10-K (10-Q) filing date. The shorter the period, the more timely the report.

Disclosure quantity. The disclosure quantity refers specifically to the amount of voluntary disclosures in annual and quarterly filings, measured by the length of different sections in financial reports:[41]

1) Business: Companies provide an overall description of their business in the first section of 10-K filings (Item One). The section usually includes a general introduction to the company, information about a firm's history, its operating segments, distribution channels, competition environment, etc. Although it can be broad-spectrum, a thorough discussion provides readers a glimpse at the big picture of the company and its industry. The variable ARBUSINESS measures the natural log of the number of words in this section in the 10-K filings.
2) Selected Financial Data (or Financial Highlight): Companies usually report a summary of key financial information in the form of yearly comparison (e.g., a five-year comparison of cash, total assets, and net income). A higher-quality report may contain more details. The variable ARHIGHLIGHT measures the

[40] On the other hand, however, timeliness can be a tradeoff against reliability. The less time it takes for a firm to prepare a financial statement, the more likely that the statement contains noise that affects representational truthfulness. Botosan and Plumlee (2002) find that the cost of equity capital increases when the disclosure quality of quarterly reports increases. They explain the result as consistent with managers' claims that more timely reports are positively associated with higher cost of capital through increased stock volatility. From this viewpoint, timely disclosures may be associated with lower-quality information. The association between timeliness and disclosure quality is therefore an empirical question.

[41] Graphical content is not considered in this study since the downloaded 10-K and 10-Q filings are text files and do not include graphical content.

natural log of the number of words in this section in the 10-K filings.[42]

3) Management Discussion and Analysis (MD&A): In this section, managers communicate and explain company performance during the past year (quarter) and are required by the SEC to outline risk factors that may impact future performance. Prior research has shown that MD&A is an important dimension of voluntary disclosures (e.g., Clarkson et al. 1994). Researchers also incorporate it as one of the indicators in self-constructed measures of disclosure quality (e.g., Botosan 1997). ARMD&A and QRMD&A are the variables measuring the natural log of the number of words of MD&A in the 10-K and 10-Q filings, respectively.

4) Notes to Financial Statement: Notes to the annual and quarterly financial statements are considered by analysts as the most important source of key financial information. In the 2003 AIMR Member Survey of Global Corporate Financial Reporting Quality, 85% of the responses consider the footnotes "very or extremely important." The variable ARNOTES (QRNOTES) measures the natural log of the number of words in the footnotes in the 10-K (10-Q) filings.

The association between disclosure quantity and disclosure quality may be either positive or negative. The relationship is positive if longer disclosures provide more information, but it can be negative if longer disclosures reduce readability. For example, more notes to financial statements may give the readers more information beyond what

[42] This section usually consists primarily of financial numbers. Numbers are included in the word count since the quantitative measure is intended to capture the length of the section. Note that numerical digits do not affect the result of a word count. For example, "100" and "1,000" are both viewed as one word. Therefore, the measure will not be higher for firms reporting larger financial numbers.

financial statements are required to present under GAAP. On the other hand, too many notes may confuse the readers and reduce the credibility of the financial statement.[43] Li (2006) uses linguistic theories to argue that longer disclosures reduce the readability of annual reports. Therefore, the association between the length of the aforementioned disclosures and the disclosure ratings is an empirical question. No directional relationship is assumed.

Voluntary disclosure frequency. Aside from annual or quarterly reports, managers also communicate with investors through other channels such as press conferences and press releases. Disclosures through these channels usually reflect firms' efforts to improve investor relations. They are timelier than financial reports, but the information is less verifiable. If analysts view these news releases as providing useful information, firms that publicize information frequently should be considered to demonstrate higher disclosure quality. To quantify the number of news releases by each sample firm, I search business news in LexisNexis, using company names and keywords including "CEO," "chair," "president," "announce," "disclose," etc.[44] The search is intended to identify press releases made by companies and exclude news reported by media without any quotations. The variable PRESS measures the number of these releases for a specific firm-year. Note that press releases reflect only part of the disclosure practices in investor relations. Other forms of disclosure include conference call and direct

[43] For example, the footnotes of Enron's financial reports were very long, and it has been suggested that they were designed to confuse the readers.

[44] Specifically, the algorithm for keyword search is set as follows: 1) News category: Business News; 2) News source: Business & Finance; 3) Search terms: in the field of "Company name," use the name of the sample firm, and in the field of "Headlines, Lead paragraph(s), Terms," use: "company name w/3 (said or CEO or officer or manage! or spokes! or chair!) w/3 (said or announc! or disclos! or talked)".

communication between managers and analysts. These practices are not captured by the news release measure.

Analyst perception (Z)

Analysts' perceptions of disclosure quality are affected by their subjective assessments of the disclosure practices they observe (*X''*). They can also be affected by analysts' personal preferences that are unrelated to disclosures (ε). However, both *X''* and ε are subject to judgment, either professional or personal. To capture these unquantifiable factors, I include several variables documented in prior research as related to financial reporting quality, as well as indicators of company popularity. Note that since both disclosure quality and analysts' personal preferences are unobservable to researchers, I do not attempt to separate one from the other for the purpose of drawing any conclusion about analysts' judgment. Instead, the inclusion of these variables serves as a control for capturing any potential qualitative aspect of the disclosure ratings not included in the quantitative disclosure measures.

Specifically, I assume that higher financial reporting quality is positively associated with firm size, stock market and earnings performance, earnings attributes, and company popularity. I use profitability and the opinions from analysts' peer groups to depict popularity. I conjecture that a company is more popular among analysts if the company is: 1) favored by other rating agencies, 2) favored by analysts' stock recommendations, 3) profitable, 4) improving in profitability, and 5) continuing to meet or beat analyst forecasts. A discussion of the variables follows.

Firm size and performance. Lang and Lundholm (1993) find that structural and performance variables such as firm size and returns explain the variation of the AIMR

ratings.[45] They report that firm size and stock returns are positively associated with the disclosure ratings. This is consistent with the predictions that larger firms enjoy a higher net benefit of disclosure due to a lower disclosure cost per unit, and that well-performing firms are more forthcoming. I measure firm size as the natural log of total assets (lnTA). Earnings performance is measured by income before extraordinary items scaled by total assets (ROA). Market performance is measured by 12-month stock returns during the fiscal year that the analysts are evaluating (RET).

Accounting-based earnings attributes. I follow Francis et al. (2004) in measuring earnings attributes.[46] It is not clear how earnings attributes affect analysts' perception of disclosure quality. For example, more stable earnings and a closer map between earnings and cash flows could allow analysts to provide more precise earnings forecasts and enhance their credibility. However, if these attributes are achieved by earnings management, then analysts may not consider them to be desirable.

I measure earnings predictability and persistence using the following auto-regressive model (e.g., Lev 1983; Ali and Zarowin 1992):

$$E_{j,t} = \phi_{0,j} + \phi_{1,j} E_{j,t-1} + \upsilon_{j,t}.$$

$E_{j,t}$ is firm j's income before extraordinary items divided by the weighted number of outstanding shares in year t. Earnings predictability (PREDICT), $-\sqrt{\sigma^2(\hat{\upsilon}_{j,t})}$, is the negative value of the square root of error variance, and persistence (PERSIST) is $\phi_{1,j}$.

[45] The structural and performance variables used in their paper also include analyst forecast errors and the correlation between returns and earnings. I do not include these variables since my other variables measure similar concepts (e.g., positive earnings surprise and earnings attributes).

[46] Note that since Francis et al. (2004) study the association between earnings attributes and the cost of equity capital, the authors measure earnings attributes in a way such that larger values of these variables indicate lower earnings quality. Therefore, if lower earnings quality is associated with higher cost of equity capital, the attribute variables are positively associated with cost of equity capital. In this chapter, the variables are instead measured in a way such that larger values represent more desirable attributes.

For each firm-year in the sample, PREDICT and PERSIST are derived from a firm-specific regression over a ten-year rolling window. Higher values of PREDICT (PERSIST) represent higher predictability (persistence).

Based on Francis et al. (2004), Smoothness (SMTH) is measured as the negative of the ratio of the standard deviation of earnings to the standard deviation of cash flows, i.e., $(-1)*\sigma(NIBE_{j,t})/\sigma(CFO_{j,t})$. $NIBE_{j,t}$ is income before extraordinary items for firm j in year t scaled by beginning total assets and $CFO_{j,t}$ is cash flow from operations for firm j in year t. Since there is no available data for cash flow from operations before 1987, I use an approach that modifies the standard balance sheet approach used to calculate operating cash flows. The modification (described in Appendix A) is designed to reduce estimation error. σ is measured over rolling ten-year windows. Higher values of SMTH mean more earnings smoothness.

Accrual quality (ACCRL) is measured as the negative of the standard deviation of the residuals $(-\sigma(\hat{\nu}_{j,t}))$ from the following year- and firm-specific regressions using rolling ten-year windows (e.g., Dechow and Dichev 2002):

$$\frac{TCA_{j,t}}{Assets_{j,t}} = \varphi_{0,j} + \varphi_{1,j}\frac{CFO_{j,t-1}}{Assets_{j,t}} + \varphi_{2,j}\frac{CFO_{j,t}}{Assets_{j,t}} + \varphi_{3,j}\frac{CFO_{j,t+1}}{Assets_{j,t}} + \nu_{j,t},$$

$TCA_{j,t}$ is total current accruals for firm j in year t. That is, total current accruals = (change in current assets – change in cash) – (change in current liabilities – change in debt in current liabilities). All changes are measured as between year t-1 and year t. $CFO_{j,t}$ is cash flow from operations, defined as above. Higher values of ACCRL mean that earnings are more closely mapping to operating cash flows. An example of high quality of accruals under this model would be if accounts receivable are recorded in one

period and collected in cash during the next period. Cash collections made two or more periods later will be included in the regression residuals, thus reflecting poor quality of accruals.

As previously mentioned, greater smoothness, predictability, or persistence may be considered by analysts to be "desirable attributes" if smoother and more persistent earnings allow analysts to do a better job in forecasting future earnings. These attributes could be viewed either positively or negatively by analysts. Therefore, they are included in the analysis to control for their impact on analysts' evaluation of a firm. Since these attributes serve as a control for the unquantifiable characteristics reflected in the ratings, I make no directional prediction on the association between earnings attributes and the ratings.

Market-based earnings attributes. As in Francis et al. (2004), market-based earnings attributes includes: value relevance of earnings in explaining return variations and the ability of earnings to reflect changes of market value of equity (i.e., timeliness and conservatism). Firms with earnings that are more value-relevant and more representative of economic income provide analysts with market-relevant information that they would otherwise collect with cost.

Value relevance (RELEVANCE) is measured as the adjusted R-squared from the following equation estimated over rolling ten-year windows (e.g., Francis and Schipper 1999; Collins et al. 1997; Bushman et al. 2004):

$$RETURN_{j,t} = \delta_{0,j} + \delta_{1,j} EARN_{j,t} + \delta_{2,j} \Delta EARN_{j,t} + \zeta_{j,t},$$

$RETURN_{j,t}$ is firm j's 15-month return ending three months after the end of fiscal year t, $EARN_{j,t}$ is firm j's income before extraordinary items in year t, scaled by market value of

equity at t-1, and $\Delta EARN_{j,t}$ is change in firm j's income before extraordinary items in year t, scaled by market value of equity at the end of fiscal year t-1.

Timeliness and conservatism are obtained from the following regression estimated over rolling ten-year windows (e.g., Basu, 1997; Pope and Walker, 1999; Givoly and Hayn, 2000):

$$EARN_{j,t} = \alpha_{0,j} + \alpha_{1,j} NEG_{j,t} + \beta_{1,j} RET_{j,t} + \beta_{2\,j,t} NEG_{j,t} \cdot RET_{j,t} + \varsigma_{j,t},$$

$NEG_{j,t}$ equals to one if $RET_{j,t} < 0$; zero otherwise. Timeliness (TIMELINESS) is measured as the adjusted R-squared of the regression and Conservatism (CONSERVE) is measured as $(\beta_{1,j} + \beta_{2,j})/\beta_{1,j}$. Higher values of TIMELINESS and CONSERVE mean timelier and more conservative earnings.

Ratings by other agencies. In addition to corporate disclosures, analysts obtain information from other information agencies that follow the same firms. There is evidence suggesting that analysts use information other than corporate disclosures (2003 AIMR Member Survey). The information providers may include news media (e.g., *Fortune* and *Forbes*) and credit rating agencies (e.g., Moody's, Standard and Poor's, etc.) It is possible that the more information analysts obtain from these sources, the less they demand corporate disclosures. It is likely that analysts are affected by other valuations made by a third party. I use the average of the Standard and Poor's long-term and short-term domestic issuer ratings in year t to proxy for the opinions from other professional agencies and transform them into ranks (S&P) based on AIMR industries. Higher values of S&P indicate higher S&P ratings within a firm's industry.

Analyst recommendations. The buy, sell, or hold recommendations made by analysts regarding a firm's stock reflect their opinion of the firm's future stock price performance.

Chen and Matsumoto (2006) find that analysts issuing more favorable stock recommendations experience a greater increase in forecast accuracy relative to other analysts with less favorable recommendations. Their results are consistent with the assumption that analysts receive more private information from managers after issuing more favorable recommendations.[47] I use the variable REC to proxy for a firm's popularity in year t. The variable is measured by the mean value of the I/B/E/S consensus recommendations (i.e., 1 = Strong buy, 2 = Buy, 3 = Hold, 4 = Underperform, and 5 = Sell). The variable is multiplied by -1 so that higher values indicate recommendations toward a long position.

Profitability. Evidence provided by Hayn (1995) and Burgstahler and Dichev (1997) indicates that managers tend to manage earnings to avoid earnings decreases and losses. Burgstahler and Dichev (1997) suggest that managers' incentives to prevent losses or earnings decreases are probably driven by the assumptions that terms of transactions are more favorable for firms with higher earnings and stakeholders use heuristic cutoffs at zero to determine the terms of transactions. Lenders may give better terms to a borrower based on whether the firm has positive earnings. Similarly, an analyst may give a firm a better rating depending on whether this firm is profitable or not. I use two dichotomous variables to proxy for this fixation. The first variable, PROFIT, equals one if a firm has non-negative income (zero otherwise). The other variable, EINCR, equals one if a firm's income before extraordinary items is higher than that of the previous year.

Positive earnings surprise. Positive earnings surprise means that firms outperform analysts' expectations, beating (or at least meeting) analyst forecasts. I posit that a positive surprise can lead analysts to favor a firm regardless of its disclosure quality. I

[47] The findings exist for the pre-Reg FD period but not after.

use the average frequency that a firm meets or beats analysts' consensus forecasts (MEETFREQ) from year t-3 to year t-1 to proxy for the frequency of the positive earnings surprises.

To summarize, I use the following regression to examine the relationship between the AIMR disclosure scores (*Y*), quantitative disclosure characteristics (*X'*), and proxies for analysts' perceptions (*Z*). The dependent variables are scores of disclosure quality obtained from the AIMR report. The variables TOT, ANL, OPB, and REL represent overall scores, the scores for annual reports, the scores for quarterly and other publications, and the scores for investor relations, respectively. The explanatory variables are described above. In the regressions, EQ_i (i = 1-7) represents the previously described seven earnings attributes.

$$\begin{aligned} TOT_t = {} & \delta_0 + \delta_1 ARBUSINESS_t + \delta_2 ARHIGHLIGH\ T_t + \delta_3 ARMD\&A_t \\ & + \delta_4 ARNOTES_t + \delta_5 ARDAYS_t + \delta_6 QRMD\&A_t + \delta_7 QRNOTES_t \\ & + \delta_8 QRDAYS_t + \delta_9 PRESS_t + \delta_{10} \ln TA_t + \delta_{11} ROA_t + \delta_{12} RET_t + \sum_{i=1}^{7} \theta_{13i} EQ_{i,t} \\ & + \delta_{14} S\&P_t + \delta_{15} REC_t + \delta_{16} MEETFREQ_t + \delta_{17} PROFIT_t + \delta_{18} EINCR_t \end{aligned} \tag{4.1}$$

$$\begin{aligned} ANL_t = {} & \alpha_0 + \alpha_1 ARBUSINESS_t + \alpha_2 ARHIGHLIGHT_t + \alpha_3 ARMD\&A_t + \alpha_4 ARNOTES_t \\ & + \alpha_5 ARDAYS_t + \alpha_6 \ln TA_t + \alpha_7 ROA_t + \alpha_8 RET_t + \sum_{i=1}^{7} \theta_{9i} EQ_{i,t} + \alpha_{10} S\&P_t \\ & + \alpha_{11} REC_t + \alpha_{12} MEETFREQ_t + \alpha_{13} PROFIT_t + \alpha_{14} EINCR_t \end{aligned} \tag{4.2}$$

$$\begin{aligned} OPB_t = {} & \beta_0 + \beta_1 QRMD\&A_t + \beta_2 QRNOTES_t + \beta_3 QRDAYS_t + \beta_4 PRESS_t + \beta_5 \ln TA_t \\ & + \beta_6 ROA_t + \beta_7 RET_t + \sum_{i=i}^{7} \theta_{8i} EQ_{i,t} + \beta_9 S\&P_t + \beta_{10} REC_t + \beta_{11} MEETFREQ_t \\ & + \beta_{12} PROFIT_t + \beta_{13} EINCR_t \end{aligned} \tag{4.3}$$

$$\begin{aligned} REL_t = {} & \gamma_0 + \gamma_1 PRESS_t + \gamma_2 \ln TA_t + \gamma_3 ROA_t + \gamma_4 RET_t + \sum_{i=1}^{7} \theta_{5i} EQ_{i,t} + \gamma_6 S\&P_t + \gamma_7 REC_t \\ & + \gamma_8 MEETFREQ_t + \gamma_9 PROFIT_t + \gamma_{10} EINCR_t \end{aligned} \tag{4.4}$$

4.4 SAMPLE SELECTION AND DISCLOSURE CHARACTERISTICS

In order to have access to companies' annual and quarterly reports for coding, I select firms from the AIMR Reports between 1993-1996, as the Security Exchange Commission (SEC) does not provide complete access to electronic filings before 1993. The initial sample consists of 1,044 firm-years from 396 firms. Matching the sample to 10-Ks and 10-Qs available in the EDGAR database reduces the sample to 803 firm-years by 396 firms. During these firm-years there are 1,715 10-Qs available.

Table 4.2 shows the industrial composition of the sample. The sample includes a variety of manufacturing and service companies. For 10-K filings, the most well represented industries are the Retail industry and Food, Beverage & Tobacco, which account for 10.6% and 11.7% of the sample, respectively. There are relatively few observations in the industries of Container & Packaging (0.9%), Diversified Companies (0.9%), International Pharmaceuticals (0.3%), Savings Institutions (0.4%), and Telecommunications Service (0.4%). The remaining industries are more evenly distributed. The composition is similar for 10-Q filings.

Table 4.3 reports the descriptive statistics for the sample in terms of disclosure scores, quantitative disclosure characteristics, and other firm characteristics. The AIMR report includes four types of scores: an overall total score and three subcategory scores, namely annual report, quarterly and other publications, and investor relations.[48] For annual report (ANL) scores, the mean is 72.16 and the median is 73.68. Firms at the lower quartile receive a score of 62.86. The ratings for the other two subcategories (i.e.,

[48] The total score is a weighted average of the three sub-scores. The weights vary by industry. The mean values of the weights for annual report, quarterly and other reports, and investor relations are 0.4, 0.27, and 0.3, respectively. For some firms only the total scores are available.

OPB and REL) are similarly distributed. For comparison, I also report the relative industry rankings (RIR) for the sample firms. RIRs are calculated as $((N-R)/(N-1))*100\%$, where N is the number of firms evaluated in the same AIMR industry and year, and R is a firm's disclosure ranking based on the original scores. The firm ranked first within an industry receives a standardized score of 100, and the last receives zero. Due to the ranking procedure, the mean and median RIRs for all four AIMR disclosure scores are 50%, with the lower quartiles and upper quartiles close to 25% and 75%.

Table 4.3 also reports the word counts for different sections in the 10-K and 10-Q filings. Disclosure quantity varies across firms, but on average the filings tend to be long. Each of the sections of Business, MD&A, and Notes to Financial Statements comprises an average of more than 4,000 words. In annual reports, firms spent approximately the same amount of space in business and management analysis and discussion. Nevertheless, the amount of disclosures in the Business section appears to be more stable across years than in the MD&A section. Untabulated results show that the changes in the MD&A section are much larger than the changes in the Business section, reflecting increased emphasis on providing details in the MD&A over time. For quarterly reports, the average MD&A section is about half the length of the annual MD&A section.

The average number of days firms take to file their financial reports following the period end is 83.25 days for 10-Ks and 42 days for 10-Qs, and the difference among firms appears to be very small.[49] The mean and median numbers of press releases are

[49] Untabulated results show little change from year to year.

2.38 and 1.00, respectively. The low frequency may be attributable to the strict search criteria, which returns zero results for many firms.

The firms in the sample appear to be large in terms of total assets and market value of equity, common characteristics of firms selected by the AIMR. The sample firms are profitable, with a median ROA of 5%. These firms are covered intensively by analysts. The mean and median numbers of analysts issuing analyst forecasts at fiscal year end are 19.3 and 18, respectively.

4.5 EMPIRICAL RESULTS

4.5.1 Variable correlations

Panel A of Table 4.4 reports the Pearson correlation between the AIMR scores and the quantitative disclosure variables. Consistent with the descriptive statistics in Table 4.3, disclosure scores in all the subcategories (ANL, OPB, and REL) are strongly associated with each other, indicating that a firm with a high score in annual report tends to receive high scores in other categories. Annual report (ANL) and quarterly report (OPB) scores are positively correlated with the quantity of disclosure in MD&A (i.e., ARMD&A, QRMD&A) and the notes to the financial statement (ARNOTES). Annual scores are negatively correlated with disclosure timeliness (ARDAYS), indicating that earlier release of the annual report is evaluated by analysts as indicating higher quality. The number of press releases (PRESS) is positively (but weakly) correlated with investor relations scores (REL) and total scores (TOT), consistent with the conjecture that the

press releases are part of the disclosure characteristics captured in the investor relations scores.

Panel B presents the correlations between the AIMR scores and the other variables related to firm performance, earnings attributes, and company popularity. Firm size (lnTA) is positively correlated with all the scores, showing that larger firms receive higher AIMR scores. Among the seven earnings attribute measures, accrual quality (ACCRL), earnings smoothness (SMTH), and relevance (RELEVANCE) are positively correlated with annual report scores. However, the correlation is weak. In general, there is no strong indication that the four AIMR scores consistently correlate to specific earnings attributes. Disclosure scores are positively associated with most of the variables used to measure company popularity, indicating that firms with positive earnings and strong analyst sentiment receive higher scores.

Panel C reports the correlation between earnings attributes and measures used to capture company popularity. In general, the correlations are weak. Among earnings attributes, note that RELEVANCE and TIMELINESS are highly correlated (0.66). Due to the strong correlation, I conduct regression analysis both with and without the latter variable.

Unreported correlations show that earnings predictability, smoothness, relevance, and timeliness are negatively but weakly correlated with the measures of disclosure quantity, including ARBUSINESS, ARMD&A, and ARNOTES. This suggests that firms talk more when their earnings are less predictable, less smooth, and less associated with market returns.

4.5.2 Regression analysis

Regression results are presented in Table 4.5. As mentioned earlier, earnings relevance and timeliness are highly correlated. In this section, I report the regression results excluding timeliness. Including or excluding this variable does not affect the significance of other variables related to quantitative disclosure measures, firm performance, and popularity.

Panel A reports regressions on the original disclosure scores. After controlling for firm characteristics, earnings attributes, and company popularity, the measures of disclosure quantity show strong associations with annual and quarterly report scores. For annual report (ANL) scores, the variables explain about 22% of the variation in the scores. The coefficients of ARBUSINESS and ARMD&A are all significantly positive at the 1% level, implying that firms with longer sections receive higher scores. The coefficient on ARMD&A is 2.63. This implies that a 1,000-word longer MD&A section is associated with an 18-point higher score in the annual report category.[50] Similarly, in the regression for quarterly report (OPB), the coefficient of QRMD&A is strongly significant, which further confirms that analysts appreciate longer Business and MD&A disclosures. The coefficient on ARDAYS is significantly negative in the annual report regression, indicating that firms that file their annual reports more quickly receive higher scores. Other disclosure variables, including number of words in the sections of financial highlights (ARHIGHLIGHT) and financial statement footnotes (ARNOTES and QRNOTES), and number of press releases (PRESS), do not attain significance in explaining the specific scores.

[50] Note that the variable ARMD&A is the log of MD&A word counts. The value of 18 is derived from the log of 1,000 times the coefficient.

Firm size apparently plays an important role in determining disclosure scores, as the coefficient on lnTA is positively significant in all four regressions, consistent with prior literature. Note that in Chapter 3, the changes in firm size (measured as total assets) do not appear to be a significant factor that impacts the likelihood of sustained disclosure changes. The inconsistency can be driven by the fact that in Chapter 3 firm size is measured in changes, while in this chapter the variable is measured in levels.

Among earnings attributes, earnings persistence (PERSIST) is negatively associated with disclosure scores in each of the four regressions. This implies that firms with higher disclosure scores have larger variability in earnings from period to period. This works against the conjecture that analysts award a firm with higher disclosure scores due to high earnings persistence. Instead, it suggests that managers provide disclosure to explain the variation across periods, thus resulting in higher disclosure scores. The variable RELEVANCE is significantly positive in the annual report and total score regressions, indicating that firms with a stronger connection between earnings and contemporaneous returns receive higher annual report scores.

While I do not find that ROA is associated with disclosure scores after controlling for other variables, the coefficients on PROFIT and EINCR are positive and significant. This indicates that earnings performance does play a role in determining disclosure ratings. However, the ratings are affected, not by the actual level of profitability, but by the outcome of whether earnings are positive and whether earnings are above their level in the previous period. In addition, the positive coefficients on analysts' stock recommendations (REC) in all four regressions suggest that firms with favorable analysts' recommendations receive higher scores. This is consistent with the

assumption that analysts receive more information from managers after issuing favorable stock recommendations (e.g., Chen and Matsumoto 2006), suggesting a positive association between the disclosure ratings and analyst recommendations.

The strong significance of REC, PROFIT, and EINCR could be associated with analysts' bias in evaluating disclosure quality, or qualitative disclosure aspects not picked up in the quantitative measures. Again, identifying causality is beyond the scope of this chapter. Instead, it is sufficient to note that after controlling for all the other variables, the quantitative disclosure characteristics are still significant in explaining the disclosure quality ratings.

Panel B presents the results for regressions on relative industry rankings. The explanatory power is lower compared to Panel A, with the exception of the rankings of total scores. Except for the earnings attributes, most of the variables with significant coefficients in Panel A continue to load in Panel B. The quantitative disclosure measures show stronger association with disclosure rankings since ARBUSINESS and ARHIGHLIGHT become positively significant in the total score (TOT) regression and ARHIGHLIGHT becomes significant in the ANL regression, although time to report (ARDAYS) is no longer significant. Firm size and analyst recommendations remain positively significant. For earnings attributes, earnings persistence and value relevance become insignificant in all four regressions.[51] Other earnings attributes again do not appear to consistently affect the disclosure scores.

Overall, the results in Table 4.5 show that disclosure ratings are associated with quantitative disclosure measures. Firms that disclose more quantitatively receive higher

[51] When timeliness is included in this set of regressions, the coefficients on this variable are significantly negative in all four regressions, and value relevance remains significantly positive. The inclusion and exclusion of timeliness do not affect the results for the other sets of explanatory variables.

scores. The results hold after controlling for firm size, stock performance, earnings attributes, and indicators of company popularity.

Latent variable regression

The results in Table 4.5 reject the null hypothesis that the AIMR scores are unrelated to quantitative disclosures measures. In addition, the scores are affected by firm size and popularity measures, particularly favorable analyst recommendations. It is possible that the characteristics are imperfectly measured by the independent variables used in the OLS regressions, therefore I further use a latent variable approach (e.g., Lambert and Larcker 1995) to examine the association between the annual report (ANL) scores and the four conceptual constructs of disclosure quality: quantifiable disclosure characteristics (QUANTITY), financial characteristics (FINANCIAL), earnings attributes (EQ), and company popularity (POPULARITY).

Each of the four constructs is associated with a set of measurable variables (i.e., "indicator" variables, x). The relation assumed between an indicator and its latent variable takes the following form (i.e., the measurement equation):

$$x = \lambda\xi + \delta,$$

where x is the indicator, ξ is the latent variable (QUANTITY, FINANCIAL, EQ, or POPULARITY), λ is the loading that shows the degree of associations, and δ is an error term assumed to be uncorrelated with ξ.[52] Specifically, the indicators for QUANTITY include all the aforementioned quantitative disclosure measures for annual reports. The indicators for FINANCIAL include lnTA, ROA, and RET. The

[52] For example, $ARBUSINESS = \lambda QUANTITY + \delta, ARMD\ \&\ A = \lambda QUANTITY + \delta$, etc.

indicators for EQ are earnings attributes.[53] The indicators for POPULARITY include REC, S&P, MEETFREQ, PROFIT, and EINCR.

The left column of Table 4.6 reports the coefficient estimates for the measurement equations ($x = \lambda\xi + \delta$). For the QUANTITY construct, most indicators show positive and significant loadings, with the exception of ARDAYS. For the POPULARITY construct, all the measures have positive loadings. For the EQ construct, earnings predictability, smoothness, and value relevance have larger loadings in measuring the earnings attribute construct.

Based on the relations between the indicators and the constructs, the structural equation is expressed as:

$$ANLSCR = \gamma_1 QUANTITY + \gamma_2 FINANCIAL + \gamma_3 EQ + \gamma_4 POPULARITY + \zeta .$$

The parameter estimates for the structural equation are reported in the right column of Table 4.6. The estimates indicate that the annual scores have a strong association with the constructs of QUANTITY and POPULARITY. Again, this is generally consistent with the results from OLS regressions. There is not much picked up by the model regarding FINANCIAL and EQ. The weak associations for these two constructs suggest that financial characteristics and earnings attributes are less likely to be the major factors contributing to the disclosure quality ratings. Indeed, this reflects a low goodness of fit for the model. I therefore modify the structural model to include only the QUANTITY and POPULARITY constructs. I further drop timeliness

[53] Earnings timeliness is excluded from this analysis. Again, including this variable does not affect the results from the structural models.

(ARDAYS) and S&P ratings from the measurement equations. This attempt largely improves the model's Goodness of Fit Index (GFI) from 0.84 to 0.97.[54]

4.6 THE APPLICABILITY OF USING QUANTITATIVE DISCLOSURE MEASURES AS AN INDICATOR OF DISCLOSURE QUALITY: A HOLDOUT SAMPLE APPROACH

The previous section shows that, after controlling for firm characteristics, earnings attributes, and indicators of company popularity, the AIMR disclosure ratings are significantly associated with quantitative disclosure characteristics. In this section, I further discuss the extent to which quantitative disclosure measures can be used in approximating a firm's disclosure quality. The question of interest is whether, by using the empirical model developed in the previous sections, one can obtain conclusions consistent with those drawn from the AIMR ratings.

I use a holdout sample approach to estimate disclosure scores and examine estimation errors. Specifically, I divide the four-year sample period in two. The earlier period is used for parameter estimation and the latter is used as a holdout sample. Annual, quarterly, and total scores are examined using equations (4.1), (4.2), and (4.3).

Table 4.7 reports the distributions of the actual scores, estimated scores, and estimation errors for the holdout sample. Among the four categories of scores, the regression models used on the test sample have the highest adjusted R-squared for the annual report scores (20.16%). In general, the standard deviations for the estimated scores are smaller than the true scores. When we compare the upper and lower quartiles

[54] Another index for model fit, the Comparative Fit Index, improves from 0.40 to 0.91.

of the two sets of distributions, it shows that, for the upper quartiles, the estimated scores are smaller than the actual scores. Regarding the lower quartiles, however, the estimated and actual scores are closer to each other. In addition, the estimation errors for total scores (TOT) and quarterly report scores (OPB) show that the estimation models underestimate by a small margin (up to five points). These results imply that the models produce conservative predictions. The models are helpful in the sense that the possibility of a type II error is lower, since they are less likely to recognize a firm as having high disclosure quality when the actual score is low. The mean and median errors for annual report scores (ANL) are insignificantly different from zero, suggesting that, on average, the estimation for annual report scores is unbiased.

Estimating relative disclosure quality

I further examine to what extent the above model for annual report correctly predict the relative disclosure performance between two firms. First, I compare a firm's actual and estimated annual report scores with the actual median of the holdout sample, which is 75.93. The estimation is considered to be correct if both the actual and estimated scores are consistently higher or lower than 75.93. Alternatively, I also compare the annual report scores between any two firms selected from the same industry and year. If both the real scores and the estimated scores indicate that firm one is better than firm two, the estimation is viewed as correct. There are 179 original observations in 14 industry-years. Each observation (i.e., firm one) is matched with another observation in the same industry and year (i.e., firm two). This procedure produces 810 non-repetitive combinations of company pairs.

Table 4.8 reports the results. Panel A reports the frequencies of correct and incorrect predictions when I compare the actual and estimated scores relative to the sample median. The panel shows that the percentage of correct predictions is 68.71%. Since a naïve predictor would accurately classify the relation half of the time (50%) by chance alone, the improvement of prediction accuracy by using the estimation model is 37.42%. For the comparison between the rankings of any two firms, the percentage of correct prediction is 59.38% (Panel B), implying an improvement of 18.76%. In the cases of incorrect predictions, qualitative aspects not captured in the models but valued by the analysts or omitted quantitative factors are outweighing the quantitative variables included in the model.

The results in Table 4.8 show that, about two-thirds of the time, conclusions drawn using the estimation models approximate the conclusions drawn from the AIMR ratings. This indicates that the AIMR scores are strongly associated with quantitative disclosure measures. More importantly, the quantitative scores can be used as an indicator to proxy for disclosure quality when other disclosure ratings are not available. This approach could provide an efficient approximation of disclosure quality for recent years when the AIMR scores are not available, especially when the number of firms of interest is large.

4.7 CONCLUSION

This chapter documents significant associations between the AIMR disclosure scores and specific quantitative disclosure characteristics. One characteristic is the length of

disclosures in annual and quarterly filings. While prior literature suggests that longer and more complicated disclosures could reduce readability, I find that analysts appear to appreciate longer discussions in the Business and MD&A sections in financial reports. I also find that firms that file their annual reports in a more timely manner receive higher annual report scores. These findings suggest that the AIMR ratings, widely used in the prior literature on disclosure quality, are associated with quantitative disclosure characteristics. Although these quantitative characteristics are only one aspect of disclosure quality, the findings build a link between disclosure quantity and quality and allow a better understanding of the AIMR ratings.

The results show that indicators of firm popularity are positively associated with the disclosure scores. Specifically, I find that the scores are sensitive to analysts' recommendations, a dichotomous variable indicating whether a firm is profitable, and a dichotomous variable indicating whether a firm's earnings are higher than in the previous year. It is possible that firms with good earnings performance also provide good disclosures, leading to high disclosure scores. Alternatively, it is also possible that the analysts award high disclosure scores to firms simply because they are profitable. Nevertheless, as discussed in the previous sections, these variables serve as control variables for factors that are not picked up by the quantitative disclosure measures. Therefore, it is not the purpose of this study to identify the degree to which each scenario holds true.

Another purpose of this chapter is to examine the plausibility of using publicly accessible disclosure data as an efficient indicator of disclosure quality. At a reasonable accuracy rate, the quantitative disclosure measures allow us to obtain conclusions

consistent with the AIMR scores. This again highlights the importance of quantitative disclosure characteristics in measuring disclosure quality.

The evidence in this chapter indicates that, for analysts who evaluate a firm's disclosure practice, disclosure quantity captures an important part of disclosure quality. That said, however, the evidence also suggests that there are other factors associated with the disclosure ratings. Future research on other potential factors will contribute further to our understanding of disclosure quality from the perspective of financial analysts.

Table 4.1 Variable Description

Disclosure ratings (Y)	
ANL_t	Original disclosure scores on annual reports.
OPB_t	Original disclosure scores on quarterly reports and other publications.
REL_t	Original disclosure scores on investor relation, including conference call, access to management, etc.
TOT_t	Original total disclosure scores.
Disclosure quantity (X')	
$ARDays_t$	Number of days between the fiscal year end and the 10-K filing date.
$QRDays_t$	Number of days between the fiscal quarter end and the 10-Q filing date.
$ARBusiness_t$	The natural log of the number of words in the Business section in a10-K filing.
$ARHighlight_t$	The natural log of the number of words in the Financial Highlight section in a 10-K filing.
$ARMD\&A_t$	The natural log of the number of words in the Management Discussion and Analysis section in a 10-K filing.
$ARNotes_t$	The natural log of the number of words in the Notes to Financial Statement section in a 10-K filing.
$QRMD\&A_t$	The natural log of the average number of words in the Management Discussion and Analysis section in 10-Q filings, Q1-Q3.
$QRNotes_t$	The natural log of the average number of words in the Notes to Financial Statement section in 10-Q filings, Q1-Q3.
$PRESS_t$	Number of press releases by corporate management (i.e., CEO, chairman, spokesman, or president) appeared in business news in LexisNexis.
Analysts' perception (Z)	
Size and performance	
$lnTA_t$	The natural log of total assets.
ROA_t	Income before extraordinary items scaled by total assets.
RET_t	Twelve-month stork returns at the fiscal year end.
Earnings attributes **(See Francis et al. 2004 for detailed descriptions)**	
$PREDICT_t$	Earnings predictability, measured as $-\sqrt{\sigma^2(\hat{\upsilon}_{j,t})}$, where $\hat{\upsilon}_j$ is the error term from the earnings persistence regression.
$PERSIST_t$	Earnings persistence, measured as $\phi_{1,j}$, is obtained from a ten-year firm-specific AR1 regression: $E_{j,t} = \phi_{0,j} + \phi_{1,j} E_{j,t-1} + \upsilon_{j,t}$, where $E_{j,t}$ = firm j's income before extraordinary items in year t, scaled by the weighted average number of shares outstanding in year t.
$ACCRL_t$	Accrual quality, measured as the negative of the standard deviation of the residuals ($-\sigma(\hat{\nu}_{j,t})$) from the following year- and firm-specific regressions using rolling ten-year windows: $\frac{TCA_{j,t}}{Assets_{j,t}} = \varphi_{0,j} + \varphi_{1,j}\frac{CFO_{j,t-1}}{Assets_{j,t}} + \varphi_{2,j}\frac{CFO_{j,t}}{Assets_{j,t}} + \varphi_{3,j}\frac{CFO_{j,t+1}}{Assets_{j,t}} + \nu_{j,t}$,

Table 4.1 (Continued)

	where $TCA_{j,t}$ = total current accruals for firm j in year t = change in current assets – change in current liabilities – change in cash + change in debt in current liabilities; all changes are measured as between year t-1 and year t. $CFO_{j,t}$ = cash flow from operations for firm j in year t = Compustat data item #110 $_{j,t}$ – $TCA_{j,t}$ (See Appendix A)
$SMTH_t$	Earnings smoothness, measured as $(-1)*\sigma(NIBE_{j,t})/\sigma(CFO_{j,t})$, where $NIBE_{j,t}$ = income before extraordinary items for firm j in year t, divided by beginning total assets. $CFO_{j,t}$ = cash flow from operations for firm j in year t. σ = standard deviation measured over rolling ten-year windows.
$RELEVANCE_t$	The adjusted R-squared from the following equation estimated over rolling ten-year windows: $RET_{j,t} = \delta_{0,j} + \delta_{1,j} EARN_{j,t} + \delta_{2,j} \Delta EARN_{j,t} + \zeta_{j,t}$, where $RET_{j,t}$ = firm j's 15-month return ending three months after the end of fiscal year t. $EARN_{j,t}$ = firm j's income before extraordinary items scaled by market value of equity in year t-1. $\Delta EARN_{j,t}$ = change in firm j's income before extraordinary items in year t, scaled by market value of equity in year t-1.
$TIMELINESS_t$	The adjusted R-squared from the following equation estimated over rolling ten-year windows: $EARN_{j,t} = \alpha_{0,j} + \alpha_{1,j} NEG_{j,t} + \beta_{1,j} RET_{j,t} + \beta_{2j,t} NEG_{j,t} \cdot RET_{j,t} + \varsigma_{j,t}$, where $NEG_{j,t}$ = 1 if $RET_{j,t} < 0$; zero otherwise.
$CONSERVE_t$	Conservatism, measured as $(\beta_{1,j} + \beta_{2,j})/\beta_{1,j}$ from the above regression.
Company popularity	
REC_t	Mean analysts' recommendation (1 = strong buy, 5 = sell) at the end of year t, multiplied by -1.
$S\&P_t$	The average of S&P long-term and short-term issuer credit ratings and S&P stock rankings in year t, multiplied by -1. The credit ratings and stock rankings are obtained from Compustat data #280, data #282, data #283, and data #320. Due to the differences in scales, missing values are assigned a value of 999, and then each variable is standardized with mean zero and standard deviation one.
$MEETFREQ_t$	$1/3\sum_{t-1}^{t-3} FE_{\tau}$, where FE is a dichotomous variable that equals one if the actual earnings is higher than analysts' forecasted earnings.
$PROFIT_t$	A dichotomous variable that equals one if the income before extraordinary items in year t >= 0, zero otherwise.
$EINCR_t$	A dichotomous variable that equals one if the income before extraordinary items in year t is higher than the amount in year t-1, zero otherwise.

Table 4.2 Sample Distribution

Data from AIMR Report

Number of firms with available ratings for annual report, quarterly report/other publication, and investor relations from the AIMR Reports during 1993-1996	396	
Number of firm-years	1,044	

Data from SEC filings

Number of firm-years with available 10-K filings	803	
Number of firm-years with available 10-Q filings [a]	585	(1,715 filings)

Industry Composition

	10-K		10-Q	
Industry	Frequency	Percent	Frequency	Percent
Airline	25	3.1	20	3.4
Apparel	15	1.9	10	1.7
Automotive	14	1.7	14	2.4
Chemical	18	2.2	9	1.5
Construction	26	3.2	12	2.1
Container & Packaging	7	0.9	0	0.0
Diversified Companies	7	0.9	1	0.2
Domestic-Petroleum	30	3.7	23	3.9
Refining & Marketing	14	1.7	12	2.1
Electrical Equipment	33	4.1	24	4.1
Financial Service	15	1.9	7	1.2
Food, Beverage & Tobacco	94	11.7	75	12.8
Health Care	59	7.4	44	7.5
International-Petroleum	19	2.4	14	2.4
International Pharmaceuticals	2	0.3	1	0.2
Machinery	44	5.5	33	5.6
National Gas	36	4.5	30	5.1
Pipelines	34	4.2	20	3.4
Paper & Forest Products	72	9.0	58	9.9
Precious Metals Mining	28	3.5	21	3.6
Media	59	7.4	50	8.6
Railroad	29	3.6	24	4.1
Retail	85	10.6	64	10.9
Savings Institution	3	0.4	0	0.0
Specialty Chemicals	23	2.9	10	1.7
Telecommunications Service	3	0.4	3	0.5
Textile	9	1.1	6	1.0
Total	803	100.0	585	100.0

[a] 10-Q filings include 559 1st quarter, 580 2nd quarter, and 576 3rd quarter filings.

Table 4.3 Descriptive Statistics of Disclosure Scores, Relative Industry Rankings, Quantitative Disclosure Characteristics, and Firm Characteristics

	N	Mean	1st quartile	Median	3rd quartile	Std.
Disclosure scores						
Total	1,044	73.84	65.55	75.40	83.45	13.16
Annual report	884	72.16	62.86	73.68	83.00	13.32
Quarterly and other publications	884	72.36	63.19	74.07	83.33	16.65
Investor relations	884	72.06	62.38	74.17	84.29	16.17
Relative industry rankings (%) [a]						
Total	1,044	50.04	23.27	50.00	76.92	31.08
Annual report	884	50.01	23.68	50.00	76.92	31.15
Quarterly and other publications	884	50.04	23.30	50.00	76.92	31.11
Investor relations	884	50.10	23.08	50.00	77.10	31.15
Quantitative disclosure characteristics						
Word counts:						
Annual report						
Business section	792	4,664.22	1,953.50	3,407.00	6,372.00	3,980.41
Financial highlight	783	767.29	319.00	553.00	906.00	901.43
MD&A	791	4,295.52	2,310.00	3,626.00	5,433.00	3,204.20
Notes to F/S	789	7,124.85	4,590.00	6,452.00	8,710.00	4,440.06
Quarterly report						
MD&A	585	2,318.08	1,247.67	1,867.67	2,807.67	1,722.10
Notes to F/S	577	1,285.67	421.67	816.00	1,547.33	1,858.61
Filing date – fiscal year (quarter) end						
Annual report	803	83.25	75.00	85.00	89.00	30.34
Quarterly report	585	42.00	40.33	42.67	44.00	8.14
Number of press releases	1,044	2.38	0.00	1.00	3.00	4.18
Firm characteristics [b]						
Total assets	650	9,866.51	1,622.50	3,367.47	9,819.99	25,159.66
Market value of equity	650	8,364.05	1,329.89	3,165.23	8,567.58	15,420.98
Return on assets	649	0.06	0.03	0.05	0.08	0.07
Number of analyst following	584	19.30	13.00	18.00	25.00	9.05

[a] Relative industry rankings (RIR) are calculated as $((N-R)/(N-1))*100\%$, where N is the number of firms evaluated in the same AIMR industry and year, and R is a firm's disclosure ranking based on the original scores.

[b] Total assets and market value of equity are measured in millions. Market value of equity is stock price at year-end times common shares outstanding. Number of analyst following is the number of analysts providing estimation in the month of fiscal year end. See Table 4.1 for the definition of other variables.

Table 4.4 Variable Correlations

Panel A Pearson correlations among disclosure scores and quantitative disclosure characteristics [a]

	ANL	OPB	REL	TOT	ARBusiness	ARHighlight	ARMD&A	ARNOTES	ARDays	QRMD&A	QRNotes	QRDays	PRESS
OPB	**0.61**												
REL	**0.55**	**0.57**											
TOT	**0.88**	**0.81**	**0.79**										
ARBusiness	0.04	**0.10**	**0.15**	0.01									
ARHighlight	-0.03	**-0.08**	0.04	0.00	-0.01								
ARMD&A	**0.20**	**0.22**	0.06	**0.10**	**0.34**	0.00							
ARNOTES	**0.10**	**0.15**	**0.09**	0.03	**0.38**	0.04	**0.53**						
ARDays	**-0.14**	**-0.07**	-0.02	0.00	-0.01	-0.03	-0.03	-0.05					
QRMD&A	**0.09**	**0.15**	**0.08**	0.03	**0.49**	0.06	**0.55**	**0.59**	-0.04				
QRNotes	-0.05	0.03	-0.03	**-0.07**	**0.36**	0.00	**0.35**	**0.46**	-0.04	**0.70**			
QRDays	-0.04	-0.02	-0.02	-0.01	0.05	0.01	-0.01	0.02	**0.09**	0.03	0.02		
PRESS	0.05	0.03	**0.06**	**0.07**	0.05	0.03	**0.08**	**0.08**	0.01	**0.14**	0.05	0.00	

Table 4.4 (Continued)

Panel B Pearson correlations between disclosure scores, earnings attributes, and company popularity [a]

	lnTA	ROA	RET	Predict	Persist	Accrl	Smth	Relevance	Timeliness	Conserve	REC	S&P	MeetFreq	Profit	EINCR
ANL	**0.17**	**0.13**	0.06	0.01	-0.02	**0.07**	**0.08**	**0.08**	0.00	-0.05	**0.2**	**0.10**	**0.08**	**0.21**	**0.12**
OPB	**0.22**	0.04	**0.08**	0.03	-0.05	**0.11**	0.04	0.00	-0.04	-0.05	**0.15**	**0.10**	**0.10**	**0.14**	0.05
REL	**0.13**	0.06	**0.07**	0.02	-0.06	-0.02	-0.06	-0.01	-0.03	0.02	**0.17**	**0.08**	0.05	0.06	**0.08**
TOT	**0.20**	**0.11**	0.05	0.02	-0.04	0.04	**0.08**	**0.08**	0.01	-0.03	**0.22**	**0.09**	**0.08**	**0.18**	**0.08**

Table 4.4 (Continued)

Panel C Pearson correlations among earnings attributes and company popularity [a]

	Predict	Persist	Accrl	Smth	Relevance	Timeliness	Conserve	REC	S&P	MeetFreq	Profit
Persist	0.02										
Accrl	-0.02	**0.08**									
Smth	0.04	**0.20**	**0.07**								
Relevance	**0.15**	0.01	0.03	**0.25**							
Timeliness	**0.11**	**-0.08**	0.01	**0.12**	**0.66**						
Conserve	0.00	0.00	-0.01	-0.02	-0.03	-0.01					
REC	0.00	**-0.17**	0.01	0.02	**0.08**	0.06	-0.03				
S&P	0.01	0.04	**0.17**	-0.03	-0.05	0.01	0.03	**-0.07**			
MeetFreq	-0.03	0.01	**0.10**	**0.11**	-0.03	-0.03	-0.03	0.05	0.02		
Profit	-0.02	**-0.07**	**0.13**	**0.10**	0.03	0.01	0.02	**0.13**	**0.13**	**0.19**	
EINCR	0.02	0.00	0.02	-0.05	**-0.06**	-0.04	0.04	**0.16**	0.01	-0.01	**0.25**

[a] See Table 4.1 for variable definitions. Correlations significant at a minimum of 10% level are marked in bold.

Table 4.5 OLS Regressions of Quantitative Disclosure Measures on Disclosure Scores/ Rankings

$$TOT_t = \delta_0 + \delta_1 ARBUSINESS_t + \delta_2 ARHIGHLIGHT_t + \delta_3 ARMD\&A_t + \delta_4 ARNOTES_t + \delta_5 ARDAYS_t + \delta_6 QRMD\&A_t + \delta_7 QRNOTES_t + \delta_8 QRDAYS_t + \delta_9 PRESS_t + \delta_{10} \ln TA_t + \delta_{11} ROA_t + \delta_{12} RET_t + \sum_{i=1}^{6} \theta_{13i} EQ_{i,t} + \delta_{14} S\&P_t + \delta_{15} REC_t + \delta_{16} MEETFREQ_t + \delta_{17} PROFIT_t + \delta_{18} EINCR_t \quad (4.1)$$

$$ANL_t = \alpha_0 + \alpha_1 ARBUSINESS_t + \alpha_2 ARHIGHLIGHT_t + \alpha_3 ARMD\&A_t + \alpha_4 ARNOTES_t + \alpha_5 ARDAYS_t + \alpha_6 \ln TA_t + \alpha_7 ROA_t + \alpha_8 RET_t + \sum_{i=1}^{6} \theta_{9i} EQ_{i,t} + \alpha_{10} S\&P_t + \alpha_{11} REC_t + \alpha_{12} MEETFREQ_t + \alpha_{13} PROFIT_t + \alpha_{14} EINCR_t \quad (4.2)$$

$$OPB_t = \beta_0 + \beta_1 QRMD\&A_t + \beta_2 QRNOTES_t + \beta_3 QRDAYS_t + \beta_4 PRESS_t + \beta_5 \ln TA_t + \beta_6 ROA_t + \beta_7 RET_t + \sum_{i=1}^{6} \theta_{8i} EQ_{i,t} + \beta_9 S\&P_t + \beta_{10} REC_t + \beta_{11} MEETFREQ_t + \beta_{12} PROFIT_t + \beta_{13} EINCR_t \quad (4.3)$$

$$REL_t = \gamma_0 + \gamma_1 PRESS_t + \gamma_2 \ln TA_t + \gamma_3 ROA_t + \gamma_4 RET_t + \sum_{i=1}^{6} \theta_{5i} EQ_{i,t} + \gamma_6 S\&P_t + \gamma_7 REC_t + \gamma_8 MEETFREQ_t + \gamma_9 PROFIT_t + \gamma_{10} EINCR_t \quad (4.4)$$

Panel A Regressions on disclosure scores [ab]

	TOT		ANL		OPB		REL	
	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p
Intercept	**37.12**	(0.02)	**44.17**	(0.00)	20.99	(0.21)	**53.25**	(<.0001)
ARBusiness	0.53	(0.59)	**2.16**	(0.01)				
ARHighlight	0.25	(0.77)	-0.85	(0.20)				
ARMD&A	0.77	(0.41)	**2.63**	(0.00)				
ARNotes	-1.78	(0.31)	-0.88	(0.47)				
ARDays	0.01	(0.70)	**-0.13**	(0.00)				
QRMD&A	**3.65**	(0.02)			**6.28**	(0.00)		
QRNotes	0.48	(0.64)			0.62	(0.60)		
QRDays	-0.02	(0.82)			-0.05	(0.60)		
PRESS	-0.07	(0.79)					0.18	(0.37)
lnTA	**2.23**	(0.03)	**1.83**	(0.01)	**2.11**	(0.04)	**1.69**	(0.04)
ROA	-11.47	(0.34)	-7.09	(0.46)	-4.76	(0.73)	-9.60	(0.43)
RET	-0.15	(0.95)	-1.86	(0.38)	-1.99	(0.52)	-1.45	(0.57)
PREDICT	0.29	(0.47)	-0.27	(0.42)	0.16	(0.73)	-0.57	(0.18)
PERSIST	**-5.68**	(0.01)	**-8.81**	(<.0001)	**-7.08**	(0.01)	**-6.10**	(0.01)
ACCRL	-23.11	(0.73)	-20.63	(0.72)	**187.18**	(0.05)	**-160.55**	(0.02)
SMTH	1.10	(0.56)	-0.17	(0.91)	2.69	(0.22)	-2.65	(0.17)
RELEVANCE	**5.67**	(0.02)	**4.10**	(0.05)	-1.01	(0.73)	-1.14	(0.66)
CONSERVE	0.00	(0.83)	0.00	(0.18)	0.01	(0.67)	0.00	(0.83)
S&P	-2.74	(0.11)	1.20	(0.40)	-1.72	(0.42)	1.63	(0.30)
REC	**6.40**	(0.00)	**4.63**	(0.00)	**7.27**	(0.00)	**3.14**	(0.09)
MEETFREQ	1.25	(0.62)	2.22	(0.27)	-1.59	(0.59)	2.08	(0.40)
PROFIT	**7.06**	(0.03)	**7.41**	(0.00)	**9.55**	(0.02)	4.31	(0.16)
EINCR	**4.07**	(0.02)	**3.21**	(0.02)	2.97	(0.14)	**4.50**	(0.01)
N	336		401		291		446	
Adj. R^2	14.96%		21.99%		17.65%		7.81%	

Table 4.5 (Continued)

Panel B Regressions on relative industry rankings [ab]

	TOT		ANL		OPB		REL	
	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p
Intercept	-54.92	(0.12)	-32.33	(0.25)	-24.70	(0.48)	**37.50**	(0.03)
ARBusiness	**6.56**	(0.00)	**7.70**	(<.0001)				
ARHighlight	**3.63**	(0.05)	**2.68**	(0.09)				
ARMD&A	1.96	(0.35)	**5.83**	(0.00)				
ARNotes	-6.43	(0.10)	-4.00	(0.16)				
ARDays	-0.04	(0.50)	-0.14	(0.15)				
QRMD&A	**8.54**	(0.02)			**11.58**	(0.00)		
QRNotes	-2.08	(0.37)			-1.87	(0.45)		
QRDays	-0.05	(0.80)			0.17	(0.37)		
PRESS	-0.36	(0.54)					0.35	(0.37)
lnTA	**4.75**	(0.03)	2.38	(0.13)	**3.99**	(0.07)	2.35	(0.14)
ROA	-21.76	(0.42)	-21.46	(0.34)	11.45	(0.69)	-36.45	(0.13)
RET	-2.08	(0.71)	-7.37	(0.13)	-7.16	(0.26)	-6.94	(0.17)
PREDICT	1.03	(0.24)	1.14	(0.15)	1.20	(0.21)	-1.12	(0.19)
PERSIST	-6.06	(0.21)	0.90	(0.84)	-3.31	(0.58)	-5.37	(0.24)
ACCRL	78.78	(0.60)	101.98	(0.45)	-21.46	(0.91)	-145.61	(0.29)
SMTH	**-7.34**	(0.08)	**-8.91**	(0.01)	-1.99	(0.66)	-1.53	(0.68)
RELEVANCE	5.48	(0.30)	3.91	(0.42)	-0.06	(0.99)	2.37	(0.63)
CONSERVE	0.02	(0.49)	0.00	(0.79)	0.02	(0.54)	0.01	(0.25)
S&P	4.74	(0.22)	3.53	(0.29)	-1.81	(0.68)	**5.27**	(0.09)
REC	**15.21**	(0.00)	**16.97**	(<.0001)	**16.16**	(0.00)	**11.86**	(0.00)
MEETFREQ	2.97	(0.60)	**8.55**	(0.07)	-4.48	(0.47)	**8.43**	(0.08)
PROFIT	**17.07**	(0.02)	**16.91**	(0.00)	4.49	(0.59)	8.27	(0.17)
EINCR	5.33	(0.17)	**5.78**	(0.07)	0.03	(0.99)	**7.07**	(0.03)
N	336		401		291		446	
Adj. R^2	18.27%		18.18%		6.98%		7.14%	

[a] See Table 4.1 for variable definitions. TOT, ANL, OPB, REL in Panel A represent raw disclosure scores for total disclosure quality, annual report, quarterly and other publications, and investor relations, respectively. TOT, ANL, OPB, REL in Panel B represent industry standardized scores (i.e., relative industry rankings, RIR) for total disclosure quality, annual report, quarterly and other publications, and investor relations, respectively. RIRs are calculated as $((N-R)/(N-1))*100\%$, where N is the number of firms evaluated in the same AIMR industry and year, and R is a firm's disclosure ranking based on the original scores.

[b] * :significant at 10% level. ** :significant at 5% level. *** :significant at 1% level.

Table 4.6 Latent Variable Regression

Structural equation:

$$ANLSCR = \gamma_1 QUANTITY + \gamma_2 FINANCIAL + \gamma_3 EQ + \gamma_4 POPULARITY + \zeta$$

Measurement equations that relates indicators (x) to latent variables (ξ) :

$$x = \lambda\xi + \delta \quad (\xi = \text{QUANTITY, EQ, FINANCIAL, or POPULARITY})$$

Loading of indicator on latent variables [ab]			Structural Models [a]		
	Coeff.	t Value		Coeff.	t Value
QUANTITY					
ARBusiness	0.54	9.39	*QUANTITY*	**0.15**	2.52
ARHighlight	0.59	10.25	*FINANCIAL*	-0.03	-0.24
ARMD&A	0.62	10.92	*EQ*	0.06	0.66
ARNotes	1.04	18.81	*POPULARITY*	**0.62**	7.31
ARDays	0.01	0.18	R-squared		28.58%
			N		401
FINANCIAL			Goodness of Fit Index		0.84
lnTA	0.13	0.59			
ROA	0.41	0.68			
RET	0.17	0.60			
EQ					
PREDICT	-0.52	-4.69			
PERSIST	-0.09	-0.91			
ACCRL	-0.16	-1.60			
SMTH	-0.82	-6.33			
RELEVANCE	-0.55	-4.82			
CONSERVE	0.05	0.55			
POPULARITY					
S&P	0.27	3.37			
REC	0.41	5.12			
MEETFREQ	0.31	3.89			
PROFIT	0.66	7.73			
EINCR	0.25	3.06			

[a] The reported numbers are the maximum likelihood estimates for the parameters in the measurement and structural equations (i.e., λ and γ). ζ and δ are measurement error terms.

[b] Refer to Table 4.1 for the definition of the indicator variables.

Table 4.7 Estimation Errors: Holdout Sample [a]

$$TOT_t = \delta_0 + \delta_1 ARBUSINESS_t + \delta_2 ARHIGHLIGH T_t + \delta_3 ARMD\&A_t + \delta_4 ARNOTES_t + \delta_5 ARDAYS_t + \delta_6 QRMD\&A_t + \delta_7 QRNOTES_t + \delta_8 QRDAYS_t + \delta_9 PRESS_t + \delta_{10} \ln TA_t + \delta_{11} ROA_t + \delta_{12} RET_t + \sum_{i=1}^{6} \theta_{13i} EQ_{i,t} + \delta_{14} S\&P_t + \delta_{15} REC_t + \delta_{16} MEETFREQ_t + \delta_{17} PROFIT_t + \delta_{18} EINCR_t \quad (4.1)$$

$$ANL_t = \alpha_0 + \alpha_1 ARBUSINESS_t + \alpha_2 ARHIGHLIGHT_t + \alpha_3 ARMD\&A_t + \alpha_4 ARNOTES_t + \alpha_5 ARDAYS_t + \alpha_6 \ln TA_t + \alpha_7 ROA_t + \alpha_8 RET_t + \sum_{i=1}^{6} \theta_{9i} EQ_{i,t} + \alpha_{10} S\&P_t + \alpha_{11} REC_t + \alpha_{12} MEETFREQ_t + \alpha_{13} PROFIT_t + \alpha_{14} EINCR_t \quad (4.2)$$

$$OPB_t = \beta_0 + \beta_1 QRMD\&A_t + \beta_2 QRNOTES_t + \beta_3 QRDAYS_t + \beta_4 PRESS_t + \beta_5 \ln TA_t + \beta_6 ROA_t + \beta_7 RET_t + \sum_{i=1}^{6} \theta_{8i} EQ_{i,t} + \beta_9 S\&P_t + \beta_{10} REC_t + \beta_{11} MEETFREQ_t + \beta_{12} PROFIT_t + \beta_{13} EINCR_t \quad (4.3)$$

	Mean	1st quartile	Median	3rd quartile	Std.
Total (TOT)					
Test sample adj. R^2: 9.76%					
Holdout sample distributions (N = 216):					
Actual	75.16	66.25	77.00	84.95	13.04
Estimated	70.10	65.58	70.73	76.20	9.56
Est. errors	-5.06	-14.66	-5.10	2.67	13.24
Annual report (ANL)					
Test sample adj. R^2: 20.16%					
Holdout sample distributions (N = 179):					
Actual	74.03	64.40	75.93	84.21	12.79
Estimated	74.94	70.46	75.34	79.19	6.48
Est. errors	0.92	-8.05	0.08	8.84	11.53
Quarterly and other publications (OPB)					
Test sample adj. R^2: 14.09%					
Holdout sample distributions (N = 176):					
Actual	72.31	64.35	73.27	85.19	15.09
Estimated	69.75	62.91	70.14	75.89	9.71
Est. errors	-2.56	-14.11	-3.85	7.00	14.49

[a] The estimation errors are calculated as the difference between the estimated scores and the actual ones. Estimations are based on a test sample that includes observations in the first half of the sample period. The parameters are then applied to a holdout sample with observations in the latter half of the sample period.

Table 4.8 Predicting Comparative Disclosure Quality [a]

Panel A Scores compared to sample median (75.93) [b]

		Prediction		
	Frequency (Percent)	SCR_{firm1} ≥ 75.93	SCR_{firm1} < 75.93	Total
A	SCR_{firm1} ≥ 75.93	57 (31.84%)	32 (17.88%)	89
M	SCR_{firm1} < 75.93	24 (13.41%)	66 (36.87%)	90
	Total	81	98	179

Chi-square = 25.2356 ($p < .0001$)

Correctly estimated: 68.71%

Panel B Scores relative to any other firms [c]

		Prediction		
	Frequency (Percent)	SCR_{firm1} ≥ SCR_{firm2}	SCR_{firm1} < SCR_{firm2}	Total
A	SCR_{firm1} ≥ SCR_{firm2}	254 (31.36%)	174 (21.48%)	428
M	SCR_{firm1} < SCR_{firm2}	155 (19.14%)	227 (28.02%)	382
	Total	409	401	810

Chi-square = 28.4477 ($p < .0001$)

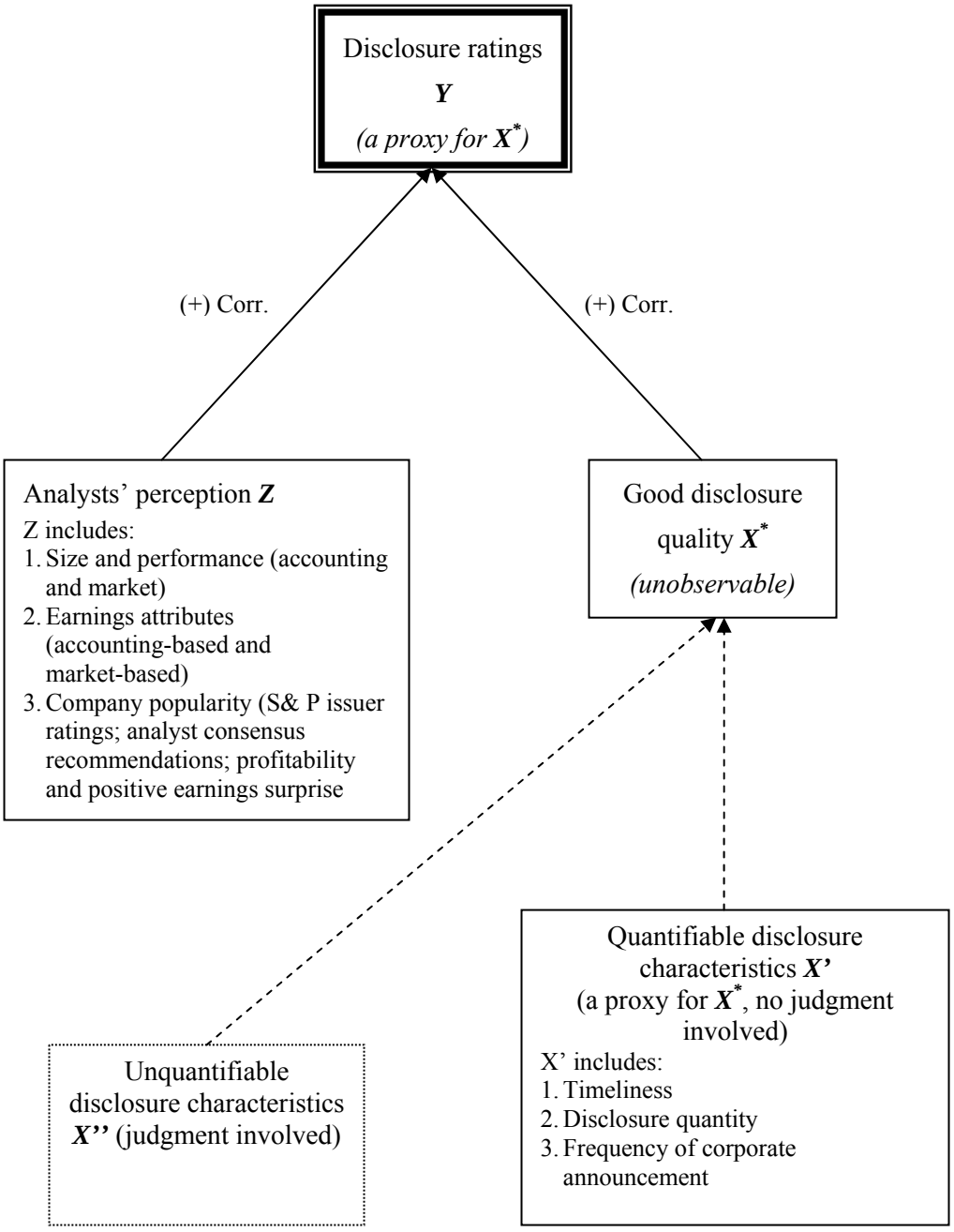
Correctly estimated: 59.38%

[a] Estimations are based on a holdout sample approach (see Table 4.7). Estimation model used is Equation (4.2).

[b] 75.93 is the median value of AIMR annual report scores for the holdout sample.

[c] There are 179 observations in 14 industry-years with available AIMR annual scores and estimated scores. Each observation (e.g., firm 1) is matched with another observation in the same industry and year (e.g., firm 2). This produces 810 combinations of company pairs.

Figure 4.1 Relationship between Disclosure Ratings and Disclosure Characteristics



CHAPTER 5

CONCLUDING REMARKS

This thesis presents a comprehensive examination of analysts' evaluations of disclosure quality. Understanding how analysts evaluate disclosure quality, in this case reflected in the AIMR ratings, helps regulators and researchers understand what attributes of disclosure quality are regarded as important for financial statement users. In Chapter 2, I document the experiences of firms in capital markets during a period in which their disclosure quality is viewed as inferior. In Chapter 3, I study the causes of the declines in the disclosure quality ratings. I explore factors that drive firms to reduce their disclosure. I also identify explanations outside of theoretical models that contribute to such declines, highlighting the fact that disclosure has its limitations. Chapter 4 scrutinizes the association between the AIMR ratings and certain quantifiable disclosure characteristics, exploring the factors reflected in analysts' ratings and developing estimation models.

This thesis shows that firms with deteriorated disclosure quality are not a mirror image of firms that improve their disclosure quality. The disclosure-decreasing firms did experience negative consequences, but the extent was not as striking as one would expect when compared to the benefits of disclosure improvement. Although these firms

experience increases in measures of information asymmetry, they are able to bypass the public equity market and meet their demand for capital from private, and even public, debt markets. That said, however, firms may not simply decrease their disclosure when they do not need capital or when they have poor earnings performance. Rather, there is evidence to suggest that firms with low disclosure quality live in an environment of heightened uncertainty. It is plausible that this increases the demand for disclosure at a time when providing such disclosure is difficult.

Certain quantifiable disclosure characteristics, such as number of words or the timeliness with which a firm releases its financial reports, are significantly associated with the AIMR ratings. How much a firm provides to users in the Business and MD&A sections of annual reports is reflected in analyst disclosure ratings. The ratings are also associated with measures of company popularity. For example, firms with positive earnings, positive earnings changes, or high stock recommendations also have higher disclosure ratings. The quantitative disclosure characteristics and company popularity measures, together with other firm fundamentals and earnings attributes, explain about 20% of the variation of the disclosure scores on annual reports. Using these factors to estimate disclosure scores generates unbiased results.

These findings are documented for a period before the regulations in recent years such as the Regulation FD and the Sarbanes-Oxley Act. The major impacts of these recent regulations are that firms are more constrained in their disclosure practices, particularly in terms of investor relations, and that analysts have much less access to private information. In the cases of public disclosures such as annual and quarterly reports, there is no reason to believe that the regulations have changed the nature of

financial statements. Since the AIMR ratings put great weight on the reporting quality of financial statements, I expect the results in this thesis to hold as long as analysts remain important users of financial statements with whom firms want to communicate.

This thesis studies disclosure quality viewing analysts as the primary users. It provides insights on how analysts evaluate disclosure quality. However, one limitation is that analysts are not the only type of users of financial reports and disclosures. If other types of users (e.g., institutional investors and individual investors) view disclosure quality differently from analysts, cautions should be exerted in generalizing the findings in this thesis. As prior empirical literature tends to focus on disclosure quality in public equity markets, future empirical research that addresses disclosure quality in other settings with different types of information recipients shall shed light on the supply and demand of disclosure policies.

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APPENDIX A

A RESEARCH NOTE ON THE MEASUREMENT OF ACCRUALS AND CASH FLOW FROM OPERATIONS

A.1 INTRODUCTION

When measuring accruals and operating cash flows, researchers face two options: using information from the cash flow statement (the cash flow statement approach) or using information from the balance sheet (the balance sheet approach). The cash flow statement approach provides a direct measure of cash flow from operations, but it can only be applied for data after 1987, since cash flow statements were not available before this date. On the other hand, the balance sheet approach allows researchers to use data from before and after 1987, but the approach is subject to measurement error problems. Hribar and Collins (2002) show that when firms undergo events such as discontinued operations and mergers and acquisitions, balance sheet-based accrual estimates are likely to be directionally biased. This may lead to erroneous conclusions about earnings management if the partitioning variables used to indicate the existence of earnings management are correlated with these events.

This appendix proposes an approach for measuring accruals (and thus operating cash flows) using data that is available on Compustat for periods before 1987. A

comparison between this new approach and the balance sheet approach shows that the new approach measures operating cash flows during the post-1987 period with much greater correspondence to the figures reported in cash flow statements.

A.2 THREE APPROACHES TO MEASURING ACCRUALS AND OPERATING CASH FLOWS

In 1987, the Financial Accounting Standards Board (FASB) issued Statement of Financial Accounting Standard (SFAS) No. 95: *Statement of Cash Flows*. It superseded Accounting Principles Board (APB) Opinion No. 19: *Reporting Changes in Financial Position*. Compared to APB No. 19, which focuses on explaining changes in working capital, SFAS No. 95 narrows the view of "funds" down to cash and cash equivalents (Block and Kintzele 1990).

The statement of cash flows is designed to reflect cash receipts and payments divided into three categories: operating, financing, and investing activities. While firms are encouraged to report cash flow from operations by major cash receipts and payments (i.e., the direct method), they can choose an indirect approach to report the same amount of cash flow from operations by removing the following items from net income: *"(a) all deferrals of past operating cash receipts and payments and all accruals of expected future operating cash receipts and payments and (b) all items that are included in net income that do not affect operating cash receipts and payments*." (SFAS No. 95) Using the indirect method, cash flow from operations is calculated as the difference between earnings before extraordinary items and total accruals:

Total Accruals = Income before Extraordinary Items – Cash Flow from Operations.

Total accruals is therefore the amount by which cash flow from operations is increased or decreased by in determining earnings before extraordinary items. Based on this concept, in Compustat the net cash flow from operations (CFO) is calculated as follows. I call this the "cash flow statement" or "CFS" approach.[55]

CFO = Compustat data #308

= Income before Extraordinary Items (Compustat data #123) – (Non-current Accruals + Current Accruals),

where

Non-current Accruals (NWCACC)
= – {Depreciation and Amortization Expense… (data #125)
+ Extraordinary Items and Discontinued Operations[56]… (data #124)
+ Deferred Taxes Expense… (data #126)
+ Equity in Net Loss… (data #106)
+ Loss of Sale of Property, Plant, and Equipment and Sale of Investment… (data #213)
+ Other Funds from Operations… (data #217)},

and

Current Accruals (WCACC)
= – {Increase in Accounts Payable … (data #304)
+ Increase in Income Taxes Accrued… (data #305)
+ Decrease in Accounts Receivable… (data #302)
+ Decrease in Inventory… (data #303)
+ Net Change in Other Assets and Liabilities… (data #307)}. **(CFS)**

Data items 302, 303, 304, 305, 307, and 308 are cash flow statement items available only after 1987.[57] Therefore, the CFS approach cannot be applied for years prior to 1987. Researchers either choose a shorter sample period after 1987 (e.g., Hribar

[55] See Compustat North America User's Guide: Chapter 5 – Data Definitions.
[56] This item (Compustat item #124) is net of the portion not affecting cash and is different from the Extraordinary Items and Discontinued Operations reported in income statement (item #48). I.e., it is the cash portion of extraordinary items and discontinued operations.
[57] Loss (Gain) of Sale of Property, Plant, and Equipment and Sale of Investment (i.e., item #213) is also available after 1987. However, this item is included in Funds from Operations (Other) prior to 1987.

and Collins 2002) or, if they want to include pre 1987 firms, they follow a balance sheet approach to estimate accruals and cash flows (e.g., Dechow et al. 1996).

The balance sheet approach (the BS approach hereafter) adopts a similar concept but uses balance sheet accounts to calculate accruals and cash flows. The approach allows for the estimation of operating cash flows and accruals using data prior to 1987. However, as Hribar and Collins (2002) point out, it is subject to significant measurement error, particularly when firms engage in mergers and acquisitions or have discontinued operations or foreign exchange gains or losses. The balance sheet approach indirectly estimates cash flow from operations as follows:

CFO = Income before Extraordinary Items (Compustat data #18) – (Non-current Accruals + Current Accruals),

where

Non-current Accruals (NWCACC)
= – Depreciation and Amortization … (data #14),

and

Current Accruals (WCACC)
= – Change in Total Current Liabilities… (Δdata #5)
+ Change in Debt in Current Liabilities… (Δdata #34)
+ Change in Total Current Assets… (Δdata #4)
– Change in Cash and Short-Term Investment… (Δdata #1). **(BS)**

The drawback of using the BS approach rather than the CFS approach to estimate accruals and CFOs is a tradeoff between sample size and measurement accuracy. Researchers who intend to measure operating cash flows using the statement of cash flows are restricted to data from after 1987, while researchers who require a longer sample period can choose to use the less accurate balance sheet approach to expand the sample period. The BS approach, as it is commonly applied, makes two errors in estimating accruals. First, it only includes one non-current accrual item (i.e.,

depreciation expense) rather than all long term accruals. Second, it estimates current accruals based on changes in working capital accounts in balance sheet.

However, some components of the Statement of Cash Flows are available in Compustat prior to 1987. A mixed approach (MIX approach hereafter) can therefore be used to generate operating cash flows that mitigate the first concern and more closely match the current definition of CFO. The MIX approach still relies on changes in balance sheet working capital accounts to estimate current accruals, but it uses a more complete measure of non-current accruals (not simply depreciation expense) that is the same as non-current accruals measured using the cash flow statement:

CFO = Income before Extraordinary Items – (Non-current Accruals + Current Accruals)

= Funds from Operations – Current Accruals,

where Non-current Accruals (NWCACC)
= Income before Extraordinary Items – Funds from Operations (Compustat data #110),

and

Current Accruals (WCACC)
= – Change in Total Current Liabilities… (Δdata #5)
+ Change in Debt in Current Liabilities… (Δdata #34)
+ Change in Total Current Assets… (Δdata #4)
– Change in Cash and Short-Term Investment… (Δdata #1). **(MIX)**

In the MIX approach, funds from operations (Compustat data #110) replaces income before extraordinary items net of non-current accruals. Since funds from operations are available in Compustat from 1971 onward, using the MIX approach allows for the more precise estimation of accruals and cash flows in an earlier period. Regarding current accruals, note that the calculations of current accruals in the BS and MIX approaches are the same. A comparison of the three approaches is presented in Table A.1.

A.3 COMPARISON OF THREE APPROACHES

In this section, I use the CFS approach as a benchmark and compare the measurement errors of the BS and MIX approaches. To compare the three approaches, I use a sample of firms in the industries of Manufacturing (two-digit SIC code between 20-39), Wholesale (SIC code 50-51), and Retail (SIC code 52-59). This selection of industries ensures the availability of working capital accounts.[58] I collect data from 1987 to 2005 for all firms in these industries. This results in a total of 67,946 firm-years with available accruals and CFO information. I also use a constant sample to exclude confounding effects due to any variations in sample composition across years.[59] Unreported results are largely consistent with the cross-sectional data.

Panel A of Table A.2 reports the current accruals (WCACC), non-current accruals (NWCACC), total accruals (TACC), and operating cash flows (CFO), calculated based on the BS, MIX, and CFS approaches. Each variable is scaled by beginning total assets. As shown in the table, the current accruals figures under the BS and MIX methods are identical, and they differ from the current accruals under the CFS approach. Calculating current accruals using balance sheet accounts generates larger variations, as the standard deviations are greater. On average, the BS and MIX approaches tend to over-estimate current accruals, leading to the underestimation of operating cash flows. For non-current accruals, the descriptive statistics under the MIX approach are identical to

[58] Working capital accounts such as current assets and current liabilities are not available for financial services industries.

[59] In this constant sample, each firm must have available data from 1988 to 2005. This results in a sample of 918 firms with 18 years of available data.

the CFS approach. Since the balance sheet approach considers only depreciation and amortization, the non-current accruals under this approach are much smaller in magnitude.[60] Again, this leads to an underestimation of operating cash flows. By removing measurement errors from non-current accruals, the MIX approach generates total accruals and operating cash flows that are much closer to the measures in cash flow statements.

Using the CFS approach as a benchmark, I next compare the differences between the BS and CFS approaches and the differences between the MIX and CFS approaches. The differences (i.e., estimation errors) are then scaled by lagged total assets and by the absolute value of income before extraordinary items. As shown in Panel B of Table A.2, the estimation errors in current accruals are much smaller than the errors in non-current accruals in terms of magnitude. Since the MIX approach removes the measurement errors in non-current accruals, the total measurement errors (i.e., $|TACC_{MIX}-TACC_{CFS}|$) are much smaller compared to the balance sheet approach (i.e., $|TACC_{BS}-TACC_{CFS}|$). The differences scaled by lagged total assets and the absolute value of earnings both show that the balance sheet approach tends to overestimate total accruals.

The median values of current, non-current, and total accruals under the three approaches over the sample period are depicted in Figure A.1 (values scaled by lagged total assets). Consistent with Table A.2, the three approaches do not generate much discrepancy in measuring current accruals. On the other hand, the balance sheet approach consistently overestimates non-current accruals by neglecting factors other than depreciation and amortization. As a result, the pattern of total accruals shows that the

[60] Note that $NWCACC_{BS}$ is negative because CFOs are defined as income before extraordinary items *minus* accruals, therefore non-current accruals under the BS approach are the negative of depreciation expense (i.e., – data item #14).

MIX approach is better than the BS approach in approximating the total accruals measured under the cash flow statement approach. This is further illustrated in Figure A.2. As depicted in the figure, the measurement errors of the MIX approach are close to zero in almost all years, while the errors of the balance sheet approach are consistently positive over years, indicating underestimation of cash flow from operations.

The above analysis shows that the MIX approach outperforms the balance sheet approach in reducing estimation errors. In fact, the latter can be superior only when the estimation errors from non-current accruals offset the errors from current accruals such that total estimation errors are smaller. However, there is no reason to believe that this is a common scenario.[61] Overall, the MIX approach is a superior way to estimate accruals and cash flow from operations as compared to the traditional balance sheet approach.

A.4 THE EFFECT OF MERGERS AND ACQUISITIONS, DISCONTINUED OPERATIONS, AND FOREIGN CURRENCY TRANSACTIONS ON MEASUREMENT ERRORS OF ACCRUALS

Hribar and Collins (2002) indicate that mergers and acquisitions, discontinued operations, and foreign currency transactions are three situations associated with the bias generated by using the balance sheet approach. Therefore, I further check whether the errors from current accruals and non-current accruals are associated with any of these three events.

[61] If we define the estimation errors from the BS approach ($|EE_{BS}|$) as $| TACC_{BS} - TACC_{CFS} |$ and the estimation errors from the MIX approach ($|EE_{MIX}|$) as $| TACC_{MIX} - TACC_{CFS} |$, then $|EE_{BS}| < |EE_{MIX}|$ only if $\frac{WCACC_{BS} - WCACC_{CFS}}{NWCACC_{BS} - NWCACC_{CFS}} < -0.5$.

Following Hribar and Collins (2002), I examine whether these three types of events affect the differences between the BS (MIX) and the CFS approaches in terms of accruals:

$$ACC_{BS\text{-}CFS} = \alpha_0 + \alpha_1 MA + \alpha_2 DO + \alpha_3 Foreign + \varepsilon \quad \text{(BS - CFS)}$$
$$ACC_{MIX\text{-}CFS} = \beta_0 + \beta_1 MA + \beta_2 DO + \beta_3 Foreign + \varepsilon \quad \text{(MIX - CFS).}$$

I define MA as a dichotomous variable that equals one if Compustat footnote item AFTNT1 = 'AA' or 'AB', and zero otherwise. DO is a dichotomous variable for discontinued operations that equals one if Compustat data item #66 is nonzero, and zero otherwise. For foreign currency transactions, Foreign equals one if Compustat data item #150 is nonzero, and zero otherwise. $ACC_{BS\text{-}CFS}$ is the difference between the accruals under the balance sheet approach and the CFS approach. $ACC_{MIX\text{-}CFS}$ is the difference between the accruals under the MIX approach and the CFS approach. For ACC, three items are examined separately: total accruals (TACC), non-current accruals (NWCACC), and current accruals (WCACC).

Consistent with Hribar and Collins (2002), the BS-CFS regression for total accruals shows that the coefficient on MA (α_1) is significantly positive and the coefficient on Foreign (α_3) is significantly negative. The coefficient on DO is insignificant. For the MIX-CFS regression, only the coefficient on MA (β_1) remains significantly positive. Furthermore, β_1 is much smaller than α_1 in magnitude, indicating that mergers and acquisitions have smaller impact on estimation errors when the MIX approach is used. F statistics show that the parameters for MA and Foreign are significantly different in the two regressions.

In addition, I decompose total accruals into current and non-current categories. For the BS-CFS model, the events of mergers and acquisitions and foreign transactions

contribute to the measurement errors of non-current accruals. On the other hand, measurement errors from current accruals are driven primarily by mergers and acquisitions. On the other hand, since the MIX approach eliminates measurement errors from non-current accruals, the impact of these events on measurement bias is much smaller. Overall, the results in this table further show that the MIX approach is more reliable than the balance sheet approach when these events occur.

A.5 APPLYING THE MIX APPROACH BEFORE SFAS NO. 95

Using data after SFAS No. 95, the previous section shows that the MIX approach produces figures much closer to those reported in cash flow statements, compared to the traditional balance sheet approach. Since the major reason for applying the balance sheet approach is to obtain consistent measures for long sample periods, this section further explores whether the MIX approach is better when accruals and CFOs are measured over a long period (i.e., before and after 1987). I use the firms in the constant sample (see section A.3) and calculate total accruals and CFOs from 1972 to 2005 using both the balance sheet and the MIX approaches. The annual data generates linear trend lines for both approaches.[62] To compare, I use the CFOs from the CFS approach during 1987-2005 to generate a third trend line.

Figure A.3 shows the variation of total accruals across time. Operating cash flows are not depicted, for simplicity. The top panel compares the balance sheet and the CFS approaches, and the bottom panel compares the MIX and the CFS approaches.

[62] The trend lines are depicted based on the least squared method that produces a straight line that best fits the data points. The equation used for time trend prediction is $y = mx + b$, where y-values are total accruals and x-values are years.

Both panels show that average total accruals were quite volatile prior to 1987 and have become more and more negative over the last three decades. When compared to the linear trend projected by the CFS approach ($Linear_{CFS}$), the balance sheet approach ($Linear_{BS}$) overestimates total accruals during the period, while the MIX approach ($Linear_{MIX}$) in general coincides much more closely with the CFS approach. Note that since the MIX approach and the balance sheet approach calculate current accruals in the same way, the figure in fact demonstrates the extent to which measurement errors from non-current accruals cause bias. This further suggests the applicability of the MIX approach in measuring accruals and CFOs prior to the availability of cash flow statements.

Table A.1 Calculation of Operating Cash Flows under Three Approaches				
Operating Cash Flows = Income before Extraordinary Items - Accruals				
Indirect Method		Cash Flow Approach	Balance Sheet Approach	Mixed Approach
Income before Extra. Items		data 123	data 18	data 123
– **Non-current Accruals**	+ Depreciation and Amortization	data 125	data 14	
	+ Extraordinary Items and Discontinued Operations	data 124[c]		
	+ Deferred Taxes	data 126		
	+ Equity in Net Loss (Earnings)	data 106		
	+ Sale of Property, Plant, and Equipment and Sale of Investments…Loss (Gain)	data 213[ab]		
	+ Funds from Operations…Other	data 217[d]		
= Funds from Operations		data 110		data 110
– **Current Accruals**	+ Accounts Receivable … Decrease (Increase)	data 302[a]		
	+ Inventory … Decrease (Increase)	data 303[a]		
	+ Accounts Payable and Accrued Liabilities…Increase (Decrease)	data 304[a]		
	+ Income Taxes Accrued…Increase (Decrease)	data 305[a]		
	+ Assets and Liabilities…Other (Net Change)	data 307[a]		
	+ Total Current Assets…Decrease (Increase) – Cash and Short-Term Investment…Decrease (Increase) + Total Current Liabilities…Increase (Decrease) – Debt in Current Liabilities…Increase (Decrease)		–Δdata 4 +Δdata 1 +Δdata 5 –Δdata 34	–Δdata 4 +Δdata 1 +Δdata 5 –Δdata 34
= Net Operating Cash Flow		data 308[a]		

[a] Annual data available since 1987.

[b] According to Standard and Poor's Compustat User's Guide (2003), "*This item is only available for companies reporting a Working Capital Statement (Format Code = 1), a Cash by Source and Use of Funds Statement (Format Code = 2), or a Cash Statement by Activity (Format Code = 3) if a company has been updated for fiscal year 1988. The item will be available from 1987. Prior to 1987, this item was included in Funds from Operations – Other on a Working Capital Statement (Format Code = 1), a Cash by Source and Use of Funds Statement (Format Code = 2), or a Cash Statement by Activity (Format Code = 3).*" (page 262)

[c] This item (data item #124) is net of the portion not affecting cash and is different from the Extraordinary Items and Discontinued Operations reported in income statements (data item #48).

[d] According to Compustat User's Guide (2003), "*Prior to 1987, this item included the loss (gain) on sale of property, plant, and equipment reported within the Operations section.*"

Table A.2 Accruals and Cash Flow from Operations under the Balance Sheet Approach, Mixed Approach, and Cash Flow Statement Approach, years 1988 - 2005 [a]

Panel A Descriptive statistics for accruals and operating cash flows

	N	Mean [b]	1st Quartile	Median	3rd Quartile	Std.
$(WCACC_{BS})/TA_{t-1}$	67946	0.117	-0.035	0.010	0.065	15.084
$(WCACC_{MIX})/TA_{t-1}$	67946	0.117	-0.035	0.010	0.065	15.084
$(WCACC_{CFS})/TA_{t-1}$	67946	-0.061	-0.028	0.011	0.059	10.141
$(NWCACC_{BS})/TA_{t-1}$	67946	-0.082	-0.064	-0.044	-0.029	1.770
$(NWCACC_{MIX})/TA_{t-1}$	67946	-0.495	-0.098	-0.060	-0.036	17.919
$(NWCACC_{CFS})/TA_{t-1}$	67946	-0.495	-0.098	-0.060	-0.036	17.919
$(TACC_{BS})/TA_{t-1}$	67946	0.035	-0.090	-0.037	0.020	15.270
$(TACC_{MIX})/TA_{t-1}$	67946	-0.378	-0.121	-0.052	0.010	22.564
$(TACC_{CFS})/TA_{t-1}$	67946	-0.556	-0.113	-0.051	0.004	21.668
$(CFO_{BS})/TA_{t-1}$	67946	-0.916	-0.091	0.045	0.119	30.370
$(CFO_{MIX})/TA_{t-1}$	67946	-0.502	-0.060	0.059	0.132	19.522
$(CFO_{CFS})/TA_{t-1}$	67946	-0.324	-0.052	0.056	0.126	16.774

Panel B Differences between approaches

	N	Mean [b]	1st Quartile	Median	3rd Quartile	Std.
Scaled by lagged total assets						
$(WCACC_{BS}\text{-}WCACC_{CFS})/TA_{t-1}$	67946	0.178	-0.020	0.000	0.015	13.980
$(WCACC_{MIX}\text{-}WCACC_{CFS})/TA_{t-1}$	67946	0.178	-0.020	0.000	0.015	13.977
$(NWCACC_{BS}\text{-}NWCACC_{CFS})/TA_{t-1}$	67946	0.413	0.000	0.010	0.036	17.534
$(NWCACC_{MIX}\text{-}NWCACC_{CFS})/TA_{t-1}$	n.a.					
$(TACC_{BS}\text{-}TACC_{CFS})/TA_{t-1}$	67946	0.592	-0.007	0.010	0.045	24.136
$(TACC_{MIX}\text{-}TACC_{CFS})/TA_{t-1}$	67946	0.178	-0.020	0.000	0.015	13.977
Scaled by the absolute value of income before extraordinary items						
$(WCACC_{BS}\text{-}WCACC_{CFS})/\lvert IBEI_t\rvert$	67946	-0.173	-0.236	-0.002	0.166	48.672
$(WCACC_{MIX}\text{-}WCACC_{CFS})/\lvert IBEI_t\rvert$	67946	-0.173	-0.236	-0.002	0.166	48.672
$(NWCACC_{BS}\text{-}NWCACC_{CFS})/\lvert IBEI_t\rvert$	67946	0.597	-0.002	0.108	0.437	27.705
$(NWCACC_{MIX}\text{-}NWCACC_{CFS})/\lvert IBEI_t\rvert$	n.a.					
$(TACC_{BS}\text{-}TACC_{CFS})/\lvert IBEI_t\rvert$	67946	0.424	-0.090	0.103	0.498	38.904
$(TACC_{MIX}\text{-}TACC_{CFS})/\lvert IBEI_t\rvert$	67946	-0.173	-0.236	-0.002	0.166	48.672

[a] WCACC = Working capital accruals; NWCACC = Nonworking capital accruals; TACC = Total accruals; CFO = Cash flow from operations; TA = Total assets (Compustat data #6) ; IBEI = Income before extraordinary items (data #18). BS = Balance Sheet Approach; MIX = Mixed Approach; CFS = Cash Flow Statement Approach.

Table A.3 The Association between Estimation Errors and the Occurrence of Mergers and Acquisitions, Discontinued Operations, and Foreign Exchange Transactions

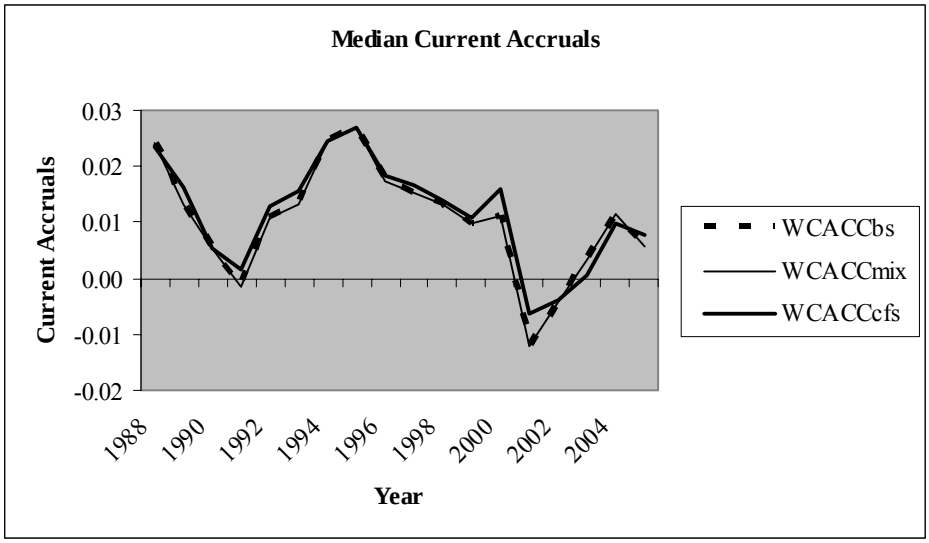
$$ACC_{BS\text{-}CFS} = \alpha_0 + \alpha_1 MA + \alpha_2 DO + \alpha_3 Foreign + \varepsilon \quad (BS - CFS)$$
$$ACC_{MIX\text{-}CFS} = \beta_0 + \beta_1 MA + \beta_2 DO + \beta_3 Foreign + \varepsilon \quad (MIX - CFS)^{a}$$

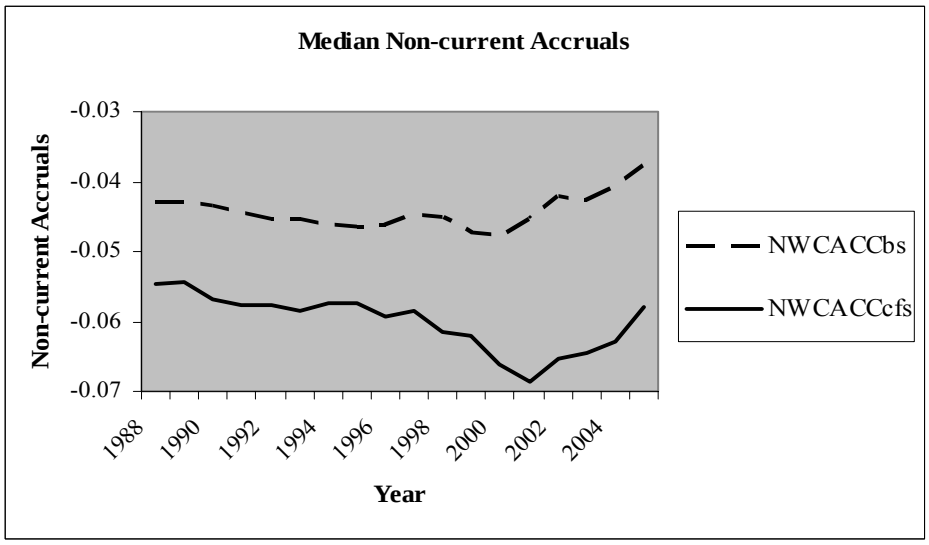
	BS–CFS	MIX–CFS	F statistics [b]
ACC = Total accruals			
Intercept	0.598***	0.148**	
	(<.0001)	(0.028)	
MA	0.958***	0.458***	6.55
	(0.000)	(0.003)	
DO	0.291	0.160	0.30
	(0.373)	(0.397)	
Foreign	-0.692***	-0.201	9.65
	(0.002)	(0.111)	
Adj. R-Sq	0.03%	0.01%	
ACC = Non-current accruals			
Intercept	0.449***		
	(<.0001)		
MA	0.500**		
	(0.010)		
Discontinue	0.131		
	(0.581)		
Foreign	-0.491***		
	(0.002)		
Adj. R-Sq	0.02%		
ACC = Current accruals			
Intercept	0.148**	0.148**	
	(0.027)	(0.028)	
MA	0.457***	0.458***	0.17
	(0.003)	(0.003)	
Discontinue	0.160	0.160	0.12
	(0.398)	(0.397)	
Foreign	-0.201	-0.201	0.30
	(0.111)	(0.111)	
Adj. R-Sq	0.01%	0.01%	

[a] BS = Balance Sheet Approach; MIX = Mixed Approach; CFS = Cash Flow Statement Approach. $ACC_{BS\text{-}CFS}$ is the difference between the accruals under the BS approach and the accruals under the CFS approach. $ACC_{MIX\text{-}CFS}$ is the difference between the accruals under the MIX approach and the accruals under the CFS approach. MA = 1 if firms experience mergers and acquisitions (i.e., Compustat footnote item AFTNT1 ='AA' or 'AB'), and MA = 0 otherwise. DO = 1 if firms report discontinued operations (i.e., Compustat data item #66 is nonzero), and DO = 0 otherwise. Foreign = 1 if firms report foreign transactions (i.e., Compustat data item #150 is nonzero), and Foreign = 0 otherwise. P-values in parentheses. ***, **, and * represent significance at 1%, 5% and 10% levels, respectively.

[b] F-statistics are for the test that $\alpha_i = \beta_i, i = 1,2,3$.

Figure A.1 Current, Non-current, and Total Accruals Calculated by the BS, MIX, and CFS Approaches (accruals scaled by lagged total assets)





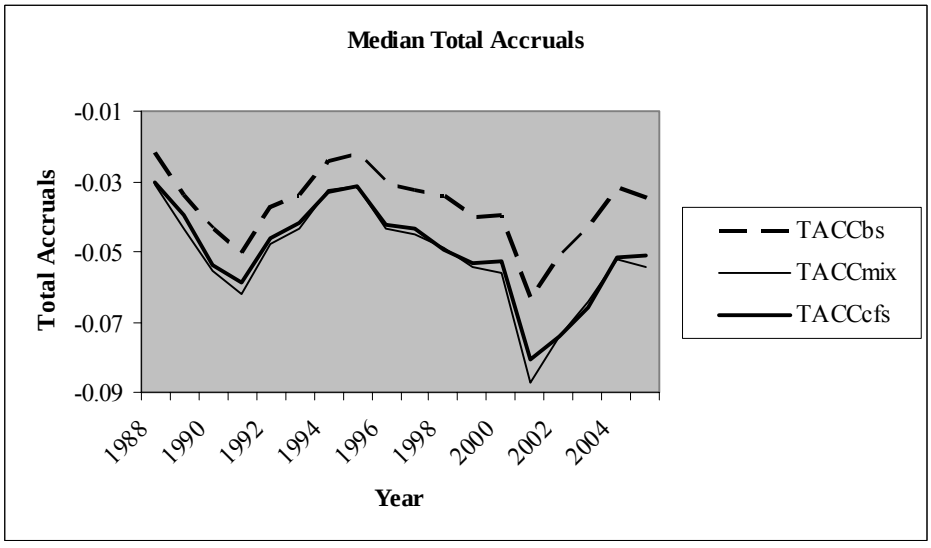


Figure A.2 Differences of Total Accruals between 1) BS and CFS approaches, and 2) MIX and CFS approaches (median values, scaled by lagged total assets)

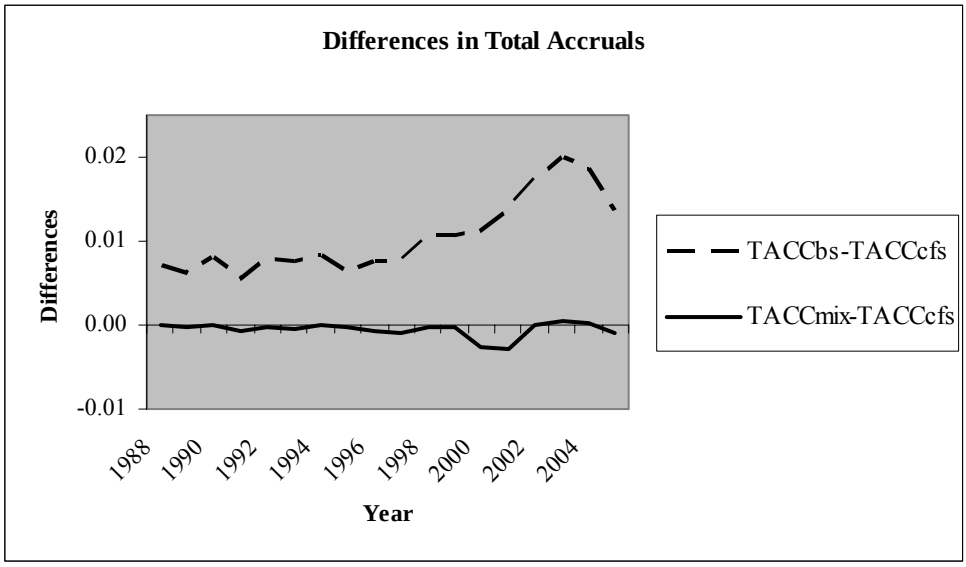


Figure A.3 A Comparison of Total Accruals from 1972 to 2005 (median values, scaled by lagged total assets, of a constant sample which consists of 918 firms with available data during 1987-2005 for calculating accruals based on the three approaches)