MANAGEMENT EARNINGS FORECASTS: A THEORETICAL AND EMPIRICAL ANALYSIS

By

SANJEEV BHOJRAJ

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By

Sanjeev Bhojraj

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Chairman: Dr. Rashad Abdel-khalik
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This research analytically and empirically examines a manager's decision to issue earnings forecasts. The manager's forecast disclosure decision is modeled by focusing on the impact on the expected cost of litigation against the firm. The model is then used to generate empirically testable hypotheses.

Consistent with prior empirical findings, the model establishes the existence and uniqueness of an equilibrium threshold level such that managers are willing to disclose information signal realizations below the threshold level and withhold realizations above it. The model also suggests that the forecast disclosure decision depends on the precision of information signal the manager receives. In empirically testing the implications of the model, I identify two factors (managerial competence and product dynamism) that are likely determinants of information quality and examine their effect on the decision to issue an earnings forecast, the form of the forecast and the news conveyed by the forecast.

The results suggest that managers who are likely to generate high quality information signals issue significantly more good news forecasts than managers who are likely to generate low quality information signals. In addition, managers who are likely to generate low quality information signals have a greater propensity to disclose bad news than good news.

The analysis also suggests that the occurrence of earnings forecast and the form of the forecast is positively associated with the proxies for managerial competence and negatively associated with the proxies for product dynamism and the amount of order backlogs.

These results have important implications in understanding differential disclosure practices by firms. This understanding is vital in light of the current debate on expanding the scope of the reporting model to include forward looking information.

CHAPTER 1
OVERVIEW

This study presents a theoretical and empirical analysis of a manager's decision to issue earnings forecasts. A management earnings forecast is an estimate made by the managers of the firm of the probable realization of earnings. Earnings forecasts have been the subject of academic research for over two decades. Researchers have tried to determine if forecasts are price relevant, the various factors associated with the timing of forecasts, the accuracy of forecasts and finally reasons for firms to issue or avoid forecasts.

While a lot of attention has been devoted to the timing, accuracy and financial market implications of management earnings forecasts, a lot less effort has gone into understanding the managerial incentives that influence the forecast issuance decision. This is a fundamental question in the research of earnings and earnings related forecasts. Waymire (1985) says "further identification of determinants of earnings forecast disclosure choices appears to be a fruitful area for further research." King, Pownall and Waymire (1990) state "The literature on management forecasts......has not yet produced a consensus on the economic determinants of management forecast choices." Baginski and Hassell (1997) state "A greater understanding of managers information producing decisions is crucial in addressing regulation issues, especially with regard to voluntary, prospective information."

Several arguments have been put forth for explaining why firms may want to forecast earnings including better relationships with analysts, lower cost of raising capital and signaling managers' ability to the market. This raises the fundamental question as to why all firms do not forecast earnings. The ultimate decision to issue an earnings forecast would depend on the demand for information relating to future earnings and the mangers ability to provide that information and to use earnings forecast as the means of providing the information.

One potentially important factor, suggested by anecdotal and empirical evidence, that would affect a manager's willingness to issue earnings forecasts, is legal liability precipitated by erroneous disclosures (or disclosures that mislead) as imposed by Rule 10b-5. However, analytical research has done little to understand the effect of the law on voluntary disclosures in general and earnings related forecasts in particular.

A manager's willingness to use earnings forecasts as a channel of communication would depend on alternative channels available to the manager and the relative informativeness of the alternative channels. The empirical literature has concentrated on studying earnings forecasts to the exclusion of other forms of discretionary disclosures. The interaction between earnings related forecasts and other forms of disclosure such as product based information, long-term investment prospects, etc., would be interesting in understanding the total picture on voluntary disclosures.

This study attempts to address some of the issues discussed above. First, an analytical model is developed by focusing on the impact of the disclosure decision on the expected litigation costs against the firm. This model reflects the prevailing institutional and legal environment that governs the issuance of earnings forecasts by the management.

Second, the study uses some of the implications of the model to identify and empirically examine potential determinants of the disclosure decision. Two factors that would affect a managers ability to generate accurate forecasts are identified. The two identified determinants are managerial competence and product dynamism. Managerial skill impacts the information generation and processing systems in an organization which in turn affects a manager's ability to generate precise forecasts. Product dynamism or changes in the product structure affects a manager's ability to generate accurate predictions of forthcoming sales and earnings thereby influencing the decision to issue forecasts. The study examines the effect of these factors on managers' incentive to issue a forecast, the form of the forecast and the kind of information conveyed by the forecast.

Third in empirically examining the potential economic determinants of earnings forecasts, this study considers the importance of the interaction between earnings forecast disclosure and other non-accounting disclosures. It does so by examining the effect of order backlog information on the managers incentive to issue earnings forecasts.

The dissertation is organized as follows. Chapters 2 and 3 are complete within themselves. Chapter 2 develops the analytical model and tests the empirical implications of the model that relate to the nature of information disclosed through the forecast. Chapter 3 develops and test hypotheses that relate to the occurrence of earnings forecasts and the specificity of the forecasts. Chapter 4 provides a summary of the dissertation.

CHAPTER 2
A THEORETICAL AND EMPIRICAL ANALYSIS OF MANAGEMENT EARNINGS FORECASTS

Introduction

In this chapter I model a manager's earnings forecast disclosure choice by focusing on the impact of the choice on the expected cost of litigation against the firm. In addition, I also test some empirical implications of the model.

Empirical and anecdotal evidence suggest that a key factor in the manager's decision to forecast (or not forecast) earnings is the threat of litigation in the event the forecast proves erroneous. The threat of litigation is asymmetric in that a firm is more likely to be sued in the event of a negative earnings surprise (actual earnings falling short of expectations). Given this threat of litigation, I develop a model where the manager's objective is to minimize potential litigation costs with the disclosure decision as the choice variable. Skinner (1997) states: "Indeed, it is possible that managers disclose bad news early not because they expect to avoid litigation (given bad news, litigation may be inevitable), but because they wish to minimize the costs of any litigation that ensues." My model captures the essence of this statement. In choosing to forecast earnings the manager is balancing better alignment of market expectations and a lower probability of negative earnings surprises with a higher probability of being sued in the event of the surprise occurring. In other words, by disclosing the forecast the manager ensures better aligned expectations which reduces the probability of a negative earnings surprise. At the same time, by making the forecast, the firm faces a higher probability of investors filing a successful lawsuit in the event of a negative earnings surprise.

This model is an extension of the model developed by Verrecchia (1983). In Verrecchia (1983), by choosing to disclose, the manager incurs a fixed explicit cost, which he can avoid by choosing not to disclose. In this paper, I model a scenario wherein the manager faces potential litigation costs both when he makes a forecast and when he does not. In addition, I relax the fixed cost assumption by making the expected litigation costs a function of the amount by which earnings falls *short of* expectations.

The model establishes the existence and uniqueness of an equilibrium threshold level such that managers are willing to disclose information signal realizations below the threshold level and withhold realizations above it. This is consistent with empirical findings that firms tend to disclose more "bad news" than "good news" (Skinner, 1994, Kasznik and Lev, 1995). The model also suggests that managers who receive perfect information signals would disclose more than managers who receive signals with no information. This finding is consistent with Verrecchia (1990). However, the association between disclosure and precision of the information signals may not be monotonic for intermediate precision levels in the information signals.

The quality of information a manager generates is unobservable.[1] Therefore, in empirically testing the implications of the model, I use two factors that affect information quality. The first factor is managerial competence (proxied by return on equity relative to industry average). Prior literature suggests that competent managers use good management information and communication systems for evaluating current performance and developing future plans. Competent managers are therefore more likely to generate more precise information signals. Another factor that would influence a manager's information signal quality is variability in the firm's product base (proxied by research and development expenditure and analysts forecast of long-term growth). Forecasting revenues from products recently introduced would be more difficult than forecasting revenues from mature products, since in the latter case the manager has the benefit of prior knowledge and experience.

The model suggests that managers generating signals with no information have no incentive to disclose it (i.e. disclosure threshold levels are at negative infinity). In an empirical context, this would suggest that managers generating imprecise signals, (i.e., the least competent managers and managers of dynamic product-base firms) are more likely to disclose more "bad" news forecasts than "good" news forecasts. Similarly, for managers generating perfect information signals the disclosure threshold level is a finite real value. In an empirical test, we should expect a more even distribution between "good" and "bad"

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[1]Information quality, as used in the theoretical literature on earnings forecasts, refers to the precision (inverse of the variance) of the signal that the manager receives about the liquidating value of the firm.

news forecasts for managers generating precise information signals (i.e., the most competent managers and managers of stable product-base firms). Finally, managers who generate perfect information signals have higher threshold levels than managers generating signals with no information. Empirically, this would indicate that managers generating precise information signals are likely to disclose more optimistic disclosures than those generating imprecise signals.

The results indicate that, in accordance with expectations, managers of firms in the lowest quintile of industry adjusted return on equity and industry adjusted earnings price ratio (i.e., Category 2 firms in the results section, where managers generate imprecise information) make more "bad" news forecasts than "good" news ones. This distribution, for firms in the highest quintile of industry adjusted return on equity and industry adjusted earnings price ratio (i.e., Category 1 firms in the results section, where managers generate precise information) is about even. As expected, I also find that Category 1 firms make significantly more "good" news forecasts than Category 2 firms.[2] The results also suggest that managers of firms in the highest quintile of R&D expenditure and analysts forecast of long-term growth (i.e., Category 2 firms) are more likely to issue "bad" news forecasts than

[2]A potential counter-argument to this finding would be that better performing firms have higher earnings to report which accounts for the higher number of "good" news forecasts. This argument is fallacious for the following two reasons. First, I am not studying the level of the forecast per se, but the difference between the forecast and the latest market expectation. Second, as the table shows well performing firms are as likely to issue "bad" news forecasts as "good" news forecasts, where news is evaluated relative to market expectations rather than in absolute terms.

"good" news ones. This distribution for forecasts made by managers of firms in the lowest quintile of R&D expenditure and analysts forecast of long-term growth (i.e. Category 1 firms) is about even. Finally, as expected, managers of Category 1 firms make significantly more "good" news forecasts than managers of Category 2 firms.

Skinner (1994) finds firms are more likely to forecast "bad" news than "good" news. The empirical findings in this paper suggests that this issue is more pronounced for firms with less competent managers at the helm and for firms with a dynamic product base. The results also suggest that the nature of news a manager is willing to disclose through a forecast is dependent on the ability of the manager and the uncertainty in the product-base of the firm. This helps further our understanding of cross-sectional disclosure practices. This understanding is important in the context of the current debate on expanding the scope of the financial reporting model to include forward-looking information.[3] Finally, the empirical results lend support to the findings of the model developed in this paper.

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[3]Wright and Keenan (1997) state "the financial reporting model is an anachronism. Despite increasingly tight regulation and extensive disclosure requirements it does not meet the needs of those who run businesses and invest in them. It is out of date with the information age." Mandatory management forecasts were also on the agenda of the AICPA's Jenkins Committee. The Committee held in abeyance its recommendation on enhanced disclosure of forward looking information until the threat of unwarranted litigation was reduced. The SEC too encourages the issuance of management's projections of future economic performance so long as they have a reasonable basis and are presented in an appropriate format (see Item 10(b) of Regulation S-K).

Institutional Framework and Prior Literature

The Securities and Exchange Commission (SEC) for several decades frowned on the concept of firms making forward-looking disclosure filings with the Commission. This policy was in force until the early 1970s when the SEC realized that the market possessed information that was not available in the filings. In order to facilitate more uniform access to such information, the SEC began to relax its stance on the issue. The major step in this area was the adoption of Rule 175 under the 1933 Act and Rule 3b-6 under the 1934 Act (so called Safe Harbor Rules). The Rules provided a defense against litigation prosecuted under Section 10(b) of the Securities Exchange Act, 1934, and SEC Rule 10b-5. The objective was to encourage firms to disclose more forward looking information in the filings. While the intent of the Rules may have been commendable, their efficacy is suspect and subject to criticism. The general opinion is that the provision is inadequate to protect firms from frivolous or abusive litigation that is triggered when the forecast turns out to be erroneous. In fact, in the opinion of one large pension fund[4]

> A major failing of the existing safe harbor is that while it may provide theoretical protection to issuers from liability when disclosing projections, it fails to prevent the threat of frivolous lawsuits that arises every time a legitimate projection is not realized

Lees (1981) in his study covering 405 corporations finds that "fear of legal action by disgruntled investors if company earnings forecasts prove to be incorrect is, of course, one

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[4]February 14, 1995 letter from the California Public Employees Retirement System to the SEC on SEC safe harbor proposal.

of the most basic reasons why managements are reluctant to disclose their projections." This finding was reiterated by Brancato (1997).[5]

The above evidence suggests that companies are petrified of the threat of litigation in the event of a forecast proving erroneous even if it was made in good faith. The reason for this is the asymmetry in the litigation costs borne by the plaintiff and the defendant. While it costs a plaintiff a few hundred dollars to file a suit, the cost to the company in the form of discovery proceedings can be very large. According to former SEC Commissioner J. Carter Beese "discovery costs account for roughly 80% of total litigation costs in securities fraud cases. Further, according to Thomas Dunlap, Intel's general counsel, "it costs the plaintiffs probably $ 120 to file the lawsuit. It costs Intel about $ 500,000 to write the Rule 11[6] letter to make it convincing enough."[7] The Council of Institutional Investors added that "We are hurt if a system allows someone to force us to spend huge amounts of money in legal costs by merely paying ten dollars and filing a meritless cookie cutter complaint against

[5]According to Brancato (1997), "The SEC first enacted the Safe Harbor Rule in 1975. Many regarded this rule as ineffective since companies could still be sued (and subjected to lengthy discovery) to sustain that they had made their projection in good faith and that the projection had a reasonable basis in fact...continued fear of litigation appears to be the major obstacle preventing companies from providing more projections to investors."

[6]Under Rule 11(b) of the Federal Rules of Civil Procedure, the plaintiff's attorney is required to certify that papers filed with the court is not intended to harass, the claims presented are warranted and non-frivolous and that the allegations have evidentiary support.

[7]Testimony of Thomas Dunlap, Jr., general counsel, Intel Corporation, Santa Clara, CA: Hearings on Securities Litigation Reform Proposals: Subcommittee on Securities, Senate Committee on Banking, Housing and Urban Affairs, June, 17, 1993.

a company or its accountants when that plaintiff is disappointed in his or her investment."[8] This disparity in litigation costs induces firms to favor settlement over proving good faith in the courts. O'Brien (1997) found that of the 952 class action suits in the sample only 13 were actually tried. The study finds that 87.6% of the suits were settled with an average settlement amount of $ 7.3 million. The total amount of settlement including judgment awards for 804 suits was $7 billion. This provides some indication of the enormity of the litigation threat problem.

The above discussion suggests that one reason firms desist from making earnings forecasts is the fear of litigation and the resultant payout in the event of the forecast proving erroneous. The accounting and legal literature provides some evidence that the firm's fears are justified. Francis, Philbrick and Schipper (1994a) provide descriptive evidence about firms' disclosures with respect to both the statements which precipitated lawsuits and the disclosures alleged to have misled the market. They find that firms at risk (defined as firms experiencing a decline of earnings of 20% or more) in their sample are more likely to face a lawsuit if the surprise was preceded by a forecast rather than if it was not. In fact, they find that shareholder lawsuit firms have about three times as many disclosures as at-risk firms. This finding is corroborated by Skinner (1997). He finds that for 183 quarters that result in stockholder litigation, earnings news is revealed through an earnings forecast 47% of the

[8]Testimony of Maryellen F. Andersen on behalf of the Council of Institutional Investors: Hearings on Securities Litigation Reform Proposals: Subcommittee on Securities, Senate Committee on Banking, Housing and Urban Affairs.

time, while for non-litigation quarters earnings forecasts occur 8.8% of the time. Walker, Levine and Pritchard (1997), in a study of a sample of securities class action filings, find that *failed earnings forecast*, accounting irregularities, earnings restatement and insider trading were the most common allegations. Francis, Philbrick and Schipper (1994b) investigate the allegations made by plaintiffs in a cross-section of class action suits filed between 1988 and 1992. Earnings-related disclosures were cited as the precipitating factor in over 80% of the suits. The evidence suggests that failed earnings forecasts provide a frivolous litigant with a potential allegation or opportunity for filing lawsuits thereby increasing a firm's exposure to lawsuits.

Earnings forecasting is therefore a double edged sword. On the one hand it could benefit the firm in various ways, from meeting the continuing disclosure criterion under the securities laws to improving relations with institutional investors and analysts. On the other hand, if a forecast is not realized, it provides a frivolous litigant with added grist for the litigation mill, thereby making it easier to sue the firm. This paper analytically studies the effect of potential litigation costs on a manager's disclosure choice and empirically tests the implications of some model.

Model

Setup and Assumptions

There are two risk-neutral players in the model: an investor and the manager of the firm. The market is passive and has homogenous beliefs. The manager's objective is to maximize expected end of period earnings, which under certain restrictive conditions, amounts to maximizing future dividends.[9]

The game is played out as given in Figure 1.

Private signal y is observed by manager	Manager decides to disclose y truthfully or not disclose	Market revises expectation of earnings	Earnings a realized	Investor's decision to sue or not	Parties settle

Figure 1

Time Line of Events and Actions

The manager always receives an information signal, y, which is informative about the realization of earnings a. The market and the investor are both aware of the existence of the information signal but do not know it's actual future realization. It is assumed that:

$$a \sim N(\mu_a, \sigma_a^2)$$
$$y = a + \gamma$$
where
$$\gamma \sim N(0, \sigma_\gamma^2)$$
γ *and* a *are independent*

Therefore, $y \sim N(\mu_a, \sigma_y^2)$, $\sigma_y^2 = \sigma_a^2 + \sigma_\gamma^2$

The manager evaluates the expected cost of disclosing and the expected cost of not disclosing and decides to disclose or withhold the signal. The expected cost to the manager

[9] See Lang (1990) for a discussion of the conditions under which earnings are sufficient for estimating future dividends

is determined by the potential amount of earnings surprise, the probability of being successfully sued and the investors cost of prosecuting the suit. The manager is assumed to be constrained to truthful reporting. The market revises its expectation of earnings based on the manager's disclosure decision. Next, the market, investor and the manager see the realization of earnings. If realized earnings falls short of the market's expectation, the investor has to then decide whether to sue the firm or not. It is assumed that the investor will not sue the firm if realized earnings exceeds expectations.[10] The investor incurs a cost © of prosecuting a suit against the firm. The payoff to the investor is dependent on the manager's disclosure decision, the earnings surprise, the probability of a successful suit and a factor *k* which defines the portion of the earnings surprise that the investor would collect from the firm as settlement. Finally, the parties settle up.

Disclosure Decision Calculus

I solve for the equilibrium strategies through a process of backward induction. First I solve for the investor's optimal strategy given a conjectured strategy of the manager and the market's mechanism for revising it's expectations based on the conjectured strategy. I then solve for the manager's strategy in response to the investor's optimal strategy. An equilibrium strategy is where the manager's response to the investor's optimal strategy is the same as the conjectured strategy. An important point to remember is that while the

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[10]This is in keeping with the asymmetric nature of legal liability, where firms tend to be sued only for negative earnings surprises. See Skinner (1994).

investor's decision to sue is based on actual realization of earnings, the manager's decision is based on a distribution of potential earnings realizations.

I begin with the conjecture (known to the market and to the investor) that the manager will disclose the signal for all realizations below $\bar{y}$ and withhold it otherwise. Therefore, the manager's conjectured strategy (s_m) is to disclose if the realized signal is in the set $I_d = \{y : y \leq \bar{y}\}$ and withhold disclosure over the set $I_{nd} = \{y : y > \bar{y}\}$. Let p^f be the investor's probability of prosecuting a successful suit in the presence of an earnings forecast and p^{nf} be the investor's probability of prosecuting a successful suit in the absence of an earnings forecast.[11] Given the conjectured strategy, the interval of realized earnings over which the investor will sue given that the manager has made an earnings forecast $\tilde{y}$ is[12]

$$\begin{gathered} I_1 = \{a : p^f(E(a|y=\tilde{y}) - a)k \geq c\} \\ = \{a : E(a|y=\tilde{y}) - a \geq c/p^f k\} \\ = \{a : a \leq E(a|y=\tilde{y}) - c_1\} \\ \textit{where} \\ c_1 = \left[\frac{c}{p^f k}\right] \\ E(a|y=\tilde{y}) = \mu_a + (\tilde{y} - \mu_a)\frac{\sigma_{ay}}{\sigma_y^2} \\ \sigma_{ay} \textit{ is the covariance between } a \textit{ and } y \end{gathered}$$

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[11]I assume p^f and p^{nf} are fixed. In reality however they are likely to be a function of the difference between the actual and expected earnings (i.e., *surprise*). I have captured some of this effect due in the assumption that decisions are made on both the fixed probability and the *surprise*.

[12]See Mood, Graybill and Boes (1974), for the conditional expectation of a bivariate and truncated bivariate normal distribution.

If the manager does not make an earnings forecast the market will assume that the forecast signal is above $\bar{y}$ and revise it's expectations accordingly. The interval of realized earnings over which the investor would sue, given that the manager has not made an earnings forecast is (see note 12):

$$\begin{aligned} I_2 &= \{ a : [p^{nf}(E(a \mid y \geq \bar{y}) - a)k] \geq c \} \\ &= \{ a : E(a \mid y \geq \bar{y}) - a \geq c/p^{nf}k \} \\ &= \{ a : a \leq (E(a \mid y \geq \bar{y}) - c_2 \} \end{aligned}$$

$$where$$

$$c_2 = \left[\frac{c}{p^{nf}k} \right]$$

$$E(a \mid y \geq \bar{y}) = \mu_a + \frac{\sigma_{ay}}{\sigma_y^2} \left[\frac{\int_{\bar{y}}^{\infty} (y - \mu_a) f(y) dy}{\int_{\bar{y}}^{\infty} f(y) dy} \right]$$

Given the optimal strategy of the investor (s_i) as laid out above, I now solve for the manager's response to the strategy. Since the manager does not know realized earnings when making the disclosure choice, the decision is based on a distribution over potential earnings realizations.

If the manager decides to make an earnings forecast, the expected cost of disclosing $\tilde{y}$ is calculated over the set I_1. The net expected revenue (expected earnings net of legal cost) to the firm is given by :

$$E(a \mid y = \tilde{y}) - p^{f}k \left\{ \int_{-\infty}^{E(a \mid y = \tilde{y}) - c_1} (E(a \mid y = \tilde{y}) - a) f(a \mid y = \tilde{y}) da \right\} \qquad (1)$$

Similarly, the expected cost of not disclosing $\tilde{y}$ is calculated over the set I_2. The net expected revenue to the firm in the event of no forecast is given by :

$$E(a|y=\tilde{y})-p^{nf}k\left\{\int_{-\infty}^{E(a|y\geq\bar{y})-c_2}(E(a|y\geq\bar{y})-a)f(a|y=\tilde{y})da\right\} \qquad (2)$$

In arriving at the manager's expectation of net earnings in the absence of a forecast, it is important to note that the distribution of earnings $(f(a|y=\tilde{y}))$ over which the manager will form her expectations is invariant to the disclosure decision and is only a function of the private signal $\tilde{y}$. The manager would have the incentive to disclose if the expected net revenue (expected earnings less expected legal costs) from disclosing an earnings forecast exceeds expected net revenue from not disclosing. It is obvious that the disclosure calculus is only dependent on the expected costs facing the manager since the gross expected revenue $(E(a|y=\tilde{y}))$ is independent of her disclosure decision. If s_m turns out to be the manager's best response to the investor's optimal strategy then equilibrium is reached and $\hat{y}=\bar{y}$ is defined to be an equilibrium threshold point of the signal.

<u>Symmetric Probability of Prosecuting a Successful Suit</u>

In establishing the existence and uniqueness of the disclosure equilibrium in this model, I start off by examining a condition wherein the probability of prosecuting a successful suit does not depend on the manager's disclosure decision. I initially lay out the arguments and the intuition. The rigorous proof is provided in Proposition 1.

When the probability of prosecuting a successful suit is invariant to the manager's disclosure decision, then $p^{nf} = p^{f}$. This implies that $c_1 = c_2 = c$ and then the investor's strategy will be determined only by the earnings surprise. Under these conditions, the manager's threshold level $\hat{y}$ is at infinity and full disclosure is the optimal strategy for the manager. To understand this let us consider a scenario wherein the threshold level $\hat{y}$ is at some point other than infinity. Let the candidate threshold point be $\bar{y}$ as shown in figure 2.

Since the market's conjecture is that the manager will disclose if the signal is below $\bar{y}$, in the absence of a disclosure the market will assume that the manager's realized signal is above $\bar{y}$, and will revise their expectations of y upwards to a value $\dot{y}$ which is greater than $\bar{y}$. The market will then revise it's expectation of *earnings* given that it expects that the value of the signal to be $\dot{y}$. If on the other hand the manager does disclose any realization of $\tilde{y}$ which is at or below $\bar{y}$, the market will revise it's expectation of earnings based on the disclosed signal $\tilde{y}$. Thus the market's expectation of earnings given disclosure i.e. $E(a \mid y = \tilde{y})$ is less than the expectation of earnings in the event the manager withholds $\tilde{y}$ i.e. $E(a \mid y = \dot{y})$. Since $E(a \mid y = \tilde{y})$ is less than $E(a \mid y = \dot{y})$ and $c_1 = c_2 = c$, the range of earnings realizations over which the investor will sue, given that the disclosure occurred [$(-\infty, a_1)$ in Figure 2] is smaller than the range of earnings realizations over which the investor would sue if there is no disclosure [$(-\infty, a_2)$ in Figure 2]. A lower expectation of earnings reduces the range of earnings realizations that can result in negative surprises and therefore reduces the exposure the manager faces to litigation costs. As a result the cost of disclosing any realization of $y \leq \bar{y}$ is less than the cost of withholding it and therefore the $\bar{y}$ cannot be a threshold point since the manager is not indifferent between disclosing and not disclosing.

Extending this logic, all candidate threshold points can be eliminated except $\bar{y} \to \infty$. As the candidate threshold tends to infinity, $\dot{y} \to \bar{y}$ and therefore the market's expectation given disclosure coincides with the market's expectation given non-disclosure and realizations of earnings over which the manager faces legal exposure is the same. The manager is indifferent between disclosing and not disclosing and therefore $\hat{y} = \bar{y} \to \infty$ is the equilibrium point.

The intuition is that if the manager is to be sued based on how much lower realized earnings is from market expectationsand the probabilityof being sued does not change based on whether a disclosure occurred or not, then the manager would like to see expectations to be as low as possible. This is because lower expectations reduces not only the probability of seeing negative earnings surprises but also the amount of the surprise for any probable realization of earnings. Since expectation of earnings is lower if the manager discloses the realized signal rather than if the signal is withheld, the firm is always better off disclosing the signal. Thus full disclosure is the optimal strategy.

Proposition 1

If the market's probability of prosecuting a successful suit is invariant to the manager's forecasting decision, full disclosure is the optimal equilibrium strategy available to the manager

The proof is in Section 1 of the proofs at the end of this chapter.

As discussed in the institutional framework section, earnings disclosures that do not meet expectations enhance the firm's exposure to litigation. I incorporate this empirical detail into the model by assuming that, provided actual earnings falls short of expectations, the investor's probability of prosecuting a successful suit in the presence of an earnings forecast is more than the probability of a successful suit in the absence of an earnings forecast i.e.,

$$p^{f} = p(success \mid forecast) > p(success \mid no\ forecast) = p^{nf}$$

Asymmetric Probability of Successful Suit:

Once I allow for the probability of prosecuting a successful suit by the investor to depend on whether the manager has made a forecast or not, I open up the possibility of sustaining a non-full disclosure equilibrium. In this scenario disclosure may not always be preferred to non- disclosure since in some cases the benefit of disclosing may be offset by its cost. By disclosing the manager ensures better aligned expectations, which reduces the probability of a negative earnings surprise. At the same time by disclosing the firm faces a higher probability of the investor filing a successful suit in the event of a negative earnings surprise. It is this friction that supports a non-full disclosure equilibrium. Proposition 2 demonstrates that there exists a threshold level $\hat{y}$ above which a manager will not disclose. To understand this let us consider a situation with a candidate threshold point $\bar{y}$ as shown in Figure 3.

Figure 3 reflects a situation where the candidate threshold point equals the observed signal i.e. $\bar{y} = \tilde{y}$. Since the market's conjecture is that the manager will disclose if the signal is below $\bar{y}$, in the absence of a disclosure the market will assume that the manager's realized signal is above $\bar{y}$, and will revise their expectations of y upwards to a value $\dot{y}$ which is greater than $\bar{y}$. The market will then revise it's expectation of earnings given that it expects that value of the signal to be $\dot{y}$. If on the other hand the manager does disclose $\bar{y}$, the market will revise it's expectation of earnings based on the disclosed signal. Thus the market's expectation of earnings given disclosure is less than the expectation of earnings in the event the manager withholds $\bar{y}$. The expected cost to the investor of suing a firm given a forecast is c_1. The firm will therefore be sued if realized earnings is in the range from negative infinity to a_1 (See figure 3) and the expected cost to the firm of disclosing is determined by the earnings surprise and the probability of observing the surprise over the said range. The expected cost to the investor of suing a firm in the absence of a forecast is c_2. The firm will therefore be sued if realized earnings is in the range from negative infinity to a_2 (See figure 3) and the expected cost to the firm of disclosing is determined by the earnings surprise and the probability of observing the surprise over that range. The trade-off is between 'small' earnings surprises over a 'large' earnings realization range, if disclosure occurs against 'large' earnings surprises over a 'small' earnings realization range, if disclosure is withheld. The true threshold point is the one at which the expected cost given disclosure equals the expected cost given non-disclosure. Since the difference between the market's expectation given disclosure($E(a \mid y = \bar{y})$) and the market's expectation given non-disclosure($E(a \mid y = \dot{y})$) is decreasing in $\bar{y}$ and $c_2 > c_1$ there exists some $\bar{y} = \hat{y}$ such that the manager is indifferent between disclosing and not disclosing.

Now given a threshold level $\hat{y}$ the manager will disclose signal realizations $\tilde{y} \leq \hat{y}$ and not disclose other realizations. This is because given a threshold level, the cost of not disclosing is decreasing in the realized signal $\tilde{y}$, while the cost of disclosing is fixed. Thus the manager will have no incentive to disclose realizations of y above $\hat{y}$ and will disclose realizations of y below $\hat{y}$.

Proposition 2

There exists a discretionary forecasting equilibrium $\hat{y}$ *above which a manager will not disclose, whenever the market's probability of prosecuting a successful suit as a result of a negative earnings surprise is greater if the surprise was preceded by a forecast than if it wasn't.*

The proof is given in Section 1 of the proofs at the end of this chapter.

The above model specifies the existence and uniqueness (within the class of conjectured strategies specified) of a disclosure equilibrium in the presence of a asymmetric legal liability function. Using the above model, I can generate some empirically testable hypotheses concerning managers' disclosure decision in the face of such liability. To do so I shall first state and prove two corollaries appertaining to the model.

Corollary 1

The disclosure equilibrium threshold ceteris paribus is lower for $\sigma_Y^2 \to \infty$ *than for* $\sigma_Y^2 \to 0$.

The proof is in Section 2 of the proofs at the end of this chapter.

This Corollary is consistent with the general intuition that a manager's incentive to disclose is dependent on the quality of the information possessed, where quality is defined as the noisiness of the signal[13]. While previous theoretical work has found a monotonic relation between the incentive to disclose and the quality of information[14], this model suggests otherwise. There may exist intervals wherein the incentive to disclose is locally decreasing in the quality of information that the manager possesses. While this has not been analytically proven in this paper, I show the existence of this possibility by an example. This possibility is driven by the fact that the manager is trading off potential costs of disclosing and not disclosing information and change in the quality of information affects both costs. The intuition behind this finding is that a decrease in the quality of information would increase the manager's uncertainty about the ultimate realization of earnings. As a result there is an increased likelihood of the realized earnings being in the tails, thereby increasing the cost of disclosing as well as the cost of withholding information. This change in distribution, which increases the possibility of the news being bad, could cause a greater increase in cost of not disclosing than in the cost of disclosing, thereby forcing the manager to disclose more.

Figure 4 provides a graphical setting of a situation where the threshold level is non-monotonic in the signal accuracy. The graph maps the difference between the cost of disclosure and the cost of non-disclosure (*d(.)*) for varying values of signal accuracy σ_γ^2 and

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[13]Strictly speaking a measure of information quality does not exist. Information quality in this paper refers to the accuracy of the information signal. This definition of quality of information is similar to the definition adopted in Verrecchia (1990).

[14]Verrecchia (1990), finds that the threshold level is decreasing in the accuracy of the information signal the manager possesses.

candidate threshold levels $\bar{y}$ given fixed costs (c_1, c_2). The first interesting observation is that consistent with the proof to Proposition 2, for any given σ_Y^2, *d(.)* is monotonically increasing in $\bar{y}$. This ensures that consistent with Proposition 2, the threshold level is unique. On the other hand for a given realization of $\bar{y}$, *d(.)* is not monotonic in σ_Y^2. This allows for the possibility of the same candidate threshold point ($\bar{y}$) being the equilibrium threshold point ($\hat{y}$) for more than one value of signal accuracy σ_Y^2.

While the lack of monotonicity may apply to some intervals of the information quality, in the limits the managers incentives are clearly defined. As $\sigma_Y^2 \to \infty$, the cost of disclosure always exceeds the cost of non-disclosure, thereby inducing the manager never to disclose. As $\sigma_Y^2 \to 0$, the cost of disclosure is never greater than the cost of non-disclosure, and equals the cost of non-disclosure for some finite real value of *y*. This implies that the threshold level given a perfect information signal is higher than the threshold level given a signal with no information.

Corollary 2

The disclosure equilibrium threshold ceteris paribus is increasing in the probability of the successful suit given non-disclosure, p^{nf}.

Proof is given in Section 2 of the proofs at the end of this chapter.

The intuition behind this Corollary is straight-forward. An increase in the probability of being successfully sued given no disclosure results in a decrease in the gap between p^{nf} and p^{f}. This results in an erosion in the relative value of not disclosing over disclosing i.e., the manager is less averse to disclosing because the value of not disclosing (which is due to the lower probability of being successfully sued in the event of a negative earnings surprise) is diminished.

The model developed in this paper builds on Verrecchia (1983, 1990). The basic question Verrecchia (1983) addresses relates to the empirical observation that managers seem to exercise some discretion in the timing of mandatory reports, which did not seem to be in accordance with Grossman-Milgrom's conclusion that a possessor of private information about an asset would be obligated to follow a policy of full disclosure. The key factor in the model is the introduction of a fixed cost of disclosure, which allows for a non full-disclosure equilibrium to be sustained. The equilibrium is such that managers have an incentive to disclose "good" news and withhold "bad" news. The equilibrium analysis of this model is carried out in Verrecchia (1990).

Empirical Hypothesis Testing

Hypotheses Development

According to Proposition 2: There exists a discretionary forecasting equilibrium above which a manager will not disclose, whenever the market's probability of prosecuting a successful suit as a result of a negative earnings surprise is greater if the surprise was preceded by a forecast than if it wasn't. Corollary 1 finds that the disclosure threshold *ceteris paribus* is lower $\sigma_Y^2 \to \infty$ than for $\sigma_Y^2 \to 0$ where σ_Y^2 is the precision, or quality of the information signal the manager receives.

Proposition 2 suggests that managers' forecasting threshold level is such that they are willing to disclose lower realizations of the information signal (i.e., bad news) and withhold higher realizations of the signal. Corollary 1 suggests that the threshold level is a function of the quality of information a manager receives. The quality of a manager's information signal is unobservable. However, there are several factors that could affect signal quality. Two critical factors are considered in this paper.

<u>Competence of managers</u>

Managerial competence is far ranging in its effect on the firm including resultant superior products, employee relations, customer relations and even recruitment of future managers (Sah and Stiglitz, 1991). In addition, effective workplaces are characterized by good decision making structures and communication systems among other things (Brancato, 1997). Dutter (1969) suggests that good managers are 'results oriented' and have a basis for evaluating current performance and developing future plans. Davenport et al. (1989) discuss how top management can influence the quality and effectiveness of a firm's information systems. Competent managers are therefore looked upon as ones who use good management information systems and internal controls that assist them in delivering good performance.[15]

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[15]In fact, external audit planning typically involves determining a qualitative estimation of the competence of the management while determining audit risk (Anderson and Marchant, 1989).

The above discussion suggests that competent managers are more likely to generate more precise information, including earnings forecasts.[16]

Product dynamism

Another factor, affecting the quality of the information signal, arises when the manager is faced with a product base that is continually changing. Forecasting revenues from products recently introduced is more difficult than forecasting revenues from mature products. This difficulty arises on several counts, including forecasting the market's response to the products (Erickson, 1990). In addition to determining sale quantities, managers also have to estimate factors such as price and advertising response. Smith, McIntyre and Achabal (1994) suggest that "the updated (sales) forecasts form the basis for adjusting inventory levels and *financial projections.*" Marketing researchers devote a great deal of attention to developing sales forecasting models (see Smith, McIntyre and Achabal, 1994). The forecasting models are usually variants of time series models. Therefore, as the manager gathers more information i.e., has more observations in the sample, he is able to generate better sales and revenue forecasts. In other words the manager has the benefit of prior experience and prior inside knowledge making it easier to generate a precise forecast. Bowman and Gatignon (1995) study another hurdle in predicting the performance of new products i.e., the competitors response to the introduction of new products and its effect on

[16]Lees (1981) finds one of the principal reasons for managerial reluctance to issue forecasts is the "management's lack of confidence in their ability to predict future trends and events."

the product sales and pricing. Given the above arguments, managers of dynamic product-base firms are expected to generate less precise information signals than managers of firms with a stable product-base, resulting in lower incentives to issue earnings forecasts.

Threshold level hypothesis

We know from Proposition 2 and the proof to Corollary 1 that managers generating signals with no information have threshold levels at negative infinity (i.e., they have no incentive to disclose). In an empirical setting this would suggest that managers generating imprecise information signals should on average have very low threshold levels and therefore should disclose more "bad" news forecasts than "good" news. Since the precision of information a manager generates depends on his competence and the variability in the product structure, this suggests the following two hypotheses:

Hypothesis 1a: Least competent managers would issue more "bad" news forecasts than "good" news forecasts.

Hypothesis 2a: Managers of firms with a dynamic product base would issue more "bad" news forecasts than "good" news forecasts.

We also know from Proposition 2 and Corollary 1 that in the event of the manager generating a perfect information signal the threshold level is finite real valued. This suggests that managers who generate perfect information signals are more willing to disclose "good" news. An empirical implication is that on average we should expect an even distribution of "good" and "bad" news for managers who are expected to generate precise information signals. Since, as argued earlier, precision in the information signal depends on the manager's competence and the variability in the product structure, I would hypothesize the following

Hypothesis 1b: The distribution of "bad" and "good" news forecasts issued by the most competent managers (who receive the most precise information) would be even.

Hypothesis 2b: The distribution of "bad" and "good" news forecasts issued by managers of firms with a stable product-base (who receive the most precise information) would be even.

Relative signal quality hypothesis

Proposition 2, read in conjunction with Corollary 1, would indicate that the differential disclosure threshold levels between managers with perfect information signals and those receiving signals with no information would in the nature of news being disclosed. Managers receiving perfect information signals have a higher threshold than those receiving signals with no information. The higher the threshold level, the larger is the range of information signal realizations that the manager is willing to disclose. This in turn would result in a greater willingness to report positive news. In an empirical context this would suggest that on average managers generating precise information signals should have a greater incentive to disclose optimistic forecasts. Since precision of the information signal would depend on managerial competence and product variability, I hypothesize that

Hypothesis 1c: The most competent managers would issue more "good" news forecasts than the least competent.

Hypothesis 2c: Managers of firms with a stable product base would issue more "good" news forecasts than managers of firms with a dynamic product base.

Sample Selection and Data

Management earnings forecast

The earnings forecast data was obtained from First Call Corporation, which maintains a Corporate Investor Guideline Database.[17] The forecasts used in this study were issued during the 1995 and 1996 fiscal years. Limiting this study to agriculture, mining and industrial firms results in a final sample of 1,537 usable forecasts[18]. The actual number of forecasts used in each hypothesis depends on the availability of the explanatory variables.

The descriptive statistics relating to the earnings forecasts are given in Table 2-1 Panel B contains the distribution of annual and quarterly forecasts. Of the 1,537 forecasts 563 are annual forecasts and the rest are quarterly forecasts. For a more comprehensive analysis of the forecast sample see Chapter 3.

[See Table 2-1]

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[17] I am grateful to Mr. Stan Levine and First Call Corporation for making available the databases on management earnings forecasts and analysts forecasts.

[18] Firms belonging to industry codes between 4000-4800, 6000-7000 and above 7500 are dropped. The industries dropped include transportation, utilities, banking and financial institutions, non-profit and entertainment.

Determinants of information signal quality

Managerial competence

While managerial competence is unobservable, it can be expected to manifest in forms that are observable. One indicator of managerial competence is the performance of the firm relative to other firms in the industry. Sah and Stiglitz (1991) argue that "there are large differences in individuals' abilities and that the abilities of those in leadership inevitably affect the performance and survival of the organization." Firms that outperform others in the same industry are more likely to have competent managers at the helm. Performance in this study is measured by the firm's return on equity (ROE), the maximization of which are the critical goals of every manager.[19] To distinguish between more and less competent managers I measure the firm's ROE relative to the industry mean. The return on equity information is obtained from Compustat.

Product dynamism

One indicator of a dynamic product base is the amount a firm expends on developing new products and processes. This is reflected in the research and development (R&D) expenditure that a firm incurs. Firms with a high intensity of R&D would be continually developing and introducing new products. Managers in these firms should find it more difficult to forecast earnings as compared with managers of firms with minimal R&D

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[19]A study by the Ernst & Young Center for Business Innovation found that earnings was among the top two measures of performance for managers, financial analysts and portfolio managers and investors. For a more detailed discussion see Brancato (1997).

expenses. Since R&D expenditure varies depending on the size of the firm, I use R&D expenditures expressed as a percentage of sales (*RD*) to proxy for the uncertainty in the product base. The R&D and sales information is collected from Compustat.

Another proxy for product dynamism is the analysts' estimates of the firm's long-term earnings growth (*GROWTH*). Analysts forecasts of long-term growth is a broad measure and could capture several factors, including a dynamic product base. Firms for which analysts expect high long-term growth would normally be characterized by a product base that is continually evolving and growing, which would make forecasting earnings more difficult. Analysts' forecasts of 5 years' future growth is collected from the Zacks database, which is available on Compact Disclosure.

Methodology

To test the hypotheses, each forecasting firm is ranked on the basis on two variables: information quality determinants and the tenor of news being disclosed. I group all firms on Compustat with non-missing data into quintiles based on each of the determinants of signal quality (ROE relative to industry, R&D and analysts forecast of long-term growth). The forecasting firms are also grouped into quintiles based on the type of news being disclosed. The tenor of news (forecast surprise) being disclosed is determined by the difference between the management's forecast (MF) and the latest available median analysts consensus forecast

(AF) immediately preceding the management's forecast, scaled by the absolute value of analysts forecast.[20]

Forecast surprise = (MF-AF) / abs(AF)

I then create a classification table based on these two ranks (i.e., signal quality and forecast surprise). Hypotheses 1a, 2a, 1b and 2b are tested by examining the distribution of forecasts made by firms within the highest and lowest quintiles of signal quality. Hypotheses 1c and 2c are tested by comparing the number of forecasts that fall in the highest quintile (or two quintiles) of forecast surprise (or, best news) for firms in the highest quintile of signal quality (Category 1) with those for firms in the lowest quintile of signal quality (Category 2).

Results

Table 2-2 provides the summary statistics for the variables used in this study. ROE has a mean value close to zero. This is by construction since the variable is adjusted for industry mean and therefore should have a mean of zero. Forecast surprise has a mean value of -0.045. The minimum value is -30.25 while the maximum is 8.00. This suggests that

[20]I use the following empirical estimates for different forms the management forecasts could take. Some are "point" forecasts wherein the manager provides an exact estimate, which is then used as the forecast value. If the forecast is a "range" forecast, the mean of the range is used as the forecast value. For lower bound forecasts, the lower bound and for upper bound forecasts, the upper bound is treated as the forecast value.

the forecasts issued cover a much larger range of "bad" news as compared with "good" news i.e., managers make bigger "bad" news forecasts than "good" news ones.

The results for Hypotheses 1a, 1b and 1c are given in Table 2-3. Panel A provides the results using industry adjusted ROE as the proxy for the first determinant of information quality i.e., managerial competence. Firms in the top quintile of ROE (i.e., Category 1 firms, where managers are likely to generate highest quality signals) made significantly more *total* forecasts than firms in the lowest quintile (389 vs. 90). Firms in the lowest quintile of ROE (i.e., Category 2 firms, where managers are likely to generate the lowest quality signals) made more "bad news" forecasts than "good news" ones though the difference is not significant. In keeping with hypothesis 1b, there is an even distribution of forecasts made by Category 1 firms. Finally, consistent with hypothesis 1c, Category 1 firms made 157 forecasts during the sample period which were in the top two quintiles of forecast surprise, compared with 27 forecasts made by Category 2 firms. The difference between the two groups is significant at the 1% level.

[See Table 2-3]

The results of Hypotheses 2a, 2b and 2c are given in Table 2-4. Panel A provides the results using Research and Development expenditure as the proxy for the second determinant of signal quality i.e., product dynamism. Firms in the highest quintile of R&D expenditure (i.e., Category 2 firms, where managers are likely to generate the lowest quality information signals) made 71 forecasts against 190 made by firms in the lowest quintile of R&D expenditure (i.e., Category 1 firms, where managers are likely to generate the highest quality information signals). Consistent with hypothesis 1a and the findings of Table 2, Category

2 firms made significantly (at 1% level) more bad news forecasts (48 forecasts or 67%) than good news forecasts (17 forecasts or 23%). Of the forecasts made by Category 1 firms 81 (42%) were classified in the lowest two quintiles against 72 (38%) in the highest two quintiles suggesting an even distribution. Of the 190 forecasts made by Category 1 firms 72 belong to the top two quintiles of forecast surprise (i.e. most optimistic forecasts), while firms in Category 2 made only 17 forecasts that belong to the top two quintiles. The difference between the two groups is significant at the 1% level and is consistent with hypothesis 1c.

Panel B provides results using analysts forecasts of long-term growth as the proxy for product dynamism. Firms in the highest quintile of analysts forecast of long-term growth (i.e., Category 2 firms) made 105 forecasts as compared with 215 by firms in the lowest quintile (i.e., Category 1 firms). Consistent with hypothesis 1a, the findings in Panel A of this table and the findings in Table 2, Category 2 firms have significantly higher number of bad news forecasts (64 forecasts or 60%) than good news forecasts (21 forecasts or 20%). But unlike the earlier results, the distribution of forecasts made by Category 1 firms is not even. Category 1 firms made significantly higher number of good news forecasts (115 forecasts or 54%) as compared with bad news forecasts (51 forecasts or 21%). Consistent with hypothesis 1c, of the forecasts made by Category 2 firms, only 21 forecasts (20%) were in the top two quintiles of forecast surprise, as compared with 115 forecasts (54%) made by Category 1 firms.

[See Table 2-4]

The results of Table 2-3 and Table 2-4 provide support for Proposition 2 and Corollary 1 of the model developed in section 3. The proxies for quality of information generated internally do affect the kind of forecast being issued externally. Managers who are likely to generate the highest quality information signals issue more forecasts that are categorized as "good" news as compared with managers who are likely to generate the lowest quality information signals. In addition, of the forecasts issued by managers who are likely to generate poor information signals there are more "bad" news forecasts than "good" news ones, while there is an even distribution for managers who are likely to generate good information signals.

Summary and Conclusions

In this paper, I model a manager's earnings forecast decision, where the decision is determined by it's effect on the expected cost of litigation against the firm. I also test some of the empirical implications of the model. The model, which is an extension of Verrecchia (1983, 1990) establishes an equilibrium threshold level such that the manager has an incentive to disclose all realizations of the information signal below the level and withhold realizations above it. This result is consistent with existing anecdotal and empirical evidence (e.g., Skinner, 1994, Kasznik and Lev, 1995) that suggest that firms tend to issue more "bad" news than "good" news. In addition, managers who receive perfect information signals have higher threshold levels than managers who receive signals with no information.

I study the empirical implications of the model by focusing on two determinants of quality of information generated, managerial competence and product base variability. I find that more competent managers (proxied by earnings performance relative to industry average) tend to issue more good news forecasts than less competent managers. I find similar results using variability in product base (proxied by R&D expenditure and analysts forecast of long-term growth) as the determinant of information quality. Managers of firms with a stable product base tend to disclose more good news forecasts than managers of firms with a variable product base. Managers of firms with a variable product base tend to issue more bad news than good news forecasts. These results suggest potential factors that must be considered when interpreting the kind of news being disclosed through a forecast. For example, in comparing a firm that issued a good news forecast against a firm which did not make a forecast, one factor that may be considered is the difference between in the firms in terms of their product variability. Similarly, the kind of forecast issued and non-disclosure of a forecast could have information about the competence of the managers at the helm of the firm. The results also provide support for the argument that a manager's decision to issue earnings forecasts is determined by it's potential effect on litigation against the firm.

Table 2-1

Description of the Sample of 1,537 Earnings Forecasts made over the period 1995-96

Panel A: Sample Selection Criteria

Criteria	No. of observations
Initial sample of Management Earnings Forecasts	1,810
Less:	
Industry screen	(273)
Usable Forecasts	1,537

Panel B: Distribution of the sample by fiscal year end

	Number of forecasts					
Year	Yearly	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
1995	231	87	94	122	102	636
1996	332	130	129	149	161	901
Total	563	217	223	271	263	**1,537**

Table 2-2

Summary Statistics

Variable	Mean	Std. Dev	High	Low
ROE	1.30e-09	27.69	2329.96	-756.78
R&D expenditure	2.45	52.81	0	3309
Analysts forecast of Long-term Growth	21.37	11.83	0	200
Forecast Surprise	-0.045	1.68	8.00	-30.25

Table 2-3

Distribution of Management Forecast Surprise
(Information Quality Determinant: Managerial Competence)

Forecast Surprise is calculated as the difference between the management forecast (MF) and the most recent median analyst forecast (AF) scaled by the absolute value of the median analyst forecast i.e. (MF-AF)/abs(AF). Category 1 consists of firms with managers likely to generate the best information signals (i.e., firms in the highest quintile based on industry adjusted ROE). Category 2 consists of firms with managers likely to generate the worst information signals (i.e., firms in the lowest quintile based on industry adjusted EP ratio or industry adjusted ROE).
Panel A:

	Competence Surrogate: Industry adjusted Return on Equity		
Forecast Surprise Quintile	Category 1 Frequency (Proportion)	Category 2 Frequency (Proportion)	Difference Category 1-Category 2
Lowest quintile	66 (17%)	22 (25%)	
2^{nd} quintile	87 (22%)	17 (19%)	
3^{rd} quintile	79 (20%)	24 (27%)	
4^{th} quintile	69 (18%)	8 (9%)	61*** (Hypo: 1c)
Highest quintile	88 (23%)	19 (21%)	69*** (Hypo: 1c)
TOTAL	**389 (100%)**	**90 (100%)**	**299*** **
$(4^{th}+5^{th})-(1^{st}+2^{nd})$	4 (Hypo: 1b)	12 (Hypo: 1a)	

***, ** indicates that the non-parametric chi-square test of independence is significant at 1% & 5% respectively

Table 2-4
Distribution of Management Forecast Surprise
(Information Quality Determinant: Product Dynamism)

Forecast Surprise is calculated as the difference between the management forecast (MF) and the most recent median analyst forecast (AF) scaled by the absolute value of the median analyst forecast i.e. (MF-AF)/abs(AF). Category 1 consists of firms with managers likely to generate the best information signals (i.e., firms in the lowest quintile based on R&D expenditure or analysts forecast of long-term growth). Category 2 consists of firms with managers likely to generate the worst information signals (i.e., firms in the highest quintile based on R&D expenditure or analysts forecast of long-term growth).

Panel A:

	Dynamism Surrogate: R&D Expenditure		
Forecast Surprise Quintile	Category 1 Frequency (Proportion)	Category 2 Frequency (Proportion)	Difference Category 1-Category 2
Lowest quintile	29 (15%)	36 (50%)	
2nd quintile	52 (27%)	12 (17%)	
3rd quintile	37 (19%)	6 (8%)	
4th quintile	50 (26%)	8 (11%)	42*** (Hypo 1c)
Highest quintile	22 (12%)	9 (12%)	13** (Hypo: 1c)
TOTAL	**190 (100%)**	**71 (100%)**	**119*** **
(4th+5th)-(1st+2nd)	9 (Hypo: 1b)	31*** (Hypo: 1a)	

Panel B:

	Dynamism Surrogate: Analysts forecast of future growth		
Forecast Surprise Quintile	Category 1 Frequency (Proportion)	Category 2 Frequency (Proportion)	Difference Category 1-Category 2
Lowest quintile	18 (8%)	48 (45%)	
2nd quintile	33 (15%)	16 (15%)	
3rd quintile	49 (23%)	20 (19%)	
4th quintile	42 (20%)	15 (14%)	27*** (Hypo: 1c)
Highest quintile	73 (34%)	6 (6%)	67*** (Hypo: 1c)
TOTAL	**215 (100%)**	**105 (100%)**	**110*** **
(4th+5th)-(1st+2nd)	-64*** (Hypo: 1b)	43*** (Hypo: 1a)	

*** indicates that the non-parametric chi-square test of independence is significant at 1%

Proofs

Section 1

Let the candidate threshold point be $\bar{y}$, where $\bar{y}$ is a potential realization of the signal y. The proof basically carried out through a process of contraction mapping. In the first two parts, I carry out the analysis assuming the threshold point and the realized signal to be equal i.e. $\bar{y} = \tilde{y}$. The first part will show that the expected disclosure costs is independent of $\bar{y}$, the observed signal. The second part will show that the expected cost given non-disclosure is a continuous decreasing function in the candidate threshold points $\bar{y}$.

Part 1

Simplifying the cost portion of (1) we get the expected costs to be

$$p^f k \left\{ \frac{\sigma_{\hat{a}}}{\sqrt{2\pi}} \exp\left(-\frac{(-c_1)^2}{2\sigma_{\hat{a}}^2} \right) \right\} \quad \text{where} \quad f(\hat{a}) = f(a \mid y = \bar{y}) \sim N(E(a \mid y = \bar{y}), \sigma_{\hat{a}}^2) \tag{3}$$

Two interesting observations that can be drawn from the above are that the cost of disclosure is always non-negative and is independent of the realized signal, $\bar{y}$. For any realized signal $\bar{y}$ the distribution of earnings is centered around $E(a \mid y = \bar{y})$. This implies that the 'surprise' for any realization of a has the same probability and value irrespective of $E(a \mid y = \bar{y})$. Since disclosure cost is a function of the earnings surprise and the probability of the surprise, the cost of disclosure is independent of the realized signal $\bar{y}$.

Part 2

Simplifying the cost portion of (2) we get the expected costs *g(.)* to be

$$g(.) = p^{nf} k \left\{ \frac{\sigma_{\hat{a}}}{\sqrt{2\pi}} \left[\exp\left(-\frac{1}{2}\left(\frac{m(.) - c_2}{\sigma_{\hat{a}}} \right)^2 \right) \right] + m(.) \int_{-\infty}^{\frac{m(.)-c_2}{\sigma_{\hat{a}}}} \phi(z)dz \right\} \quad \text{where} \quad z \sim N(0,1) \quad m(.) = E(a \mid y \geq \bar{y}) - E(a \mid y = \bar{y}) \tag{4}$$

$$= \frac{\sigma_{ay}}{\sigma_y^2}\left[\frac{\frac{\sigma_y}{\sqrt{2\pi}}\exp\left(-\frac{1}{2}\left(\frac{\bar{y}-\mu_a}{\sigma_y}\right)^2\right) - \bar{y}\int_{\bar{y}}^{\infty} f(y)dy + \mu_a \int_{\bar{y}}^{\infty} f(y)dy}{\int_{\bar{y}}^{\infty} f(y)dy}\right]$$

Now *m(.)* is a non-negative continuous function in $\bar{y}$ since

$$m(.) = \frac{\sigma_{ay}}{\sigma_y^2}\left[\frac{\int_{\bar{y}}^{\infty} y f(y)dy - \bar{y}\int_{\bar{y}}^{\infty} f(y)dy}{\int_{\bar{y}}^{\infty} f(y)dy}\right] > 0$$

and $\int_{\bar{y}}^{\infty} f(y)dy > 0$.

Lemma 1

m(.) is strictly decreasing in $\bar{y}$

For a proof see Appendix B

By application of l'Hopital's Rule we get

$$\lim_{\bar{y}\to -\infty} m(.) \to \infty$$
$$\lim_{\bar{y}\to \infty} m(.) \to 0 \qquad \textbf{(5)}$$

Lemma 2

g(.) is a continuous non-negative function which is decreasing in $\bar{y}$

For a proof see Appendix B

From (4) and (5) we get

$$\lim_{\bar{y}\to-\infty} g(.)\to\infty$$

$$\lim_{\bar{y}\to\infty} g(.)\to p^{nf}k\frac{\sigma_{\hat{a}}}{\sqrt{2\pi}}\left[\exp\left(-\frac{1}{2}\left(\frac{-c_2}{\sigma_{\hat{a}}}\right)^2\right)\right]$$

Proof of Proposition 1

If p^f equals p^{nf} then c_1 will equal c_2. This implies that the cost of non disclosure *g(.)* will be greater than the cost of disclosure for all finite values of $\bar{y}$. This would induce full disclosure by the manager.

Q.E.D.

Proof of Proposition 2 :

In Lemma 2 we have already shown that *g(.)* is a continuous non-negative function which is decreasing in $\bar{y}$ and that

$$\lim_{\bar{y}\to-\infty} g(.)\to\infty$$

$$\lim_{\bar{y}\to\infty} g(.)\to p^{nf}k\frac{\sigma_{\hat{a}}}{\sqrt{2\pi}}\left[\exp\left(-\frac{1}{2}\left(\frac{-c_2}{\sigma_{\hat{a}}}\right)^2\right)\right] \qquad \textbf{(6)}$$

We also know that the cost of disclosure is given by (3) and is not a function of the candidate threshold point $\bar{y}$. So long as p^f exceeds p^{nf} (6) will be less than (3). Therefore the Intermediate Value Theorem requires that there must exist a unique $\bar{y}=\hat{y}$ such that *g(.)*=(3).

To complete the proof I will demonstrate that the manager will not have an incentive to deviate from the equilibrium strategy of disclosing all realizations of $\tilde{y}\le\hat{y}$ and withhold realizations above $\hat{y}$. To do so I will show that given a threshold point $\hat{y}$, the manager will not withold disclose of realizations of $\tilde{y}\le\hat{y}$ or disclose any realizations above $\hat{y}$ since given the threshold point, the cost of not disclosing is decreasing in $\tilde{y}$.

From part I we know that the cost of disclosure to the manager of any realization of the information signal is independent of the signal. So cost of disclosure is a constant in the realized signal.

The cost of non-disclosure given an equilibrium threshold point is given by

$$p^{nf}k\left\{\int_{-\infty}^{E(a|y\geq\hat{y})-c_2}(E(a|y\geq\hat{y})-a)f(a|y=\tilde{y})da\right\}$$

Differentiating w.r.t $\tilde{y}$ we get

$$p^{nf}k\left\{\int_{-\infty}^{E(a|y\geq\hat{y})-c_2}(E(a|y\geq\hat{y})-a)f(a|y=\tilde{y})\frac{1}{\sigma_y^2}(a-E(a|y=\tilde{y}))\,da\right\}$$

The sign of of the differential would depend on the sign of the term $(a-E(a|y=\tilde{y}))$, since the integral range is held constant and the other terms are always positive. If a is less than $E(a|y=\tilde{y})$ then the whole differential is negative and the function is decreasing. If a is more than $E(a|y=\tilde{y})$ then by symmetry (and since we are interested only in the downside) we will have a range of a less than $E(a|y=\tilde{y})$ that will offset the range that is above $E(a|y=\tilde{y})$. We are therefore again left with a realizations of a less than $E(a|y=\tilde{y})$ which results in a negative value for the derivative. The cost of disclosure is therefore decreasing for all values of $\tilde{y}$ given a equilibrium threshold level $\tilde{y}$. The manager will therefore have no incentive to shift from the equilibrium strategy.

Q.E.D.

<u>Section 2</u>

Proof of Lemma 1: *m(.)* is strictly decreasing in $\bar{y}$:

m(.) is given by

$$m(.)=\frac{\int_{\bar{y}}^{\infty}yf(y)\,dy-\bar{y}\int_{\bar{y}}^{\infty}f(y)\,dy}{\int_{\bar{y}}^{\infty}f(y)\,dy}$$

Therefore

$$\frac{\delta m(.)}{\delta \bar{y}} = h(\bar{y}) - 1$$

$$where$$

$$h(\bar{y}) = \phi(\bar{z}_1)\left[\frac{\int_{\bar{z}_1}^{\infty} z\phi(z) - \bar{z}_1 \int_{\bar{z}_1}^{\infty} \phi(z)\,dz}{\left\{\int_{\bar{z}_1}^{\infty} \phi(z)\,dz\right\}^2}\right]$$

$$\bar{z}_1 = \frac{\bar{y} - \mu_y}{\sigma_y}$$

$$and$$

$$\phi(.) \sim N(0,1)$$

Since $h(\bar{y}) > 0$, the function is strictly increasing in $\bar{y}$.

Further

$$\lim_{\bar{y} \to \infty} h(\bar{y}) \to 1$$

$$and$$

$$\lim_{\bar{y} \to -\infty} h(\bar{y}) \to 0$$

This implies that $\frac{\delta m(.)}{\delta \bar{y}}$ is strictly decreasing in $\bar{y}$

Q.E.D.

Proof of Lemma 2: g(.) is decreasing in $\bar{y}$

g(.) is given by

$$g(.)=p^{n/}k\left\{\frac{\sigma_{\hat{a}}}{\sqrt{2\pi}}\left[\exp\left(-\frac{1}{2}\left(\frac{m(.)-c_2}{\sigma_{\hat{a}}}\right)^2\right)\right]+m(.)\int_{-\infty}^{\frac{m(.)-c_2}{\sigma_{\hat{a}}}}\phi(z)dz\right\}$$

$$\text{where}$$

$$z\sim N(0,1)$$

$$m(.)=E(a|y\geq\bar{y})-E(a|y=\bar{y})$$

$$=\frac{\sigma_{ay}}{\sigma_y^2}\left[\frac{\int_{\bar{y}}^{\infty}yf(y)dy-\bar{y}\int_{\bar{y}}^{\infty}f(y)dy}{\int_{\bar{y}}^{\infty}f(y)dy}\right]$$

Since $\bar{y}$ affects g(.) through its effect on *m(.)*,

$$\frac{\delta g(.)}{\delta m(.)}=p^{n/}k\left[\frac{c_2\phi(\bar{z}_2)}{\sigma_{\hat{a}}}+\Phi(\bar{z}_2)\right] > 0$$

$$\text{where}$$

$$\bar{z}_2=\frac{m(.)-c_2}{\sigma_{\hat{a}}}$$

Since *g(.)* is increasing in *m(.)* and *m(.)* is decreasing in $\bar{y}$ (Lemma 1), *g(.)* is decreasing in $\bar{y}$

Q.E.D.

Proof of Corollary 1

The difference between the cost of disclosure and cost of non-disclosure is given by

$$d(.) = p^{f}k\left\{\frac{\sigma_{\hat{a}}}{\sqrt{2\pi}}\left[\exp\left(-\frac{1}{2}\left(\frac{-c_1}{\sigma_{\hat{a}}}\right)^2\right)\right]\right\} - p^{nf}k\left\{\frac{\sigma_{\hat{a}}}{\sqrt{2\pi}}\left[\exp\left(-\frac{1}{2}\left(\frac{m(.)-c_2}{\sigma_{\hat{a}}}\right)^2\right)\right] + m(.)\int_{-\infty}^{\frac{m(.)-c_2}{\sigma_{\hat{a}}}}\phi(z)dz\right\}$$

$$\begin{gathered} where \\ z \sim N(0,1) \end{gathered}$$

$$\sigma_{\hat{a}} = \sigma_a\sqrt{1-\frac{\sigma_a^2}{(\sigma_a^2+\sigma_\gamma^2)}}$$

$$m(.) = E(a\,|\,y \geq \bar{y}) - E(a\,|\,y = \bar{y})$$

$$= \frac{\sigma_{ay}}{\sigma_y^2}\left[\frac{\int_{\bar{y}}^{\infty} yf(y)dy - \bar{y}\int_{\bar{y}}^{\infty} f(y)dy + \mu_a\int_{\bar{y}}^{\infty} f(y)dy}{\int_{\bar{y}}^{\infty} f(y)dy}\right]$$

$$= \frac{\sigma_a^2}{\sigma_a^2+\sigma_\gamma^2}\left[\frac{\frac{\sqrt{\sigma_a^2+\sigma_\gamma^2}}{\sqrt{2\pi}}\exp\left(-\frac{1}{2}\left(\frac{\bar{y}-\mu_a}{\sigma_y}\right)^2\right)}{\int_{\frac{\bar{y}-\mu_a}{\sqrt{\sigma_a^2+\sigma_\gamma^2}}}^{\infty}\phi(z)dz} - \bar{y} + \mu_a\right]$$

$$\lim_{\sigma_\gamma^2 \to \infty} m(.) \to \frac{\sigma_a^2}{0.5\sqrt{2\pi}\,\infty} - \frac{1}{\infty} + \frac{1}{\infty}$$

$$\lim_{\sigma_\gamma^2 \to \infty} m(.) \to 0$$

$$\lim_{\sigma_\gamma^2 \to 0} m(.) \to \sigma_a^2 \left[\frac{\frac{1}{\sqrt{2\pi}} \exp\left(-\frac{1}{2}\left(\frac{\bar{y}-\mu_a}{\sigma_a} \right)^2 \right)}{\int_{\frac{\bar{y}-\mu_a}{\sigma_a}}^{\infty} \phi(z)dz} - \bar{y} + \mu_a \right]$$

Since $\lim_{\sigma_\gamma^2 \to \infty} \sigma_{\hat{a}} \to \sigma_a$ *and* $\lim_{\sigma_\gamma^2 \to 0} \sigma_{\hat{a}} \to 0$

$$\lim_{\sigma_\gamma^2 \to \infty} \frac{m(.)}{\sigma_{\hat{a}}} \to \frac{0}{\sigma_a} \to 0$$

$$\lim_{\sigma_\gamma^2 \to 0} \frac{m(.)}{\sigma_{\hat{a}}} \to \left[\frac{\frac{\sigma_a}{\sqrt{2\pi}} \exp\left(-\frac{1}{2}\left(\frac{\bar{y}-\mu_a}{\sigma_a} \right)^2 \right)}{\int_{\frac{\bar{y}-\mu_a}{\sigma_a}}^{\infty} \phi(z)dz} - \bar{y} + \mu_a \right] \frac{1}{0} \to \infty$$

Therefore

$$\underset{\to \infty}{\text{m}}\ d(.) \to p^{f} k \left\{ \frac{\sigma_a}{\sqrt{2\pi}} \left[\exp\left(-\frac{1}{2}\left(\frac{-c_1}{\sigma_a} \right)^2 \right) \right] \right\} - p^{nf} k \left\{ \frac{\sigma_a}{\sqrt{2\pi}} \left[\exp\left(-\frac{1}{2}\left(\frac{-c_2}{\sigma_a} \right)^2 \right) \right] \right\} > 0 \textit{ for all}$$

This implies that when there is no information in the signal (i.e., σ_γ^2), the cost of disclosure of any realization of y is always higher than the cost of non-disclosure. The manager therefore has no incentive to disclose the signal realization and sets the threshold level to negative infinity (i.e., no disclosure).

In addition,

$$\lim_{\sigma_Y^2 \to 0} d(.) \to -p^{nf} k \sigma_a^2 \left[\frac{\frac{1}{\sqrt{2\pi}} \exp\left(-\frac{1}{2}\left(\frac{\bar{y}-\mu_a}{\sigma_a} \right)^2 \right)}{\int_{\frac{\bar{y}-\mu_a}{\sigma_a}}^{\infty} \phi(z)dz} - \bar{y} + \mu_a \right] \int_{-\infty}^{\pm\infty} \phi(z)dz \leq 0 \; for \; all \; \bar{y}$$

which implies that in the event of a perfect information signal, the cost of non-disclosure is never less than the cost of disclosure but there exist some finite real valued y such that *d(.)* is zero. In other words the threshold point is a finite value.

From the above it is obvious that the threshold level is higher in the event of a perfect information signal than in the event of the signal providing no information. The manager therefore has an incentive to disclose more if the signal has perfect information than if the information signal had no information.

Proof of Corollary 2

$$\frac{\delta d(.)}{\delta p^{nf}} = -k \left\{ \frac{\sigma_{\hat{a}}}{\sqrt{2\pi}} \left[\exp\left(-\frac{1}{2}\left(\frac{m(.)-c_2}{\sigma_{\hat{a}}} \right)^2 \right) \right] + m(.) \int_{-\infty}^{\frac{m(.)-c_2}{\sigma_{\hat{a}}}} \phi(z)dz \right\}$$

$$-p^{nf} k \left\{ -\frac{\sigma_{\hat{a}}}{\sqrt{2\pi}} \left[\exp\left(-\frac{1}{2}\left(\frac{m(.)-c_2}{\sigma_{\hat{a}}} \right)^2 \right) \right] \left(\frac{c}{k \sigma_{\hat{a}} (p^{nf})^2} \right) \left(\frac{m(.)-c_2}{\sigma_{\hat{a}}} \right) + m(.) \phi(z_2) \frac{c}{k \sigma_{\hat{a}} (p^{nf})^2} \right\}$$

At the threshold point m(.)-c_2 is less than 0. Therefore

$$\left. \frac{\delta d(.)}{\delta p^{nf}} \right|_{\hat{y}} < 0$$

Since d(.) is increasing in $\bar{y}$, in order to keep the manager indifferent between disclosure and non-disclosure an increase in p^{nf} results in an upward shift in the threshold level $\hat{y}$.
Q.E.D.

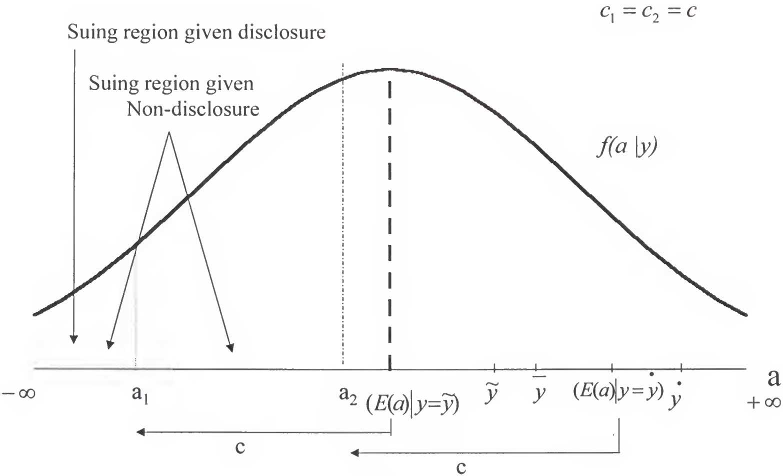

Figure 2
Equilibrium Under Identical Costs

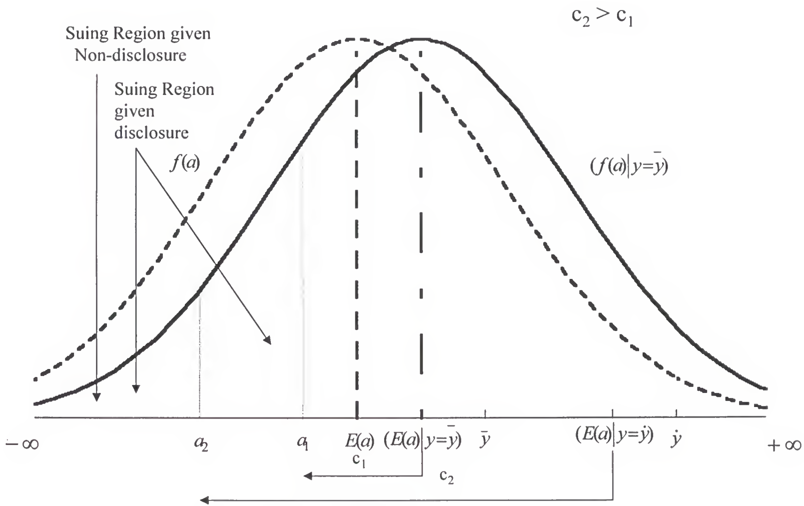

Figure 3
Equilibrium Under Differential Costs

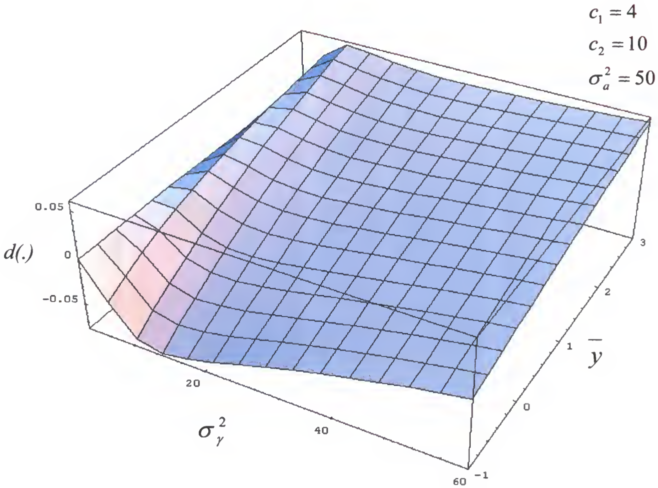

Figure 4
Net Disclosure Costs for Varying Signal Quality and Conjectured Threshold Levels

CHAPTER 3
AN EMPIRICAL ANALYSIS OF THE MANAGEMENT EARNINGS FORECAST DISCLOSURE DECISION

Introduction

This paper examines the association between factors that affect the quality of information generated by a manager and his decision to issue an earnings forecast. The effect of these factors on the form (point or range) of the forecast is also studied. I also examine the interaction between a mandatory non-accounting disclosure (order backlogs) and the managers decision to issue earnings predictions.

Financial market participants spend a great deal of time and effort in predicting earnings. There are several reasons for managers to assist them in this process by voluntarily providing information to the markets (Waymire, 1985, Ajinkya and Gift, 1984). Voluntary disclosure increases stock liquidity (Welker, 1995), analyst following (Healy, Palepu and Hutton, 1995) and lowers the cost of capital (Botosan, 1997, Sengupta, 1998). Managers can assist the market in predicting earnings in several ways including disclosure of their own prediction of earnings. But issuing a management earnings forecast is not without it's associated costs, since erroneous forecasts that result in a price decline are likely to be the subject of litigation against the firm (Felsenthal, 1994, Walker, Levine and Pritchard, 1997, O'Brien, 1997).

Theoretical work in earnings forecasts (e.g., Verrecchia, 1990, Chapter 2 of this dissertation) finds that a manager's incentive to disclose earnings forecasts is a function of the quality of information he generates.[1] Managers who generate more precise information have a greater incentive to reveal information voluntarily. The quality of information a manager generates, while unobservable, depends on his competence and also on the variability in the firm's product structure, among other factors. A competent manager is likely to generate higher quality earnings predictions (than those less competent) and therefore has greater incentive to publicly disclose the predictions. Further, the manager of a firm wherein the products and processes are continually changing is more likely to generate predictions of lower quality and therefore have a lower incentive to forecast earnings. These factors (i.e., competence and product dynamism) also influence the form (range or point) of the forecast. When managers generate less precise information they are likely issue forecasts of a less precise form, i.e., range rather than point.

The decision to issue forecasts could also depend on other information available to the market participants. One such important item is order backlog information, which represents unfilled sales orders. This is a mandatory (10K) non-accounting disclosure[2] made

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[1]Information quality, as used in the theoretical literature on earnings forecasts, refers to the precision (inverse of the variance) of the signal that the manager receives about the liquidating value of the firm. Information quality and information precision will be used interchangebly throughout this paper.

[2]Order backlog information is treated as non-accounting information since it is not incorporated into the accounting process, and is disclosed as part of a general description of the business.

by firms which has a direct impact on the firm's prospective earnings and is closely followed by analysts (Lev and Thiagarajan, 1993). To the extent that order backlog information assists the market participants in predicting earnings, it reduces the pressure on the managers to issue earnings forecasts.

I find that occurrence of earnings forecasts is positively associated with industry adjusted return on equity and managerial compensation relative to industry average, both of which are used as proxies for managerial competence. Earnings forecasts are negatively associated with R&D/Sales ratio and analysts forecasts of long-term growth, both of which are used to proxy for product dynamism. The decision to issue earnings forecasts is also negatively associated with the relative amount of order backlogs. All of the above variables also affect the kind of forecast a manager issues. An ordered probit analysis suggests that the precision in the forecasts issued, i.e., their form, is decreasing in the proxies for product dynamism and order backlog information, while increasing in the proxies for managerial competency.

This study contributes to two lines of research. I identify factors that explain cross-sectional variation in the incidence of management forecasts across firms as well as the form of the forecasts issued. The study also provides some insight into the importance of substitute non-accounting information in the forecasting decision and in choosing the kind of forecast to issue. These results not only provide us with a better understanding of observed forecasting practices, but also suggest factors that must be considered in the current debate on expanding the scope of the financial reporting model to include forward looking information.[3] The study also illustrates some methodological and econometric issues that arise when dealing with categorical variables that are not binary.

Motivation and Hypothesis Development

Occurrence of Forecasts

Verrecchia (1983,1990) studies the effect of the quality of information that a manager receives on his incentives to disclose information voluntarily.[4] The model suggests that the

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[3]Wright and Keenan (1997) state "the financial reporting model is an anachronism. Despite increasingly tight regulation and extensive disclosure requirements it does not meet the needs of those who run businesses and invest in them. It is out of date with the information age." Mandatory management forecasts were also on the agenda of the AICPA's Jenkins Committee. The Committee held in abeyance its recommendation on enhanced disclosure of forward looking information until the threat of unwarranted litigation was reduced. The SEC too encourages the issuance of management's projections of future economic performance so long as they have a reasonable basis and are presented in an appropriate format (see Item 10(b) of Regulation S-K). See also Walther (1993) and Bannister, Newman and Chalos (1995).

[4]The one period model envisages a situation where the manager receives a signal of the liquidating value of the firm and has to decide whether to disclose or withhold it. The disclosure of information is costly and the managers objective is to maximize price. The basic friction in this model is as follows. Managers, by disclosing, are incurring a fixed cost which reduces the ultimate liquidating value of the firm. But by withholding the information, the market fears the worst and therefore heavily discounts the value of the firm. In a costless environment full disclosure is optimal (Grossman, 1981), but in Verrecchia's model the existence of a cost of disclosure allows some managers not to issue forecasts. By allowing a cost of disclosure, the market does not know if the manager withheld information because it is bad news or if it is reasonably good news, but not good enough to warrant incurring the cost of disclosure.

disclosure threshold level decreases as the precision of the signal increases.[5] In the extreme case of a zero precision information signal, disclosure has no value to the market and therefore the manager never discloses. In contrast, some degree of disclosure is optimal with perfect information.[6]

Another theoretical model in this area is developed in Chapter 2, which modifies Verrecchia's model to consider the risk of litigation if realized earnings do not meet market expectations. In the model in Chapter 2 the manager's objective is to minimize expected litigation costs with the choice of whether to make a forecast.[7] One result of this model, which is consistent with Verrecchia (1990) is that managers generating perfect information signals have higher incentives to disclose earnings forecasts compared to managers receiving

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[5]The basic intuition rests on the relative weights that the market would place on its priors and the information that the manager discloses or withholds. The relative weight the market places on the manager's private information (given the market's prior) decreases with the decrease in precision, thereby reducing the pressure on the manager to disclose.

[6]Penno (1997) studies the frequency of voluntary disclosure of non-proprietary information (i.e., costless disclosure), within a model of uncertain information endowment (See Dye, 1985). In this setting, voluntary disclosures are not necessarily positively associated with quality of information.

[7]By disclosing, the manager ensures better alignment of market expectations but is more likely to be sued if actual earnings fall short of the revised expectations. Since the cost of disclosure or non-disclosure in this model is dependent on the difference between actual and expected earnings and the probability of being sued, the manager has to choose the option that minimizes expected litigation costs. In keeping with reality and the current institutional setting (O'Brien, 1997, Francis, Philbrick and Schipper, 1994a), the manager faces an asymmetric loss function in that only negative earnings surprises are litigated.

signals with no information.[8] Both studies suggest that the decision to issue earnings predictions depend on the quality of the forecast the manager can generate (see Exhibit 1).

The quality of a manager's information signal is unobservable in itself. However, there are several factors that could affect signal quality. Two critical factors are considered in this paper.

Competence of managers

Managerial competence is far ranging in its effect on the firm including resultant superior products, employee relations, customer relations and even recruitment of future managers (Sah and Stiglitz, 1991). In addition, effective workplaces are characterized by good decision making structures and communication systems among other things (Brancato, 1997). Dutter (1969) suggests that good managers are 'results oriented' and have a basis for evaluating current performance and developing future plans. Davenport et al. (1989) discuss how top management can influence the quality and effectiveness of a firm's information systems. Competent managers are therefore looked upon as ones who use good management information systems and internal controls that assist them in delivering good performance.[9]

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[8]Another result of the model in Chapter 2 is that it switches the Verrecchia (1983) threshold by establishing an equilibrium wherein the manager has incentives to disclose all realizations of his information signal upto a threshold point and withhold disclosure of signals realizations whose value is greater than the threshold point. This would suggest that managers have incentives to disclose bad news and withhold good news, which is consistent with existing empirical literature (Skinner, 1994, Kasznik and Lev, 1995).

[9]In fact, external audit planning typically involves determining a qualitative estimation of the competence of the management while determining audit risk (Anderson and Marchant,

The above discussion suggests that competent managers are more likely to generate more precise information, including earnings forecasts, which increases their incentives to issue earnings forecasts.[10]

Hypothesis 1a: Firms with competent managers are more likely to issue earnings forecasts than other firms.

Product dynamism

A second factor, affecting the quality of the information signal, arises when the manager is faced with a product base that is continually changing. Forecasting revenues from products recently introduced is more difficult than forecasting revenues from mature products. This difficulty arises on several counts, including forecasting the market's response to the products (Erickson, 1990). In addition to determining sale quantities, managers also have to estimate factors such as price and advertising response. Smith, McIntyre and Achabal (1994) suggest that "the updated (sales) forecasts form the basis for adjusting inventory levels and *financial projections.*" Marketing researchers devote a great deal of attention to developing sales forecasting models (see Smith, McIntyre and Achabal, 1994). The forecasting models are usually variants of time series models. Therefore, as the manager gathers more information i.e., has more observations in the sample, he is able to generate better sales and revenue forecasts. In other words the manager has the benefit of

1989).

[10]Lees (1981) finds one of the principal reasons for managerial reluctance to issue forecasts is the "management's lack of confidence in their ability to predict future trends and events."

prior experience and prior inside knowledge making it easier to generate a precise forecast. Bowman and Gatignon (1995) study another hurdle in predicting the performance of new products i.e., the competitors' response to the introduction of new products and its effect on the product sales and pricing. Given the above arguments, managers of dynamic product-base firms are expected to generate less precise information signals than managers of firms with a stable product-base, resulting in lower incentives to issue earnings forecasts.

Hypothesis 2a: Managers of firms with a dynamic product base are likely to forecast less frequently than managers of firms with a stable product base.

Form of the Forecast

While both models discussed earlier relate information quality to the managers' decision to issue forecasts, they are silent about its effect on the form of the forecast. Managers issue forecasts of varying precision including point and range forecasts. Point forecasts are where the manager predicts the exact amount of earnings, while range forecasts predict the range in which earnings would fall (or, the upper bound or lower bound of earnings). Kim and Verrecchia (1991) in analytically examining trading volume and price reactions to public announcements find that price change at the time of an announcement is increasing in the precision of the announcement. Baginski, Conrad and Hassell (1993) provide empirical evidence supporting this theoretical result. They find that the association between unexpected earnings and unexpected returns is increasing in forecast precision.[11] The study also establishes positive association between the precision of the forecast issued and the reduction in the dispersion of analysts forecasts. While these findings indicate potential benefits of more precise forecasts, Bamber and Cheon (1998) examine a potential drawback to making more precise forecasts. They argue that more precise forecasts are more likely to be inaccurate and therefore subject firms to increased litigation exposure. The study finds evidence that firms faced with greater exposure to legal liability are less likely to issue specific forecast. Consequently range forecasts are less risky than point forecasts but are also less informative to the financial markets. Managers who wish to issue forecasts but do not have sufficient quality information to make a point forecast could choose to issue a range forecast. If one views "no" forecasts, "range" forecasts and "point" forecasts as part of a continuum of forecast precision, it is likely that the manager with higher quality information would opt for a higher precision forecast (see Exhibit 1). Since the quality of information a managers generates depends on his competence and the variability in the firm's product base, this leads us to the following hypotheses:

Hypothesis 1b: Precision in the form of earnings forecasts issued is increasing in managerial competence.

Hypothesis 2b: Precision in the form of earnings forecasts issued is decreasing in product dynamism.

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[11]However Pownall, Wasley and Waymire (1993) do not find significant differences in stock price effects across forecast forms.

Order Backlogs (Non-accounting information)

The decision to forecast earnings, while dependent on the quality of the manager's information, could also depend on other forward-looking information available to the financial market participants that would assist them in forecasting earnings. While such information can take on several forms (including qualitative disclosures of product information), one critical non-accounting information item is the disclosure of order backlog information. Securities and Exchange Commission's Regulation S-K requires firms to disclose in their 10K, dollar amounts of their order backlog if material[12]. Lev and Thiagarajan (1993) suggest that order backlog is a leading indicator of future sales and earnings and watched by analysts[13]. Behn (1996) finds that changes in order backlog affects returns through their ability to signal future changes in earnings. Order backlog data disclosed by the firm is a credible source of information for estimating potential earnings since it has an direct effect on the earnings numbers to be realized. Therefore the decision to issue earnings forecasts depends on the quality of the information signal as well as the

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[12]Regulation S-K requires industry segment disclosure which would encompass 'to the extent material to an understanding of the registrant's business taken as a whole, the description of each such segment shall include the information specified in paragraphs (c)(1) (I) through (x) of this section'. Paragraph (c)(1)(viii) requires disclosure of 'The dollar amount of backlog orders believed to be firm, as of a recent date and as of a comparable date in the preceding fiscal year, together with an indication of the portion thereof not reasonably expected to be filled within the current fiscal year, and seasonal or other material aspects of the backlog'.

[13]They find for example that change in order backlogs(relative to sales) is the most closely watched indicator in the computer industry.

extent to which order backlogs assist the market in predicting earnings (see Exhibit 1). Assuming production capacity is relatively inelastic in the short run, high order backlogs would ensure that the sales in the forthcoming period are relatively unambiguous. This would facilitate accurate earnings predictions by the financial markets, thereby diminishing the managers' incentive to issue earnings forecasts.[14,15]

Hypothesis 3: Likelihood of earnings forecasts occurring is decreasing in the value of order backlog information

As discussed earlier, issuance of a forecast that turns out to be erroneous subjects a firm to considerable litigation and reputation risk. If a manager generates a low quality information signal and issues a forecast, there is a higher likelihood it would turn out to be erroneous and would subject the firm to high potential litigation costs. Under these circumstances the manager is unlikely to hazard issuing an earnings forecast and order

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[14]If order backlog information were private information and not disclosed to the markets, I would expect a positive association between amount of backlogs and the forecasting decision, since backlogs would assist the manager in generating a better forecast. Since backlog information is mandatorily disclosed to the markets, it reduces the managers' incentive to risk using a costlier form of disclosure (i.e., earnings forecasts).

[15]This hypothesis ties in well with Verrecchia's (1990) finding that a manager's incentive to disclose an information signal is decreasing in the quality of information the market possesses. The basis intuition here is that with better information the market is less reliant on the manager's disclosure of information, which reduces the managers incentive to disclose. Order backlog information is a means of providing information to the market. Higher backlog information improves the markets information about forthcoming earnings thereby reducing the pressure on the manager to issue earnings predictions.

backlog information disclosed to the market is not likely to affect his decision. I therefore do not expect a negative association between earnings forecast likelihood and order backlog information (see Exhibit 1). On the other hand, managers who are likely to generate reasonably good predictions of earnings (Category 2 in Exhibit 1) are likely to consider order backlog information when deciding to issue a forecast. These managers face lower costs of disclosure and are therefore more willing to issue a forecast. At the same time these managers would not disclose if the market already has sufficient information to predict earnings accurately. For these firms I would expect a negative association between forecast likelihood and value of order backlogs.

> Hypothesis 4: Managers who are likely to generate less precise earnings forecasts will not consider order backlog information in deciding whether to issue earnings forecasts.

Hypotheses 3 and 4 highlight the importance of non-accounting information that may reduce the need to forecast earnings. Alternative forms of disclosure are not limited to mandated disclosure like order backlog information and could include voluntary disclosures of product information, information on mergers, etc, but unlike order backlog their effect on short term earnings is likely to be of second order importance.

Data and Method

Sample Selection

Management earnings forecasts used in this study are obtained from First Call Corporation.[16] The Corporate Investor Guidelines (CIG) database maintained by First Call Corporation has 1,910 forecasts made during the fiscal years 1995-1996. These are earnings predictions issued prior to the end of the fiscal period to which they relate. A screen was applied to sort out some industries. Utilities, financial and investment firms are very different from industrials. Utilities are regulated and have different disclosure policies and tend to disclose more than other firms (Kasznik and Lev, 1995). Financial and investment firms have added uncertainty emanating from interest rates, exchange rates and loan portfolios. These differences are not fully captured in the analysis and therefore the firms in those industries were deleted. Further, firms belonging to transportation, entertainment and non-profit organizations were also deleted from the sample.[17] The various screens limited the sample used in this study to 1,537 forecasts by agricultural, mining and industrial firms.

The descriptive statistics relating to these forecasts are given in Table 3-1. Panel B shows the distribution of annual and quarterly forecasts. Of the 1,537 forecasts 563 are

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[16] I am grateful to Mr. Stan Levine and First Call Corporation for making available the database of management forecasts and analyst forecasts.

[17] Compustat does not report order backlog information for transportation firms.

annual and 974 are quarterly forecasts. Panel C provides the industry distribution of the sample. Panel D reflects the number of firms in the forecasting sample. Of the 915 firms in the sample, 563 have only one forecast during the sample period. It is interesting to note, however, that 352 firms have two or more forecasts during the two years effectively covered by the sample. This suggests that management forecasts may not be as infrequent as is normally perceived.

Empirical Methodology

In this section I describe the methodology adopted to test each hypothesis, including describing the proxies used and variable construction. Data on firm characteristics are collected from Compustat, unless a different source is specifically identified.

Hypotheses 1a, 2a and 3

These hypotheses are tested using binomial logistic regression. The general form of the regression model used in the tests is:

$$EF1 = \beta_0 + \beta_1 COMPETENCE + \beta_2 DYNAMISM + \beta_3 BACK + \beta_4 VOLATILE + \beta_5 SIZE + \beta_6 ISSUE + \beta_7 BETA + \epsilon$$

EF1	is equal to 1 if the firm made a forecast during the sample period, and 0 otherwise;
COMPETENCE	proxied by scaled long-term incentive compensation relative to industry, or ROE ratio relative to industry;
DYNAMISM	proxied by R&D/Sales, or analysts forecasts of long-term growth;
BACK	dollar value of order backlog information disclosed by the company scaled by sales;
VOLATILITY	standard deviation of earnings measured over 48 quarters ending December 1996;

SIZE — is the average of the 1995 and 1996 fiscal year-end market value of common stock;

ISSUANCE — set equal to 1 if the firm engaged in external financing over the sample period, and 0 otherwise;

BETA — is calculated using the market model for all trading days in the fiscal year considered;

The forecasting sample is merged with all firms[18] on the Compustat primary, supplementary, tertiary (PST) files and the Full Coverage file[19]. All the observations with non-missing data are used in hypothesis testing. This estimation is designed to minimize potential bias by making the test sample as close to the population as possible. Forecast observations are coded 1 and non-forecast observations are coded 0.

While managerial competence is unobservable, it can be expected to manifest in forms that are observable. One indicator of managerial competence is the compensation that the manager receives in the form of long-term incentive compensation[20]. Long-term incentive payouts are payments made upon achievement of three to five year financial performance goals. Klein (1995), in a Conference Board survey, found long-term incentive compensation to be increasing in importance with around half the firms surveyed using them

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[18]Firms belonging to industry codes between 4000-4800, 6000-7000 and above 7500 are dropped. The industries dropped include transportation, utilities, banking and financial institutions, non-profit and entertainment.

[19]Firms on Compustat which are not in the forecasting sample are treated as non-forecasting and coded 0.

[20]This is a better measure than salary, since salary tends to be fixed and not directly linked to performance.

as an incentive mechanism. One of the reasons attributed to the increasing interest in this form of compensation is the belief that regular option plans can benefit participants in rising markets even if performance is not upto standards. Information on long-term incentive compensation is collected from the Execucomp® database. The compensation is scaled by sales to control for potential size effects. In addition, to control for potential industry differences in the structure of incentive plans, the scaled compensation is differenced from the industry mean (*ACOMP*). However since choice of compensation scheme could depend on the factors such as risk aversion of the manager, I also use total compensation received by the manager as an alternative proxy for competence. Total compensation includes compensation received in the form on salary, bonus and the value of options received (valued using the Black-Scholes option pricing method). This variable is scaled by firm sales and adjusted for industry averages (*ATOTCOMP*).

Another manifestation of managerial competence is the performance of the firm relative to other firms in the industry. Sah and Stiglitz (1991) argue that "there are large differences in individuals' abilities and that the abilities of those in leadership inevitably affect the performance and survival of the organization." Firms that outperform others in the same industry are more likely to have competent managers at the helm. Performance in this study is measured by the firm's return on equity, the maximization of which is one of the critical goals of every manager.[21] To distinguish between more and less competent managers I measure the firm's ROE ratio relative to the industry mean (*AROE*).

One indicator of a dynamic product base is the amount a firm expends on developing new products and processes. This is reflected in the research and development (R&D) expenditure that a firm incurs. Firms with a high amount of R&D would be continually developing and introducing new products. Since R&D expenditure varies depending on the size of the firm, I use R&D expenditures expressed as a percentage of sales (*RD*) to proxy for the volatility in the product base.

Another proxy of product dynamism is the analysts' estimates of the firm's long-term earnings growth (*GROWTH*). This is a broad measure and would capture several factors, including a dynamic product base. Firms for which analysts expect high long-term growth would normally be characterized by a dynamic product base, which would make forecasting earnings more difficult. Analysts' forecasts of 5 years future growth is collected from the Zacks database which is available on Compact Disclosure.

Regulation S-K requires firms to disclose dollar amounts of their order backlog if material (see note 12 above). It follows that firms that do not disclose backlog information are likely to be those with small amounts of backlog sales orders. These firms are assigned zero backlog orders because absence of disclosure implies immaterial amounts. The dollar

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[21]A study by the Ernst & Young Center for Business Innovation found that earnings was among the top two measures of performance for managers, financial analysts and portfolio managers and investors. For a more detailed discussion see Brancato (1997).

values of the backlogs are scaled by sales (*BACK*) in order to provide an indicator of the extent to which a firm's sales are predetermined.

The control variables I use have been established in prior literature to be associated with the earnings forecast decision. Prior literature consistently shows evidence supporting the association between firm size and earnings forecasts (e.g. Kasznik and Lev, 1995, and Kross, Lewellen and Ro, 1994). Large firms have been found to have a greater predilection to forecasting than small firms. Lang and Lundholm (1993) suggest this association could be a result of economies of scale that occur in preparation costs of disclosure. If disclosure costs have a fixed component then the cost per unit of size is decreasing. Also, previous papers have established an association between the number of analysts and earnings forecasts (e.g., Yeo and Ziebart, 1996). Since analysts following and firm size are highly correlated only size is included as a control variable. The size proxy (*SIZE*) is measured as the average of the 1995 and 1996 fiscal year-end market values of the firm's common stock.

Waymire (1985) studied the association between a firms' earnings volatility and the frequency of management earnings forecasts. Kross, Lewellen and Ro (1994) have a similar measure called stability (Std. Deviation of ROE). In order to control for the effect of earnings volatility, I use the standard deviation of quarterly earnings as a proxy. The proxy (*VOLATILE*) is calculated as the standard deviation in quarterly earnings measured over 48 quarters ending 1996.

Frankel, McNichols and Wilson (1995) document a positive association between the firm's frequency of accessing capital markets and the tendency to disclose earnings forecasts. The proxy for external financing (*ISSUE*) is set to equal 1 if the firm has issued equity during the fiscal years 1995 and 1996 and 0 otherwise. The data on stock issuances is obtained from the database maintained by the Securities Data Corporation.

Following Lev and Penman (1990) and Kross, Lewellen and Ro (1994), I include firm beta in my analysis to control for potential systematic risk effects. While Lev and Penman do not find an association between risk and the decision to forecast earnings, Kross, Lewellen and Ro (1994) find a negative association. Firm beta (*BETA*) is calculated using the market model over all the trading days for a year prior to the fiscal year end of the company. For example, if a firm's fiscal year ends 1/31/96, then beta for that observation is calculated over the trading days in the year ending 1/31/96.

Hypothesis 1b and 2b

These hypotheses relate to the form of the forecast (point or range). Baginski and Hassell (1997) adopt the ordered logit technique when studying the form (or precision) of management earnings forecasts. They find precision of annual earnings forecasts is affected by firm size, analysts following and forecast horizon. Kross, Lewellen and Ro (1994), using a binomial logistic regression, find that quantitative and qualitative forecasters are substantially homogenous in their characteristics. I test the hypotheses using an *ordered probit* regression as given below

$$EF2 = \beta_0 + \beta_1 COMPETENCE + \beta_2 DYNAMISM + \beta_3 BACK + \beta_4 VOLATILE + \beta_5 SIZE + \beta_6 ISSUE + \beta_7 BETA + \epsilon$$

All the variables are as described earlier except EF2, where:

EF2 is equal to 3 if the firm made a point forecast during the sample period, 2 if a range forecast was made, 1 if an upper or lower bound forecast is made and 0 if no forecast is made.

Both the studies mentioned above concentrate on samples consisting of forecasters while ignoring the non-forecasters as a category. A potential problem with this method is that it, in effect, truncates the error distribution and using a logit or probit analysis on the truncated distribution could yield inconsistent or erroneous results. One way to overcome this problem would be to run a censored logistic regression analysis. Another way would be to complete the distribution by including the category of non-disclosers, which is the method I adopt in this study.

Hypothesis 4

In order to test hypothesis 4, I rank all observations with non-missing data into two categories based on each of the variables that could affect the quality of forecast the manager can generate.[22] Category 1 consists of lower information quality firms which are in the highest (lowest) third of all firms based on R&D expenditure or analysts forecast of long-term growth (industry adjusted ROE). Category 2 consists of the remaining firms that are of higher information quality. I then run a binomial logistic regression of the following form for each category within each of the two sub-groups

$$EF1 = \beta_0 + \beta_1 BACK + \beta_2 VOLATILE + \beta_3 SIZE + \beta_4 ISSUE + \beta_5 BETA + \epsilon$$

EF1 is equal to 1 if the firm made a forecast during the sample period and 0 otherwise

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[22] I use R&D expenditure, analysts forecast of long-term growth and industry adjusted ROE in this section as factors affecting the quality of information the manager can generate. I do not use managerial compensation as it does not have enough observations to allow for partitioning the sample.

All other variables are as defined earlier. The above logistic regressions identify the association between order backlog and the occurrence of the forecasting decision for each category of information quality. The purpose is to test if managers who are likely to generate low quality forecasts are indifferent to order backlog information.

Results

Descriptive Statistics and Correlation Analysis

The sample statistics in Panel A of Table 3-2 reflect the comprehensive nature of the sample. All firms on the Compustat PST and Full Coverage files, with non-missing data are included in the sample. The average R&D to Sales ratio is about 76%. The average market value of equity for a firm in the sample is $2 billion with a standard deviation of around $8 billion. The average beta is 0.93 which is consistent with expectations. Average firm order backlog is 11% of sales. The correlation matrix is given in Panel B of Table 3-2.

[See Table 3-2]

Hypothesis 1a, 2a and 3

The results of the binomial logistic regression are given in Table 3-3. The first column of co-efficients reflect results using industry adjusted ROE (*AROE*) as the proxy for managerial competence and R&D/Sales (*RD*) as the proxy for product dynamism. The coefficient on *AROE* is positive as predicted and highly significant. The co-efficient on *RD* is negative as expected and significant at the 1% level. Consistent with the hypothesis the coefficient on *BACK* turns out negative and significant at 1%. All the control variables are consistent with prior findings (except *BETA*) and are signficant at 1% except for *VOLATILE* which is significant at 5%. The chi-square for all covariates is 227.03, which is highly significant.

The results using analysts forecasts of long-term growth (*GROWTH*) as the proxy for product dynamism (in column 2) are consistent with the hypotheses. The coefficients on *GROWTH* and *BACK* are negative and highly significant. *AROE* continues to be positive but is not significant at conventional levels. The results on the control variables are similar to column 1. The chi-square on the log likelihood is 149.14, which is significant at 1%.

The last two columns use industry adjusted long-term incentive payouts (*ACOMP*) as an alternative proxy for competence.[23] This reduces the sample size though the sample is still large at about eleven hundred observations. The results using *ACOMP* are qualitatively similar to the prior two cases. The only difference is that the stock issuance control variable (*ISSUE*) is no longer significant. The variables of interest are of the predicted sign and highly significant.

[See Table 3-3]

The results suggest that product dynamism and competence have a significant effect on a forecasting decision. In addition, order backlog information is strongly (negatively)

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[23]The results using total compensation (*ATOTCOMP*) as the proxy for managerial competence is provided in Table 3-9. Column 1 reflects results using R&D expenditure as the proxy for product dynamism, while results using analysts forecasts of growth and given in column 2. The results are consistent with expectations and with the findings in Table 3-3.

associated with the decision. This has implications on the importance of other forms of disclosure that condition the forecasting decision of the manager[24].

Hypothesis 1b and 2b

Hypothesis 1b and 2b deal with the form of the forecast disclosure. They partition the forecast disclosure *finer* along the precision dimension : no forecasts, upper/lower bound forecasts, range forecasts and point forecasts.

The results of the ordered probit regression using industry adjusted long-term incentive compensation as the proxy for managerial competence and R&D expenditure and analysts forecasts of long-term growth as proxies for product dynamism are given in Table 3-4. The coefficient on R&D expenditure (*RD*) is negative and significant as expected. The alternative product dynamism variable (*GROWTH*) is negative too and highly significant. Order backlog (*BACK*) information has a negative and significant influence on the forecasting decision, across both the specifications. Similarly, the extent to which the managers long-term incentive compensation exceeds industry average (*ACOMP*) has a positive and significant influence on the forecasting decision. All the control variables are of the correct sign and are significant.

Table 3-4 also provides information on the estimated cutoff points μ_1, μ_2, and μ_3 that define the boundaries between no forecasters, upper/lower bound forecasters, range

[24]The results in Table 3-3 include multiple observations for firms that have made multiple forecasts. The results are qualitatively similar for tests using only one observation per forecasting firm.

forecasters and point forecasters. A test of equality between μ_1 and μ_2 is rejected (p-value $< 1\%$) suggesting that no forecasters are a group distinct from upper/lower bound forecasters who are in turn distinct from range forecasters. Similarly tests of equality between μ_2 and μ_3 is rejected (p-value $< 1\%$) suggesting that these groups are distinct from point forecasters.

In order to determine the marginal effect on the dependent variable resulting from a unit increase in an explanatory variable, one needs to determine the partial derivative of the function. In a linear regression the partial derivative is the regression co-efficient itself and is therefore easy to interpret. But in an ordered probit, the partial derivative is dependent not only on the coefficient but also the predicted value of the dependent variable, thus making coefficient signs difficult to interpret though this is often done in the extant literature.[25] In Table 3-4, the co-efficient signs can be directly used to determine the effect of each variable on the probability of point forecasters and no-forecasters. But, to interpret the effect of a variable on range forecasters I need to determine it's marginal effect on probabilities of each of the groups. Table 3-5 provides information on the marginal effects of each of the coefficients on the various groups. The marginal effects are consistent with the hypotheses. Group 1 provides the marginal effect of each variable on the probability of no-forecasts (p_0), upper/lower bound forecasts, range forecasts and point forecasts (p_3) respectively using *RD* as a measure of product dynamism. Group 2 provides the marginal effect of each variable on the respective probabilities using *GROWTH* as a measure of product dynamism. The

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[25]See Greene (1993), Crown (1998) and Train (1984) for a discussion of this issue.

marginal effects of *RD* and *GROWTH* on upper/lower bound forecasters, range forecasters and point forecasters are negative as expected, with a higher negative effect on point forecasters than upper/lower bound forecasters and range forecasters. This suggests that product dynamism proxies not only impact a manager's disclosure decision, but also the form of the forecast. The marginal effect on both range and point forecasts is increasing in industry adjusted long term incentive compensation. The effect of order backlog information (*BACK*) on the forecasting decision is interesting. A 1% increase in order backlog to sales ratio decreases the probability of a range forecast occurring by 3.4% and 2.8% under the two specifications. The effect on point forecasters is 8.6% and 7.2% respectively. This suggests that order backlog information not only has a substantial impact on the forecasting decision, but also on the form of the forecast. The control variables used here have been previously studied only the context of forecasting decisions. Their effect on the form of a forecast has not been previously studied and is therefore a novel finding. A unit increase in size increases the probability of both a point and a range forecast with a greater impact on the probability of point forecasts occurring. However the co-efficient on stock issuance is not significant. The results indicate that both the variables of interest and the control variables do affect the decision to issue range and point forecasts in the posited direction.[26]

[See Tables 3-4 and 3-5]

[26]The marginal effect of each variable was determined by determining the marginal effect for each observation and then computing the average effect.

Tables 3-6 and 3-7 provide results of the ordered probit regressing using industry adjusted return on equity (*AROE*) as the proxy for managerial competence.[27] Consistent with expectations and the findings in Table 4A, the coefficient on *RD* and *GROWTH* are negative and significant. Industry adjusted return on equity is positive under both columns but significant only in column 1. The coefficient on order backlogs is negative and significant further suggesting that order backlogs not only influence the managers decision to issue forecasts but also influences the form of the forecast. In addition, the coefficient on *ISSUE* is posit and significant under both specifications. Consistent with the findings in Table 3-4, μ_1, μ_2, and μ_3 are significantly different from each other providing further support for the distinctness of the various groups in the analysis. Table 3-7 which reflects the marginal probabilities derived from the coefficients in Table 3-6 provides results consistent with expectations and to that in Table 3-5.

[See Tables 3-6 and 3-7]

Hypothesis 4

The results from testing hypothesis 4 are given in Table 3-8. Panel A has firms grouped in categories based on R&D while Panel B uses analysts forecasts of long-term

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[27]The results using total compensation (*ATOTCOMP*) as the proxy for managerial competence is provided in Tables 3-10 and 3-11. Column 1 reflects results using R&D expenditure as the proxy for product dynamism. Column 2 reflects results using analysts forecast of long-term growth as the proxy for product dynamism. The coefficients on *ATOTCOMP*, *RD* and *GROWTH* are consistent with expectations while the coefficient on order backlog is not significant. Table 3-11 provides details of the marginal effect of each of the explanatory variables.

growth to categorize the sample. Panel C uses ROE ratio to group the sample. In all three panels, the coefficient on order backlog for category 1 (the lower quality information generated) is insignificant. The null hypothesis of no association between order backlog information and the forecasting decision cannot be rejected for this group. The coefficient on order backlog for the category 2 (higher quality information generated) is negative and significant in all three panels. Comparison of the two categories provides support for the argument that firms that are likely to generate poor quality forecasts will be indifferent to order backlog information, since the cost of disclosing the forecast would be steep in any event.

[See Table 3-8]

Summary and Conclusions

In this paper I examine how factors affecting the quality of information generated by a manager affect a managers decision (i) to issue an earnings forecast as a means of communicating information to the markets and (ii) the form (precision) of the forecast chosen. I also examine the interaction between a mandated non-accounting disclosure (order backlog) and the forecast disclosure decision.

Baginski and Hassell (1997) state that "scant empirical evidence currently exists on the motivations for voluntary disclosure." This study identifies several factors that influence a manager's disclosure decision. Managers who receive compensation that is above industry average have a greater likelihood of making a forecast. Similarly, managers of firms with return on equity that outperforms the industry are more likely to issue an earnings forecast. Further, R&D/Sales and analysts forecast of long-term growth are both negatively associated with the likelihood of forecast occurrence. Finally, I examine the effect that a non-accounting disclosure (order backlog information) has on a managers decision to forecast earnings. Order backlogs are negatively associated with the decision to forecast earnings.

I also examine the effect of the above factors on the form of the forecast issued (point or range or upper/lower bound). I adopt an ordered probit estimation approach to analyze the problem. The analysis yields results consistent with the hypotheses. Proxies for product dynamism have a greater negative marginal impact on point forecasters than range forecasters suggesting that point forecasts are more likely to be issued by firms with a stable product base. Similarly the negative marginal impact on range forecasters is higher than the impact on upper/lower bound forecasters. The results on the proxy for managers' competence suggest that competent managers are more likely to make point forecasts over range forecasts and upper/lower bound forecasts. The form of the forecast issued is also affected by the order backlog information disclosed, size of the firm and whether the firm issued equity stock in the sample period.

Table 3-1
Description of the Sample of 1,537 Earnings Forecasts made over the period 1995-96

Panel A: Sample Selection Criteria

Criteria	No. of observations
Initial sample of Management Earnings Forecasts	1,810
Less:	
Industry screen	(273)
Usable Forecasts	1,537

Panel B: Distribution of the sample by fiscal year end

	Number of forecasts					
Year	Yearly	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
1995	231	87	94	122	102	636
1996	332	130	129	149	161	901
Total	563	217	223	271	263	1,537

Panel C: Industry distribution of the sample

	Number of Forecasts					
Industry	Yearly	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
Agriculture	3	0	0	1	1	5
Mining	14	3	3	2	6	28
Building Construction	10	0	1	1	3	15
Food	24	9	12	15	9	69
Textiles	13	4	1	7	7	32
Lumber and Furnishings	12	4	4	4	4	28
Paper & Printing	34	8	14	9	7	72
Chem. & Petroleum	51	11	13	22	18	115
Metals & Rubber	49	23	22	15	21	130
Machinery, Computer and Misc.	183	76	74	117	102	552
Communications	6	4	3	4	6	23
Wholesale & Retail	100	45	49	45	46	285
Personal & Bus. Services	64	30	27	29	33	183
Total	563	217	223	271	263	1,537

Panel D: Distribution based on the number of forecasts made by a firm

Number of forecasts	1	2	3	4	5 or more	Total
Number of firms	563	200	87	40	25	915

Table 3-2
Descriptive Statistics

Panel A : Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
EF	3005	0.24	0.43	0.00	1.00
RD	3005	0.76	5.28	0.00	89.04
GROWTH	2510	20.34	10.98	0.00	200.00
AROE	2942	-0.04	19.46	-749.43	49.22
BACK	3005	0.11	0.28	0.00	6.91
ISSUE	3005	0.15	0.36	0.00	1.00
VOLATILE	3005	18.20	78.04	0.013	1890.94
BETA	3005	0.93	0.94	-6.20	19.37
SIZE	3005	2123.54	8722.69	0.11	141296.50
ACOMP	1157	- 0.0025	0.17	-1.54	1.74

Panel B : Correlation Martrix

	EF	*RD*	*AROE*	*BACK*	*ISSUE*	*VOLATILE*	*BETA*	*SIZE*	*GROWTH*
RD	-0.0613	1.0000							
AROE	0.0272	-0.0064	1.0000						
BACK	-0.0610	-0.0422	-0.0111	1.0000					
ISSUE	-0.0945	0.0166	-0.0356	0.0105	1.0000				
VOLATILE	0.0627	-0.0281	0.0067	0.0026	-0.0206	1.0000			
BETA	0.1674	-0.0067	-0.0102	-0.0010	0.1861	-0.0040	1.0000		
SIZE	0.1658	-0.0306	0.0144	-0.0265	-0.0423	0.6268	0.0146	1.0000	
GROWTH	-0.1100	0.0724	-0.0333	0.0078	0.2333	-0.1810	0.3526	-0.1512	1.0000
ACOMP	0.1160	-0.0266	0.0026	0.0053	0.0633	-0.0185	0.0145	0.0072	-0.0327

EF	is 1 if the firm made a forecast during the sample period and 0 otherwise
ACOMP	long-term incentive compensation paid during 1995, scaled by sales and adjusted for industry average
AROE	Return on equity relative to industry
RD	average of the 1995 and 1996 R&D/Sales ratios
GROWTH	average of the 1995 and 1996 analysts forecasts of long-term growth
BACK	average of the 1995 and 1996 dollar values of order backlogs scaled by sales
VOLATILE	standard deviation of earnings measured over 48 quarters ending Dec.1996
SIZE	average of the 1995 and 1996 fiscal year-end market values of common stock
ISSUE	set equal to 1 if the firm engaged in external financing over the sample period
BETA	average of the beta calculated for the fiscal year 1995 and 1996

Table 3-3
Binomial Logistic Regression Explaining Occurrence of Management Earnings Forecasts (Hypothesis 1a, 2a and 3)

EF1 is the discrete dependent variable taking on value of 1 if the firm made a forecast during the sample period and 0 otherwise. ACOMP is the long-term incentive compensation paid during 1995 adjusted for industry average. AROE is a the average of the 1995 and 1996 return on equity adjusted for industry average. RD is the average of the 1995 and 1996 R&D/Sales ratios. GROWTH is the average of the 1995 and 1996 analysts forecasts of long-term growth. BACK is the average of the 1995 and 1996 dollar values of order backlogs scaled by sales. VOLATILE is the standard deviation of earnings measured over 48 quarters ending December 1996. SIZE average of the 1995 and 1996 fiscal year-end market values of common stock. ISSUE is a dummy variable set equal to 1 if the firm engaged in external financing over the sample period and 0 otherwise. BETA is the average of the beta calculated over the fiscal years 1995 and 1996.

	Estimated Co-efficient t-statistic			
Variable (expected sign)	(1)	(2)	(3)	(4)
AROE (+)	0.03412 ***	0.01472		
	2.50	1.15		
ACOMP (+)			1.5143 ***	0.8724 **
			2.79	2.11
RD (-)	-0.18516 ***		-1.6368 ***	
	-3.23		-2.79	
GROWTH (-)		-0.04478 ***		-0.02468 **
		-7.80		-2.04
BACK (-)	-0.75915 ***	-0.56888 ***	-0.8360 ***	-0.7351 ***
	-3.47	-2.91	-2.61	-2.55
ISSUE (+)	0.52143 ***	0.29343 ***	0.0204	-0.2332
	4.47	2.59	0.08	-1.05
VOLATILE (-)	-0.00221 **	-0.00438 **	-0.00293 **	-0.00298 ***
	-2.31	-3.85	-2.45	-2.57
BETA (?)	0.45446 ***	0.50958 ***	0.50874 ***	0.5922 ***
	8.26	7.33	3.86	4.48
SIZE (+)	0.00005 ***	0.00004 ***	0.00004 ***	0.00003 ***
	6.35	5.08	4.14	4.06
INTERCEPT (?)	-1.67253 ***	-0.19812 **	-0.5310 ***	-0.1928
	-20.96	-1.77	-3.46	-1.00
# of obs	2936	2471	838	1058
Chi Square	227.03	149.14	78	65.4

***,** represents significance at 1% and 5% respectively level

Table 3-4
Ordered Probit Regression Explaining Form of Management Earnings Forecasts
(Hypotheses 1b and 2b)

EF2 is the discrete dependent variable taking on value of 3 if the firm made a point forecast, 2 if the firm made a range forecast, 1 if the firm made an upper bound or lower bound forecast and 0 otherwise. ACOMP is the long-term incentive payout adjusted for industry average. RD is the average of the 1995 and 1996 R&D/Sales ratios. GROWTH is the average of the 1995 and 1996 analysts forecasts of long-term growth. BACK is the average of the 1995 and 1996 dollar values of order backlogs scaled by sales. VOLATILE is the standard deviation of earnings measured over 48 quarters ending December 1996. SIZE average of the 1995 and 1996 fiscal year-end market values of common stock. ISSUE is a dummy variable set equal to 1 if the firm engaged in external financing over the sample period and 0 otherwise. BETA is the average of the beta calculated over the fiscal years 1995 and 1996. OBSPROB is the observed distribution of no forecasters, upper/lower bound, range and point forecasters. PREDPROB is the predicted probability of no forecasters, upper/lower bound, range and point forecasters. μ_1, μ_2 and μ_3 are the cutoff points from the ordered probit.

	Estimated Co-efficient t-statistic (1)	(2)
RD (-)	-1.22*** -2.89	
GROWTH (-)		-0.01** -1.75
ACOMP (+)	0.71*** 2.85	0.45** 2.08
BACK (-)	-0.34** -1.97	-0.27** -1.73
SIZE (+)	0.00001*** 3.53	0.00001*** 4.15
VOLATILE (-)	-0.0009** -1.64	-0.001** -2.17
ISSUE (+)	-0.06 -0.46	-0.12 -0.92
BETA (?)	0.32*** 4.25	0.32*** 4.36
CUT1 (μ_1)	0.36	0.18
CUT2 (μ_2)	0.59	0.39
CUT3 (μ_3)	1.17	0.98
# OBS	835	1058
CHI-SQUARE	57.96***	48.55***
OBSPROB	0.5389 0.0862 0.1856 0.1892	0.5274 0.0822 0.1928 0.1975
PREDPROB	0.5410 0.0866 0.1838 0.1884	0.5294 0.0826 0.1910 0.1969

*** , ** and * represent significance at 1% , 5% and 10% level respectively

Table 3-5

Marginal Effects of Ordered Probit Coefficients on Probabilities of Point, Range and No Forecasters

The marginal probabilities under group (1) are derived using the coeffcients from column (1) of Table 4A. The marginal probabilities under group (2) are derived using the coeffcients from column (2) of Table 4A

	(1) (R&D)				(2) (Growth)			
	p_0	p_1	p_2	p_3	p_0	p_1	p_2	p_3
RD	0.4613	-0.0206	-0.1256	-0.3150				
GROWTH					0.0047	-0.0002	-0.0012	-0.0033
ACOMP	-0.2688	0.0120	0.0732	0.1835	-0.1748	0.0066	0.0468	0.1213
BACK	0.1277	-0.0057	-0.0348	-0.0872	0.1046	-0.0040	-0.0280	-0.0726
SIZE	-4.86e-06	2.18e-07	1.32e-06	3.32e-06	-5.12e-06	1.94e-07	1.37e-06	3.55e-06
VOLATILE	0.00034	-0.00001	-0.00009	-0.0002	0.00048	-0.00002	-0.00012	-0.00033
ISSUE	0.0236	-0.001	-0.0064	-0.016	0.0455	-0.0021	-0.0128	-0.0304
BETA	-0.1204	0.0053	0.0328	0.0822	-0.1236	0.0046	0.0331	0.0857

where :

$$p_0 = \frac{\partial \text{Prob}(EF2=0)}{\partial x_i} = -\phi(\mu_1 - \beta' x_i)\beta_i$$

$$p_1 = \frac{\partial \text{Prob}(EF2=1)}{\partial x_i} = (\phi(\mu_1 - \beta' x_i) - \phi(\mu_2 - \beta' x_i))\beta_i$$

$$p_2 = \frac{\partial \text{Prob}(EF2=2)}{\partial x_i} = (\phi(\mu_2 - \beta' x_i) - \phi(\mu_3 - \beta' x_i))\beta_i$$

$$p_3 = \frac{\partial \text{Prob}(EF2=3)}{\partial x_i} = \phi(\mu_3 - \beta' x_i)\beta_i$$

ϕ is the standard normal density function, μ_1, μ_2 and μ_3 are the cutoff points for the ordered probit.

Table 3-6
Ordered Probit Regression Explaining Form of Management Earnings Forecasts
(Hypotheses 1b and 2b)

EF2 is the discrete dependent variable taking on value of 3 if the firm made a point forecast, 2 if the firm made a range forecast, 1 if the firm made an upper bound or lower bound forecast and 0 otherwise. AROE is a the average of the 1995 and 1996 return on equity adjusted for industry average. RD is the average of the 1995 and 1996 R&D/Sales ratios. GROWTH is the average of the 1995 and 1996 analysts forecasts of long-term growth. BACK is the average of the 1995 and 1996 dollar values of order backlogs scaled by sales. VOLATILE is the standard deviation of earnings measured over 48 quarters ending December 1996. SIZE average of the 1995 and 1996 fiscal year-end market values of common stock. ISSUE is a dummy variable set equal to 1 if the firm engaged in external financing over the sample period and 0 otherwise. BETA is the average of the beta calculated over the fiscal years 1995 and 1996. OBSPROB is the observed distribution of no forecasters, upper/lower bound, range and point forecasters. PREDPROB is the predicted probability of no forecasters, upper/lower bound, range and point forecasters. μ_1, μ_2 and μ_3 are the cutoff points from the ordered probit.

	Estimated Co-efficient t-statistic (1)				(2)			
RD (-)	-0.32*** -5.54							
GROWTH (-)					-0.02*** -7.37			
AROE (+)	0.01** 1.87				0.01 0.91			
BACK (-)	-0.38*** -3.28				-0.24** -2.25			
SIZE (+)	0.00002*** 6.14				0.00002*** 5.36			
VOLATILE (-)	-0.0007* -1.57				-0.002*** -3.60			
ISSUE (+)	0.32*** 4.67				0.21*** 3.17			
BETA (?)	0.27*** 8.54				0.26*** 7.02			
CUT1 (μ_1)	1.01				0.21			
CUT2 (μ_2)	1.18				0.38			
CUT2 (μ_2)	1.63				0.89			
# OBS	2901				2474			
CHI-SQUARE	213.58***				122.34***			
OBSPROB	0.7677	0.0445	0.0934	0.0945	0.6497	0.0598	0.1418	0.1487
PREDPROB	0.7700	0.0444	0.0917	0.0936	0.6519	0.0597	0.1399	0.1482

***, ** and * represent significance at 1% , 5% and 10% level respectively

Table 3-7
Marginal Effects of Ordered Probit Coefficients on Probabilities of Point, Range and No Forecasters

The marginal probabilities under group (1) are derived using the coeffcients from column (1) of Table 4A. The marginal probabilities under group (2) are derived using the coeffcients from column (2) of Table 4A

	(1) (R&D)				(2) (Growth)			
	p_0	p_1	p_2	p_3	p_0	p_1	p_2	p_4
RD	0.0905	-0.0108	-0.0300	-0.0496				
GROWTH					0.0084	-0.0006	-0.0025	-0.0053
AROE	-0.0040	0.0004	0.0013	0.0022	-0.0022	0.0002	0.0006	0.0013
BACK	0.1096	-0.0131	-0.0363	-0.0600	0.0857	-0.0065	-0.0255	-0.0536
SIZE	-5.67e-06	6.81e-07	1.88e-06	3.11e-06	–6.03e-06	4.61e-07	1.80e-06	3.77e-06
VOLATILE	0.0002	-0.00002	-0.00006	0.0001	0.0007	-0.00005	-0.0002	-0.0005
ISSUE	-0.0974	0.0104	0.0306	0.0565	0.0755	0.0050	0.0212	0.0492
BETA	-0.0772	0.0092	0.0256	0.0423	-0.0943	0.0072	0.0281	0.0590

where :

$$p_0 = \frac{\partial \text{Prob}(EF2=0)}{\partial x_i} = -\phi(\mu_1 - \beta' x_i)\beta_i$$

$$p_1 = \frac{\partial \text{Prob}(EF2=1)}{\partial x_i} = (\phi(\mu_1 - \beta' x_i) - \phi(\mu_2 - \beta' x_i))\beta_i$$

$$p_2 = \frac{\partial \text{Prob}(EF2=2)}{\partial x_i} = (\phi(\mu_2 - \beta' x_i) - \phi(\mu_3 - \beta' x_i))\beta_i$$

$$p_3 = \frac{\partial \text{Prob}(EF2=3)}{\partial x_i} = \phi(\mu_3 - \beta' x_i)\beta_i$$

ϕ is the standard normal density function, μ_1, μ_2 and μ_3 are the cutoff points for the ordered probit.

Table 3-8

Logistic Regression Testing the Effect of Order Backlog on Occurrence of Management Earnings Forecasts (Partitioned Samples)

(Hypothesis 4)

EF1 is the discrete dependent variable taking on value of 1 if the firm made a forecast during the sample period and 0 otherwise. AROE is a the average of the 1995 and 1996 return on equity adjusted for industry average. RD is the average of the 1995 and 1996 R&D/Sales ratios. GROWTH is the average of the 1995 and 1996 analysts forecasts of long-term growth. BACK is the average of the 1995 and 1996 dollar values of order backlogs scaled by sales. VOLATILE is the standard deviation of earnings measured over 48 quarters ending December 1996. SIZE average of the 1995 and 1996 fiscal year-end market values of common stock. ISSUE is a dummy variable set equal to 1 if the firm engaged in external financing over the sample period and 0 otherwise. BETA is the average of the beta calculated over the fiscal years 1995 and 1996. Category 1 (likely to generate poor quality forecasts) consists of observations in the highest third based on RD and GROWTH and lowest third based on AROE. Category 2 consists of the remaining observations

Categories based on

	Panel A: RD		Panel B: GROWTH		Panel C: AROE	
	Category1	Category2	Category1	Category2	Category1	Category2
BACK	-0.145	-1.002***	-0.216	-0.786***	-0.021	-1.316***
	-0.509	-3.89	-0.712	-3.274	-0.39	-3.26
VOLATILE	0.005	-0.002**	0.003	-0.003***	-0.052***	0.006***
	0.611	-2.03	0.542	-3.43	-4.44	-2.46
SIZE	0.0001***	0.00004***	0.0001***	0.00003***	0.0052***	0.00007
	2.98	4.99	2.70	4.51	12.02	5.28
ISSUE	0.344***	0.579***	0.576***	0.0001	0.174**	0.223
	1.92	4.04	3.52	0.001	0.32	1.30
BETA	0.443***	0.534***	0.214***	0.702***	-0.070	0.674***
	5.25	7.02	2.37	7.71	-0.93	8.90
INTERCEPT	-2.064***	-1.39***	-1.432***	-0.761***	-1.159***	-2.891***
	-12.73	-16.50	-8.25	-8.15	-11.84	-26.05
# obs	997	2089	766	1813	1375	2937
chi-square	100.95***	149.73***	39.44***	108.56***	528.02***	183.77***

***, ** represent significance at 1% & 5% level respectively

Table 3-9
Binomial Logistic Regression Explaining Occurrence of Management Earnings Forecasts
(Hypothesis 1a, 2a and 3)

EF1 is the discrete dependent variable taking on value of 1 if the firm made a forecast during the sample period and 0 otherwise. ATOTCOMP is the total compensation paid during 1995 adjusted for industry average. RD is the average of the 1995 and 1996 R&D/Sales ratios. GROWTH is the average of the 1995 and 1996 analysts forecasts of long-term growth. BACK is the average of the 1995 and 1996 dollar values of order backlogs scaled by sales. VOLATILE is the standard deviation of earnings measured over 48 quarters ending December 1996. SIZE average of the 1995 and 1996 fiscal year-end market values of common stock. ISSUE is a dummy variable set equal to 1 if the firm engaged in external financing over the sample period and 0 otherwise. BETA is the average of the beta calculated over the fiscal years 1995 and 1996.

	Estimated Co-efficient t-statistic	
Variable (expected sign)	(1)	(2)
ATOTCOMP (+)	0.5593 ***	0.6424
	16.01	18.27
RD (-)	-12.79 ***	
	-8.33	
GROWTH (-)		-0.1574 ***
		-6.75
PATENT (-)		
BACK (-)	-0.5960	-0.0432 **
	-1.17	-0.09
ISSUE (+)	-0.6694 **	-0.3923
	-1.84	-1.08
VOLATILE (-)	-0.0006	-0.0018
	-0.51	-0.92
BETA (?)	0.6301 ***	0.8873 ***
	3.14	4.18
SIZE (+)	0.00005 ***	0.00004 ***
	4.01	3.15
INTERCEPT (?)	1.67 ***	3.62
	6.54	9.28
# of obs	810	1033
Chi Square	554.53	799.14

***,** represents significance at 1% and 5% respectively level

Table 3-10
Ordered Probit Regression Explaining Form of Management Earnings Forecasts
(Hypotheses 1b and 2b)

EF2 is the discrete dependent variable taking on value of 3 if the firm made a point forecast, 2 if the firm made a range forecast, 1 if the firm made an upper bound or lower bound forecast and 0 otherwise. ATOTCOMP is total compensation adjusted for industry average. RD is the average of the 1995 and 1996 R&D/Sales ratios. GROWTH is the average of the 1995 and 1996 analysts forecasts of long-term growth. BACK is the average of the 1995 and 1996 dollar values of order backlogs scaled by sales. VOLATILE is the standard deviation of earnings measured over 48 quarters ending December 1996. SIZE average of the 1995 and 1996 fiscal year-end market values of common stock. ISSUE is a dummy variable set equal to 1 if the firm engaged in external financing over the sample period and 0 otherwise. BETA is the average of the beta calculated over the fiscal years 1995 and 1996. OBSPROB is the observed distribution of no forecasters, upper/lower bound, range and point forecasters. PREDPROB is the predicted probability of no forecasters, upper/lower bound, range and point forecasters. μ_1, μ_2 and μ_3 are the cutoff points from the ordered probit.

	Estimated Co-efficient t-statistic (1)				(2)			
RD (-)	-3.67***							
	-4.71							
GROWTH (-)					-0.06***			
					-6.40			
ATOTCOMP (+)	0.25***				0.21**			
	19.93				21.71			
BACK (-)	0.11				0.08			
	0.61				0.47			
SIZE (+)	0.00001***				0.00001***			
	3.06				3.57			
VOLATILE (-)	0.0003				-0.0006			
	0.54				-0.99			
ISSUE (+)	-0.31**				-0.10			
	-2.01				-0.69			
BETA (?)	0.20**				0.28***			
	2.20				3.43			
CUT1 (μ_1)	-0.68				-1.18			
CUT2 (μ_2)	-0.25				-0.82			
CUT3 (μ_3)	0.55				-0.47			
# OBS	800				1033			
CHI-SQUARE	532.90***				602.04***			
OBSPROB	0.5188	0.0900	0.1938	0.1975	0.5198	0.0833	0.1955	0.2014
PREDPROB	0.5423	0.0991	0.1713	0.1872	0.5450	0.0927	0.1756	0.1865

*** , ** and * represent significance at 1% , 5% and 10% level respectively

Table 3-11
Marginal Effects of Ordered Probit Coefficients on Probabilities of Point, Range and No Forecasters

The marginal probabilities under group (1) are derived using the coeffcients from column (1) of Table 4A. The marginal probabilities under group (2) are derived using the coeffcients from column (2) of Table 4A

	(1) (R&D)				**(2) (Growth)**			
	p_0	p_1	p_2	p_3	p_0	p_1	p_2	p_3
RD	0.8602	-0.0182	-0.1795	-0.6624				
GROWTH					0.0143	-0.0005	-0.0033	-0.0104
ACOMP	-0.0585	0.0012	0.0122	0.0451	-0.0558	0.0019	0.0130	0.0407
BACK	-0.0278	0.0005	0.0058	0.0214	-0.0210	0.0007	0.0050	0.0156
SIZE	-2.72e-06	5.76e-08	5.68e-07	2.10e-06	-3.19e-06	1.12e-07	7.45e-07	2.33e-06
VOLATILE	-0.00073	1.55e-06	0.00002	0.00006	0.00017	-5.88e-06	-0.00003	-0.00012
ISSUE	0.0744	-0.0016	-0.0055	-0.0573	0.0266	-0.0009	-0.0062	-0.0194
BETA	-0.0467	0.0010	0.0097	0.0359	-0.0737	0.0002	0.0172	0.0538

where :

$$p_0 = \frac{\partial \text{Prob}(EF2=0)}{\partial x_i} = -\phi(\mu_1 - \beta' x_i)\beta_i$$

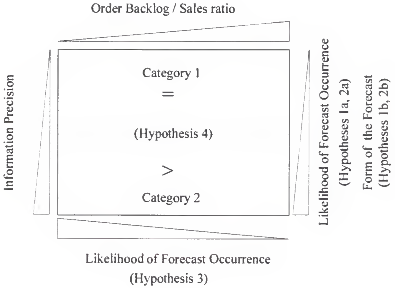
$$p_1 = \frac{\partial \text{Prob}(EF2=1)}{\partial x_i} = (\phi(\mu_1 - \beta' x_i) - \phi(\mu_2 - \beta' x_i))\beta_i$$

$$p_2 = \frac{\partial \text{Prob}(EF2=2)}{\partial x_i} = (\phi(\mu_2 - \beta' x_i) - \phi(\mu_3 - \beta' x_i))\beta_i$$

$$p_3 = \frac{\partial \text{Prob}(EF2=3)}{\partial x_i} = \phi(\mu_3 - \beta' x_i)\beta_i$$

ϕ is the standard normal density function, μ_1, μ_2 and μ_3 are the cutoff points for the ordered probit.

Exhibit 1



Hypotheses 1a and 2a suggest that the likelihood of earnings forecast issuance is increasing in the quality of information the manager is likely to generate.

Hypotheses 1b and 2b suggest that the precision of the forecast issued is increasing in the quality of information the manager is likely to generate.

Hypothesis 3 relates likelihood of forecast occurrence to the relative amount of order backlog, by suggesting a negative association between the two.

Hypothesis 4 extends hypothesis 3 by suggesting that for firms in the lower range of information precision we should not expect a negative association between backlog information and forecast likelihood.

CHAPTER 4
SUMMARY AND CONCLUSIONS

In this study I theoretically and empirically examine a manager's incentives in issuing an earnings forecast. The model developed in this paper focuses on the effect of the disclosure decision on the expected litigation costs to the firm. An implication of the model is that managers have an incentive to withhold favorable realizations of the information signal while disclosing adverse realizations of the signal. In addition, consistent with prior work the decision to issue a forecast is conditioned on the quality of the information the manager generates. I test some implications of the model using a database of 1,537 management earnings forecasts made during the fiscal years 1995 and 1996 (provided to me by First Call). In addition I examine the effect of a non-accounting source of information on the manager's incentive to issue forecasts.

The empirical analysis yielded a number of interesting results. First, firms with skilled or competent managers at the helm are more likely to issue earnings forecasts. The proxies for managerial competence were also found to be positively associated with the form (point or range) of the forecast. Second, firms with greater uncertainty in their product base are less likely to issue management forecasts. Proxies for product dynamism were also negatively associated with the form of the forecast issued. Third, forecast occurrence was found to be negatively associated with the availability of an alternative source of information, namely order backlog information. Fourth, the form of forecast issued was found to be positively associated with the decision to raise equity from the capital markets. Fifth, proxies for managerial competence and firm dynamism were found to be associated with the tenor of the news being disclosed. Firms with competent managers at the helm and a stable product base were found to be more willing to disclose both good and bad news forecasts, while less competent managers and managers of dynamic product base firms were likely to desist from issuing good news forecasts.

The findings of this research has important implications in our understanding of differential firm disclosure practices. It furthers our understanding of why many firms desist from issuing forecasts. In addition, it suggests potential factors that influence the form or specificity of the forecast. It also provides some explanation for why some firms have a propensity to issue bad news while other are willing to issue good and bad news. An understanding of all these factors is vital in light of the current debate on expanding the scope of financial reporting to include forward-looking information.

There are several potential directions for future research. The most interesting and promising path would be to study the choice of qualitative disclosures (e.g., product information, organizational disclosures) and their effect on the managers incentive to issue forecasts. Many of the firms that do not issue forecasts could be mitigating the information asymmetry problem by choosing to issue other forms of disclosures. A study of the conditions where managers choose alternative forms of disclosure would be very interesting. While the current study is carried out in a cross-sectional setting and therefore provides insight into cross-sectional differences in forecasting practices, it would be relevant and interesting to study factors that influence temporal differences in forecasting practices.

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BIOGRAPHICAL SKETCH

Sanjeev Bhojraj was born in Bombay, India in 1969. He received his Bachelor of Commerce degree from University of Madras in 1989, while receiving the outstanding student award from his college. In 1989, he passed the requisite examinations and became a member of the Institute of Cost and Works Accountants of India. In 1992, while working as a trainee for Citibank N. A. Sanjeev qualified as a Chartered Accountant. He secured a national rank in the examinations held by the Institute of Chartered Accountants of India.

Sanjeev worked for Citibank N. A. as an assistant manager until 1993 before moving to Indonesia. He worked as a supervisor in the Corporate Audit Department of the Sinar Mas Group till 1994. Sanjeev joined the doctoral program in accounting at the University of Florida in 1994 and received his Ph.D. in 1999. His current interests are in empirical and modeling issues relating to discretionary disclosure by corporations and corporate governance. Sanjeev has accepted a faculty position at Cornell University.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Rashad Abdel-khalik, Chairman
Graduate Research Professor of Accounting

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Bipin B. Ajinkya
Professor of Accounting

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

for Anwer Ahmed

Anwer Ahmed
Associate Professor of Accounting

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

John K. Simmons
KPMG Peat Marwick Distinguished Service Professor of Accounting

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Chunrong Ai
Associate Professor of Economics

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

M. Nimalendran
Associate Professor of Finance,
Insurance and Real Estate

This dissertation was submitted to the Graduate Faculty of the Fisher School of Accounting in the College of Business Administration and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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Dean, Graduate School