CREDIBILITY OF ANNUAL MANAGEMENT EARNINGS FORECASTS: THEORY AND EVIDENCE

by

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(ABSTRACT)

Much of accounting research is predicated on the fact that the capital markets operate well because disclosures of annual earnings are verified. It is generally observed, however, that market responses to the unverified management forecasts may be as strong as responses to similar, verified information disclosures. This dissertation is concerned with the credibility of such unverified information. Three hypotheses are investigated in the study. The data includes managements' annual earnings forecasts gathered from the 1986 to 1992 editions of the Wall Street Journal.

The first hypothesis concerns the timing of the disclosure of the forecasts by management. It is tested by comparing liquidity and leverage ratios at the event date to prior same-firm ratios. Evidence is found that supports the

conclusion that the firm is preparing the market for a possible capital offering.

The second hypothesis concerns the asymmetry of information between the firm and investors. This asymmetry affects the stock market reaction. It is tested using OLS regressions with the market reaction as the dependent variable and various asymmetry surrogates as independent variables. Evidence is found that supports the conclusion that as more investors follow the firm, there is less new information associated with the management forecast disclosure. Further, as fewer investors follow the firm, there is a lower tendency to disclose forecasts.

The third hypothesis concerns the ability of the firm to provide credible communication. It is tested using OLS regressions with the market reaction as the dependent variable and various proprietary information surrogates as independent variables. Weak support is found for the conclusion that those firms releasing proprietary information through the forecast disclosure provide more credible communication. The support is restricted to the negative forecasts. For positive forecasts, it may be that reputation is most important to investor response.

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CHAPTER 1

INTRODUCTION

This dissertation is concerned with the credibility of unverified and voluntary annual earnings forecast disclosures by management. Much of accounting research is predicated on the fact that the capital markets operate well because disclosures of annual earnings are verified. It is generally observed, however, that market responses to the unverified management forecasts may be as strong as responses to similar, verified information disclosures. If verification is absent, why are these disclosures credible?

The above noted problem is separated into three questions. The first question addressed is: Why do firms choose to disclose at a particular time? The question is investigated by analyzing the timing of disclosures by comparing a firm's event period ratios with those ratios outside the event period. The second question addressed is: Does firm knowledge impact investor response to the information? The question is investigated by looking at the information asymmetry between investors and management. The third question addressed is: What substitutes for a verification process? The final question is investigated by

comparing the responses to differing amounts of proprietary information disclosures.

Results indicate that a combination of factors makes management forecasts credible. Management forecasts tend to be disclosed when firms may be seeking external financing; thereby providing the firms with an incentive to disclose. Moreover, the investment community tracks disclosers better than nondisclosers; thus, investors are able to better assess the unverified information. Lastly, greater stock price reactions to the public disclosure of management earnings forecasts are noted for those firms that release proprietary information; thus the information is credible because disclosure is costly.

1.1 STATEMENT OF OBJECTIVE

Earnings forecasts that are voluntarily disclosed by corporations present a unique environment for studying the supply and demand for financial information. These disclosures are not confounded by regulation, and the legal sanctions that may have curtailed such disclosures have been severely limited by the Safe Harbor Rule For Projections (SEC, 1979).[1] On the supply side, forecasts are potentially available from every company that prepares budgets,

[1] This rule protects disclosers of forecasts and plans from liability as long as the projections were prepared in good faith with reasonable assumptions. This lack of regulatory sanctions, however, may impede the credibility of forecasts.

projections and forecasts. Further, the size and sophistication of the market does not limit the demand for useful information in any meaningful way. Within this relatively unrestricted environment, researchers have attempted to address questions of information transfer.

The concept of voluntary disclosure is broad. Adoption of an accounting policy prior to the policy being mandated, is a voluntary disclosure (for instance, a company may have adhered to SFAS No.33 prior to the statement becoming part of GAAP). Other voluntary information may also be included in annual reports (e.g. topics in the Management Discussion and Analysis). Voluntary disclosures may be oriented toward public interest (e.g. an article in Time Magazine about pollution controls installed by a firm), or oriented to the financial community if disclosed through the financial press (e.g. most articles in The Wall Street Journal). This study focuses on earnings forecasts disclosed through the financial press. This medium is assumed to be an explicit venue of the financial community: investors and investments.

Earnings forecasts have been shown to be useful to investors.[2] Because substantial resources are expended by analysts to predict earnings, Diamond (1985) predicted that all firms would release useful information. Lees (1981),

[2] Evidence of the usefulness of voluntarily disclosed forecasts has a rich tradition. Examples include Foster (1973), Patell (1976), Penman (1980), Ajinkya and Gift (1984), Waymire (1984), McNichols (1989), Pownall and Waymire (1989a), Lev and Penman (1990), and Kasznik and Lev (1995), to name a few.

however, estimated that only about 10% of public companies voluntarily provide earnings forecasts to the market. Subsequent empirical studies have generally confirmed this estimate. Assuming that most firms prepare forecasts, are only 10% of earnings forecasts useful? Further, some firms disclose forecasts frequently and some infrequently. Does inconsistent disclosure impact the credibility of forecasts?[3] The primary objective of this study is to investigate the forecast signal to aid understanding of why few firms release forecasts, and why investors are able to rely on the forecasts.

Contracts can be written to allow for full disclosure on either a firm basis or for society as a whole, but opinions on regulating forecast disclosures are diverse. Efficient market proponents view accounting regulations as hindrances to full and fair disclosure (Benston, 1973). Standards setters, on the other hand, believe that regulation of public disclosures is critical to a fair market (FASB, 1978; SEC, 1934).

---

[3] Credibility refers to the believability of the information. Jennings (1987) also investigated the credibility of earnings forecasts and equates credibility with believability. It is assumed that information must be relevant and credible for a market reaction to occur. SFAC 2 describes three components of useful information: relevance, reliability, and comparability. Disclosures investigated herein are earnings forecasts, thus, comparability is not a concern. The word "credibility" is used instead of reliability to be consistent with other studies on voluntary disclosures. SFAC 2 identifies three components of reliability: verifiability, neutrality, and representational faithfulness. Without third party verification of the forecast, it is questionable how these three components are demonstrable.

Voluntary and mandatory disclosures are not independent of each other. Bushman (1991) demonstrates that interaction between the two may provide users with qualitatively superior information. Given that the purpose of the regulated reporting function is to provide users of limited resources and ability with relevant investing information (AICPA, 1973), a close examination of voluntary disclosures is warranted (cf. Johnson, 1992). Where systematic benefits are observed, they may be extrapolated to society through financial reporting's codification.

In this financial market setting, the following research questions are addressed.

1. What are the characteristics of disclosing firms that influence those firms to voluntarily supply earnings forecasts at a point in time?
2. What are the demand characteristics of firms' ownerships that impact on firms' decisions to voluntarily disclose earnings forecasts?
3. Noting that the disclosures are not audited, why are they credible?

1.2 SIGNIFICANCE OF RESEARCH

On the surface, it is rational for firms to release earnings forecasts voluntarily only when benefits follow. Unfortunately, this description is not supported by at least

three empirical observations. First, firms release bad news as well as good news: Waymire (1984) concluded that the Penman (1980) sample is about equally divided between positive and negative surprise earnings expectations.[4] This implies a willingness by firms to incur a penalty for the negative surprise. Second, negative market reactions have been associated with (negative) earnings forecast releases (Waymire, 1984). This implies that investors believe the forecasts and assign a penalty for the negative surprises. Third, non-forecasting firms are not systematically penalized (Lev and Penman, 1990). This implies a lack of benefit attributed to the set of disclosing firms for their voluntary disclosures.

Researchers, regulators, and professionals have expressed interest in voluntary earnings forecast releases. Reviewing the samples of the studies cited in footnote 2, it is evident that the release of forecasts is not a consistent activity for most firms. Firms may disclose once or several times during a period, or may stop and go. As will be demonstrated later, the lack of consistent disclosure is evident in every study, so there do not appear to be systematic changes in disclosure frequencies through time. Little published evidence is of a longitudinal nature;

[4] Waymire (1984) calculates the surprise by taking the difference between the forecasted earnings per share and the closest prior analyst forecasts. Ajinkya and Gift (1984) reach the same conclusions from a separate data set.

therefore, few conclusions can be reached regarding discloser characteristics (see, however, Frankel, McNichols, and Wilson, 1995, for an analysis of disclosing firms' financing histories).

King, Pownall and Waymire (1990), hereafter KPW, review extant evidence and conclude that no theory adequately explains voluntary earnings forecast disclosures. KPW (p. 120) reach the following conclusions from empirical evidence:

1. Forecasts have information content, which is conditioned on other information.
2. Firms do not have regular policies for disclosure.
3. Forecasts are not systematically biased.
4. Forecasts tend to be disclosed later in the fiscal year.

In general, management earnings forecasts are useful and the market finds them credible. But, few have investigated why these unverified disclosures are credible.

Regulatory interest in earnings forecast disclosure has spanned twenty years. Table I presents a chronology of relevant regulatory activity. The table demonstrates that the SEC has not found it necessary to regulate forecasts to any significant extent. Concern by legislators has not blossomed into law. If disclosure of forecasted earnings is

mandated, then proprietary corporate strategy may be compromised (Lees, 1981; McGrath and Walsh, 1973; Stern, 1984). Regulators are concerned, however, that uninformed investors may be misled by forecasts while "insiders" benefit (see Penman, 1982, 1985). The present study provides evidence that may aid regulators' assessments of the necessity of forecast regulation.

Professionals have also demonstrated concern over the reliability of management forecasts. Analysts and market participants rely to a great extent on management information releases (Lees, 1981; McGrath and Walsh, 1973; Lorinc, 1992). Recent concerns of over-reliance have been noted in the financial press (e.g. Wall Street Journal, May 6, 1991). In this article, it is reported that firms may intentionally underestimate their forecasts in order to obtain a "good" surprise when year-end results are announced. While no substantial legal statutes have been established, professional standards have. Table II presents a time line of professional standards for presenting and reporting earnings forecasts. As can be seen, disclosure of earnings forecasts has been left largely voluntary. The AICPA has not promulgated strong preparation or reporting guidelines.

TABLE I

TIME LINE OF SEC EARNINGS FORECAST ACTIVITY

1971:	SEC announces that it is considering mandatory earnings forecast disclosures.
≈	
1973:	SEC publishes "Statement by the Commission on the Disclosure of Projections of Future Economic Performance" (the Statement).
≈	
1975:	SEC publishes rules and required forms for the Statement.
1976:	SEC withdraws the Statement.
≈	
1978:	SEC releases guidelines for the voluntary disclosure of earnings forecasts.
1979:	SEC adopts a "safe harbor" rule for financial forecasts.
≈	
1982:	SEC releases instructions for the preparation and presentation of pro forma financial information.

(table adapted from Cameron, 1986)

TABLE II

TIME LINE OF AICPA EARNINGS FORECAST ACTIVITY

1980:	AICPA releases "Guide for a Review of a Financial Forecast."
≈	
1983:	AICPA issues for review "Proposed Guide for Prospective Financial Statements."
1984:	ASB releases for comment "Reporting on Pro Forma Financial Information in SEC Filings."
1985:	ASB releases "Statement on Standards for Accountant's Services on Prospective Financial Information."
1986:	AICPA releases "Guide for Prospective Financial Statements."
≈	
1989:	AICPA issues "Questions Concerning Accountants Services on Prospective Financial Statements."
1990:	AICPA issues "Accountants' Financial Statements for Internal Use Only and Partial Presentations."

(table adapted from Cameron, 1986)

I conclude that research into management earnings forecasts has practical as well as theoretical importance. When researchers are able to understand why unverified disclosures are believed by the market participants, regulatory and professional interests will benefit.

1.3 OUTLINE OF DISSERTATION

1.3.1 Theoretical Foundation

Information transfer may take place when at least two entities possess different amounts of information. The manager of a firm, for example, possesses more information about the firm than do investors. This information asymmetry is a familiar economic setting and can be further described as either a moral hazard problem or an adverse selection problem (Kreps, 1990).

Moral hazard problems occur after a contract between two entities has been signed. The contract stipulates performance measures and rewards. If the performance involves activities (e.g. effort) that are not observable and these activities imperfectly affect the measurement of the performance (the greater the effort, the higher the performance), then a moral hazard problem may exist. A standard solution to moral hazard problems is the use of incentives. Because the manager also receives remuneration based on the success of the project, there is incentive to expend great effort to achieve high performance.

Note that moral hazard problems occur after a contract is made. The stewardship attribute of accounting information helps reduce these problems. The information transfer presented here involves earnings forecasts. Forecasts do not measure past performance; therefore, the incentive solution

may not apply. This future oriented information helps investors evaluate expected performance instead of adherence to terms of a contract (past performance). This evaluation is related to the decision to invest in the firm. In other words, the investor uses the forecast before the contract is made.

When, prior to a contract, one entity has information another does not have, the asymmetry results in an adverse selection problem. How does the investor know the investment is not a "lemon"? A standard solution for adverse selection problems is market signaling. This present study adopts a signaling model to investigate the research questions identified in Section 1.1.

Critical to a signaling model is that signals have costs that are different for the low and the high quality firm. Given that firms prepare budgets/forecasts, incremental costs of disclosure may be insignificant. When Lev and Penman (1990) found no systematic penalty imposed on non-disclosers, the results may have been hampered by not adequately identifying firms with successful signals. Indeed, Dye (1985) describes earnings forecasts as non-proprietary information that does not alter a firm's cash flows, so releasing a forecast has little cost and, therefore, little signal value.

Costs of forecast disclosures may be described in a two-market signaling model. In this model, the disclosure of forecasts is a signal made in a public forum composed of two outside parties with interests in the firm: competitors and investors. Competitors are motivated to "harm" the firm economically. Investors are motivated to help the firm "succeed". Both the investors and the competitors are at an informational disadvantage with regard to the insiders (the firm) so the forecast is useful to both.

The basic cost is derived from the tension between these two outside parties. If private information is released through earnings forecasts,[5] competitors may use the information to harm the firm. If the forecast implies a change in demand, competitors will adjust production levels to earn higher profits, perhaps at the expense of the disclosing firm. The firm has incentive, however, to keep investors informed. If potential investors are uninformed, a lower price will be ascribed to the firm's shares.

This subsection describes the applicability of a signaling model to earnings forecast disclosures. Also presented is justification for applying a two-market signaling model to earnings forecast disclosures. Chapter 3 presents the model more fully.

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[5] Waymire (1984) finds greater market responses to management forecasts of firms not followed by analysts than to forecasts of followed firms.

1.3.2 Empirical Methods

Empirical testing of the signaling model in the present study consists of three essential parts: regression analysis, a portfolio formation, and a matched firm analysis.

The model presented in Chapter 3 demonstrates that a firm may provide costly information to competitors through public release of earnings forecasts. Recognizing this, shareholders react more strongly to a signal from such a firm. This relationship can be tested using a regression methodology with market response as the dependent variable and the publicly issued forecast as the independent variable. Independent variables depicting the cost of disclosure and the level of information asymmetry (high or low) are added to observe different reactions by investors. Because the independent variables are not categorical, their measures are points on a continuum of possible firm characteristics. Success of the signal, measured by the market reaction to the earnings forecast release, is associated with the varying levels of these characteristics.

Empiricists recognize that variable representations and measurements may be noisy, which is typical with social science research. In this study, firms are ranked by variable measures and only extremes from each ranking are reclassified into separate portfolios. Because the measures

may not capture completely the variables conceptualized by the model, using only the extreme approximations provides alternative evidence to test the model. Further, some variables are partitioned into groups by levels, thus creating dichotomous variables rather than continuous variables. OLS regression procedures are used with data from these portfolios.

The last set of tests uses logistic regressions. In a further attempt to address the unavailability of clear surrogates, samples are separated into groups and the tests are repeated to determine the surrogates' ability to discern between the groups. A matched pair design is used with a logistic regression to examine the difference between disclosers and non-disclosers of MF (management forecasts of annual earnings). By matching sample firms on industry and size, the tests can concentrate on the predictions from the signaling model. Size is chosen because it is apparently associated with many information measures.[6] Industry has also been shown to affect measures of market reaction because firms' returns covary, perhaps with unspecified macroeconomic conditions (Han, Wild, and Ramesh, 1989; Pyo and Lustgarten, 1991). Holding these two characteristics (size and industry) constant, critical variables from the

[6] Size has been found to be significantly associated with a firm's return (Keim, 1983), information production (Atiase, 1985), analyst following (O'Brien and Bhushan, 1990), and voluntary disclosures (Cox, 1985; Rhuland et al., 1990, Kasznik and Lev, 1995). All these variables are of concern in this study. Size is also a traditional proxy for agency costs.

signaling model are used to predict membership in various portfolios

1.3.3 Conclusions

Results indicate that the stock market believes the unverified information provided by management. The size and sign of the unexpected earnings explains about 10% of the market reaction to the release of MF, consistent with previous studies.

The first research question identified in Section 1.1 is concerned with characteristics of firms that induce a disclosure at a particular point in time. The results indicate that the financing ability of disclosing firms may be weak prior to MF disclosures. The current ratio tends to decrease and the debt to equity ratio tends to increase. This has not been previously documented and contrasts with previous research conclusions on the soundness of disclosing firms.

The second research question addresses the concern of how investor make-up impacts on the demand for management earnings forecasts: does the level of asymmetry between investors and the firm impact on the demand for forecasts? The results support the conclusion that less asymmetry results in a smaller market reaction, but an increase in the frequency of disclosure of MF's.

The third research question focuses on how the management forecast is determined to be credible. The results are consistent with the conclusion that those firms that release more proprietary information through the management forecast generate a greater market reaction. This result has not been previously documented.

1.3.4 Organization of Dissertation

The remainder of the dissertation is organized as follows. Relevant literature is reviewed in Chapter 2. A review of the two-market simultaneous signaling theory and formalization of predictions from the signaling model are presented in Chapter 3. Empirical methods to test the statistical hypotheses are described in Chapter 4. Results from the empirical tests are presented in Chapter 5. Conclusions and discussion are included in Chapter 6.

1.4 CONTRIBUTIONS AND POLICY IMPLICATIONS

This study contributes to the growing body of evidence concerning mandatory disclosure policies. Significant resources are expended by regulatory agencies to develop standards for disclosure and to monitor these requirements. Further descriptions of the disclosure environment and the participants help to focus standard setters attention on areas where regulation is required. Evidence also helps to focus monitoring efforts on areas that require control.

CHAPTER 2

LITERATURE REVIEW

There is a significant body of empirical research studying management earnings forecast disclosures.[7] Jennings (1987) notes that investors' beliefs are altered by a management earnings forecast for two reasons, (1) the unexpectedness (surprise) and (2) the credibility of the forecast. Few studies have separately addressed the credibility issue.[8]

The literature is organized herein around the issue of credibility. First, Section 2.1 focuses on characteristics of the forecasts. A brief review of the studies offers the immediate conclusion that forecasts are credible. This is because most empirical work presents evidence of market reaction to MF disclosures. Second, Section 2.2 focuses on the characteristics of the forecasters. What factors enhance the credibility of forecasts? Factors may be classified as ownership characteristics and firm specific characteristics.

---

[7] King, Pownall, and Waymire (1990) organize the empirical literature into two broad categories. The first category addresses the informational value of the management earnings forecasts (MF). This category consists largely of market studies. The second category addresses the (hypothesized) selective disclosure by firms. This category consists of studies of firm characteristics.

[8] Jennings (1987), McNichols (1989), and Pownall and Waymire (1989a) explicitly address the credibility of forecasts.

The overall conclusion from these studies is that credibility is not well understood.

2.1 CHARACTERISTICS OF EARNINGS FORECASTS

2.1.1 Market Reactions

A significant market reaction to information is evidence of relevance and credibility. Relevant information that is not credible will not be believed by investors, and credible information that is not relevant will not affect share prices. Both qualities are necessary for information to be useful (per SFAC 2) and both are necessary for a market reaction. Therefore, if a market reaction is observed, credibility can be inferred.

Patell (1976) examined 336 forecasts gathered from the Wall Street Journal (WSJ) for the years 1963-67. Using an OLS estimate of the CAPM, he found a significant market reaction during the week of the publication of the forecast in the WSJ. This reaction is independent of the sign of the "surprise".[9] He did find, however, that the CARs for the highest surprise forecasters are generally positive in the 16 weeks surrounding disclosure, and negative for the lowest surprise forecasters. This is difficult to interpret. The

[9] The "surprise" is the unexpected amount of earnings. For instance, if the forecast is higher than expected by the market, the surprise is positive; if lower, the surprise is negative. Patell (1976) uses three proxies for market expectations: a martingale (prior year's earnings equals expected current year earnings), a martingale with a drift (historical average drift), and a martingale with a drift based on first differences in a market index of earnings.

stock performance may be due to anticipation by the market, to a screening by the market, or to self selection by disclosers.

Penman (1980) analyzed return differences between portfolios of forecasters and non-forecasters (market) formed cross-sectionally between 1968-73. His sample consists of 1,188 forecasts collected from WSJ. He found higher daily returns for the forecast portfolio for the day of and the days surrounding the forecast disclosure. He also found a significant market reaction to the surprise MF conditioned on the prior year's actual earnings. This means that the portfolio differences are not the result of self selection, but instead the forecast incrementally contributes to the return, thereby implying a credible communication. In his study, positive forecast surprises are associated with positive returns, but negative surprises are not significantly different from zero. Penman also found forecasters generally to have earnings per share (and returns) that are higher than the market. It may be that disclosers self select. In any case, Penman questions the ability of the market to rely on voluntary mechanisms for full disclosure.

Waymire (1984), and Ajinkya and Gift (1984) present additional evidence that earnings forecasts are a credible source of information for investors. While Patell (1976) and

Penman (1980) used an earnings expectation based on prior years' actual earnings to determine the surprise of the forecast, Waymire (1984) and Ajinkya and Gift (1984) based the surprise on the closest prior analyst forecast. This innovation provides sharper results and interpretations.

Waymire (1984) used Penman's (1980) data set to measure the information content using abnormal daily returns from a standard market model. He ranked forecasters into 25 portfolios based on size of surprise forecast, and found the magnitude and direction of unexpected forecasted earnings significantly associated with the size and direction of the market reaction. Waymire also provided controls for news releases concurrent with the forecast disclosure.[10] Although he only accounted for earnings and dividend information over days -1, 0, +1 around the forecast release date, the controls allowed for stronger inferences than given by Patell (1976) or Penman (1980), which utilized no controls for concurrent information. Therefore, Waymire's study is the first to clearly establish evidence of credible communication of information via a management earnings forecast.

Ajinkya and Gift's (1984) intended research question relates to the infrequent disclosure of management

[10] Waymire (1984) used the Penman data set and estimated that only 20% of the forecasts were issued **without** any contemporaneous disclosures.

forecasts. Their sample was selected from the WSJ Index for the years 1970-77 and was matched to non-disclosers without any criteria (e.g., size, industry, risk). The authors found a significant market reaction to the disclosures (although a monthly return was used) after controlling for concurrent disclosures[11] for the two weeks on either side of the forecast publication date. This extended control for additional disclosures increased the strength of the evidence for credibility. They found market reaction positively correlated with the sign of the surprise. The study's conclusion is that forecasts are released in order to correct the market's expectations (although their mean surprise forecast was not significantly different from zero). Thus, forecasts occur infrequently because they are only used to correct market (analyst) expectations. Ajinkya and Gift's conclusion is driven by the sign and significance of the returns test. They also concluded that the magnitude of the surprise affects the magnitude of the return, but this result is based on only a two group partition.

Penman (1980) also reports that the abnormal returns measured at the year end's actual earnings release, but conditioned on the forecast, are insignificant,[12] implying

[11] Ajinkya and Gift eliminated from their final sample forecasts with concurrent announcements of earnings, dividends, stock splits or new capital issues within the two weeks centered on the event date.

[12] Penman warns that the results may not be strong due to the small sample size. He points out that Beaver (1968) provides strong evidence of a year-end market reaction, in general.

forecasts to be quite credible. Pownall and Waymire (1989a) specifically addressed the credibility issue, and found evidence similar to Penman's.

Pownall and Waymire (1989a) retained only the multiple disclosers from the Penman (1980) sample, resulting in 134 firms with 313 forecasts. The authors used multiple regression with firms' returns as the dependent variable and four independent variables-- market return, indicator variable for discloser/nondiscloser, surprise earnings announcement, and surprise forecast disclosure. The null hypothesis was that the response coefficient to the sample forecast disclosures (FRC) equals the response coefficient to the earnings announcements (ERC). A seemingly unrelated regression procedure was used to control for cross-sectional covariance and heteroscedasticity. The authors found the FRC to be as strong as the ERC. They conclude that forecasts are as credible as earnings announcements. Interestingly, Pownall et al. (1993), using the same methodology, found evidence to the contrary and conclude that the Pownall and Waymire (1989a) results are sample specific.

McNichols (1989) provides evidence that contradicts any conclusions about the primacy of the information content of voluntary disclosures. Building on Beaver, Lambert and Ryan (1987), McNichols found significant directional correlations ($p<.01$) between the forecast error (actual less MF, all

divided by MF) and pre-forecast abnormal returns. She extended her tests to include a forecast error conditioned on forecast deviation (MF less AF, all divided by AF), and reports a significant directional correlation with pre- and post-forecast abnormal returns. This is interpreted as evidence of the market's wider information set. Additionally, her results do not support Teoh and Hwang's (1991) conclusion that only high quality firms can withstand a current negative market reaction.

McNichols (1989) provides additional evidence of the uncertainty of forecasts. The first concerns the apparent superior credibility attributed to forecasts over actual announcements (Penman, 1980; Pownall and Waymire, 1989a). She presents a cross-sectional multiple regression, with return as the dependent variable and the forecast error and forecast deviation as the independent variables (IVs). She reports that forecast announcement period returns are positively associated with the two IVs, but the pre- and post-announcement returns are only associated with the forecast error. Secondly, she notes that the deviations and the errors have a positive covariance. This means that the market waits for additional evidence before all directional effects are incorporated into the price. Based on this, she concludes that the market does not fully respond to the management information, but investors treat the voluntary

management releases with a healthy reserve (in contrast to Penman, 1980; and Pownall and Waymire, 1989a; and, as will be seen, Lev and Penman, 1990). For this present study, the reservation implies lower credibility.

Jennings (1987) found significant market reactions to analyst forecast revisions, conditioned on MF. The reaction is strongest when both the unexpected MF and the subsequent analyst revision are positive. Jennings attributes this to the confirming effect of the AF revisions. He surmises, like McNichols (1989), that investors do not give full credence to positive unexpected MF.

Lev and Penman (1990) utilized signaling theory to study MF credibility. They asked two questions: do forecasting firms have higher market valuation than nonforecasting firms (the screening question), and do disclosers experience an upward revision in share prices, while nondisclosers experience a downward revision (the price-reaction question)? If the earnings forecasts are credible signals of higher quality firms, then nondisclosures are credible signals of poor quality firms. They measured abnormal returns over a 15 month period starting at the beginning of the fiscal year of the MF. Using an OLS regression, they found (1) that the market value of forecasters' shares is significantly greater than that of nonforecasters; and (2) that the abnormal return at

actual earnings announcement date of forecasters is greater than the abnormal return of nonforecasters. Because the nonforecasters were matched to forecasters based on SIC codes, the authors conclude that the forecasters are screened from similar industry members. This conclusion is important to this dissertation, which utilizes industry measures to derive a signal (see Chapter 3).

Further, Lev and Penman (1990) found positive price residuals at the announcement date for forecasters, but nonforecasters' residuals were not significantly different from zero. This implies that the market does not impose a penalty on nonforecasters; therefore, a penalizing price-reaction mechanism is not supported. This is problematic in a signaling model because separating costs must exist. But the model to be presented in Chapter 3 demonstrates that the nondisclosers may be pooled with the low forecasters; but high quality firms with an adverse selection dilemma are separated from the rest. No new credible information is presented by lowballers; therefore, no price movement results. Lev and Penman's (1990) results are consistent with predictions from this model.

2.1.2 Directional Bias

Researchers have also investigated the existence of bias in the forecast sample. Biased estimates would undermine the credibility of the forecast. A forecast is

biased when the discloser presents information that is significantly different from an objective estimate. Objective estimates have been measured by (1) an algorithm of prior earnings; (2) closest, median, or mean analyst forecast; and (3) market reaction.

Although Patell (1976) and Penman (1980) conclude that voluntary disclosures are positively biased, Ajinkya and Gift (1984) disagree. Ajinkya and Gift reconcile the difference to the fact that the two earlier studies calculated the surprise using estimates from earnings histories. Waymire (1984) confirmed this when he found, based on a comparison with prior analyst forecasts, that the Penman (1980) sample was only marginally positively biased (54% of sample). The Baginski (1987) and Baginski et al. (1993) samples were not significantly biased.

McNichols (1989) concluded that her sample is negatively biased because the cumulative residuals over the sample period were negative. Lev and Penman (1990) used the same measure to reveal a positive bias in their sample. The Pownall et al. (1993) sample appears to have been marginally negatively biased; their surprise was calculated from most recent analyst forecast and includes "open-ended forecasts".[13]

[13] Most studies have provided relatively comparable results because similar criteria were used to determine samples. Included in these criteria was the limitation of MF to point estimates or to midpoints of ranges. Lev and Penman (1990), Pownall et al. (1993), and Baginski et al. (1993) also included forecasts such as

Kasznik and Lev (1995) find some bias in their broader based sample. Their study concerns the disclosure policies with large earnings surprises, so their sample is based on firms with large surprises rather than basing their sample on MF disclosers. Their main result is that less than 10% of the large surprises were pre-empted by MF disclosures (50% of the firms had no information releases prior to the large surprise announcement). Dividing the sample into Good News and Bad News firms (based on Actual Earnings less Expected Earnings), they do not find much difference in point or range MF disclosures. They do find, however, greater use of other types of discretionary disclosures (e.g. qualitative forecasts). Even though the market response is not different for the positive and negative surprise subsamples, they cannot explain much of the positive response (the coefficient for the surprise is insignificant).

It is important to point out that many of these differing results occurred over concurrent sample periods. Generally, the bias question has not been settled, although *a priori* expected bias can have a significant impact on the investor response to MF.

"earnings will be at least..." or "earnings will be at most..." These represent "open-ended" forecasts. Lev and Penman (1992) also included qualitative projections.

2.1.3 Summary

In summary, there exists much evidence of forecast credibility. Contributing to the credibility is the relative accuracy of forecasts (Jaggi, 1980, Waymire, 1986, and Hassell and Jennings, 1986). Additional measures of credible responses include the evidence of interfirm investor information transfer (Baginski, 1987, Pownall and Waymire, 1989b, and Pyo and Lustgarten, 1991), and analyst opinion revisions (Jennings, 1987, and Baginski and Hassell, 1991).

McNichols (1989) demonstrates that this credibility is warranted because of the directionally consistent firm performance after the forecast disclosure. In fact, many other disclosures exist around the forecast date and preceding the disclosure date (thus, pre-empting some of the forecast news). Kasznik and Lev (1995) find the combination of pre-emptions and surprise to be significantly associated with the (negative subsample) market response. Because not all these noisy disclosures are controlled in any of the above mentioned studies, the market reactions may be misstated. Further, Penman (1982) notes that many forecasts do not meet with a significant price reaction. This observation, made over ten years ago, has still not been addressed.

2.2 DETERMINANTS OF EARNINGS FORECAST DISCLOSURES

2.2.1 Firm Factors

The disclosure frequency rates have not changed over the years (Table III). Disclosers, therefore, have not adopted the management forecast for expanded uses. Forecasts are made once or twice, serve their purpose, and do not become part of a (implicit) contractual obligation for the firm. If firm characteristics change significantly, then infrequent forecasts may be associated with the infrequent changes.

2.2.1.1 Earnings History

Reasons for accurate MF have been investigated by Waymire (1985), who reports that the earnings histories of forecasting firms are less volatile than the histories of nonforecasting firms. He divided his 1969-73 sample of forecasters into repeaters (more than one forecast in the sample period) and nonrepeaters. The nonrepeaters were significantly associated with greater earnings volatility and disclosed later in the year. He also found, however, that repeaters' and nonrepeaters' forecasts are equally accurate, and that analysts' forecasts are equally inaccurate for both groups. He concludes that further study into the whole information environment is needed to control for concurrent and substitute releases.

Cox (1985) also examined forecaster earnings stability. He compared nonrepeaters (who disclose MF only once; see Table III) to nondisclosers, matched on size, beta, and 3-digit SIC code during the years 1969-76. Using a Wilcoxon sign-rank test, he found greater variability in earnings of the nondisclosers.

Lev and Penman (1990) also compared the earnings of forecasters to matched nonforecasters (by industry and year-end) and found that nonforecasters had historically flat earnings, but the forecasters had increasing earnings in the year of disclosure. Additionally, the matched nonforecasters had earnings equal to the "market".

The evidence of earnings stability does not produce strong implications for credibility. If earnings histories are stable, then forecasts will not disclose significant surprises and investors should not receive much new information. A study on credibility should study credibility factors of groups partitioned by significant and insignificant market reactions.

2.2.1.2 Other Issues

Cox (1985), Rhuland et al. (1990), and Lev and Penman (1990) report disclosers to be significantly larger as measured by market value of common stock. Cox (1985) and Lev and Penman (1990) confirm that the market risk of disclosers and nondisclosers is similar.

TABLE III

FREQUENCIES OF EARNINGS FORECASTS PER FIRM

Study	Years	# of Firms	% One Time	% Two Times	Three or More	Full Sample
Lev & Penman[a]	68-75	1382	55%	25%	0%	-
Ajinkya & Gift	70-77	191	74%	18%	8%	-[c]
Jaggi	71-74	121	71%	35%[d]	-	-
Baginski	78-83	51	94%	4%	2%	-[c]
Jennings	79-83	88	83%	13%	3%	1%
Han, Wild & Ramesh	79-82	149	77%	22%[d]	-	1%
McNichols	79-83	425	69%	21%	8%	10%
Pyo &[b] Lustgarten	79-85	65	77%	17%	6%	-[c]
Cairney	86-92	483	81%	13%	6%	0%

[a] The data for the Lev and Penman study are basically from Penman (1980), which has enjoyed much and thorough analysis by Waymire (1984, 1985) and Pownall and Waymire (1989a, b). Lev and Penman added two years to the original data, so the final sample period was 8 years (longer than most other studies).[14]

[b] The data for this study include some of Jennings (1987).

[c] Percentages are unable to be determined from these studies.

[d] These publications indicate only that more than one forecast was made.

[14] The substantially greater number of firms in Lev and Penman (1990) results from the inclusion of more qualitative forecasts than is traditionally allowed for in the literature. Most studies include only point or range forecasts; Lev and Penman also included those forecasts with only directional indicators.

Lev and Penman (1990) compared CARs of firms to industry averages and conclude that the firms are screened from industry members. Industry-to-market comparisons suggest further that industries are screened from the market. The authors observe that forecasts may be clustered by industry for any particular year, but not over multiple years. By combining these findings with the results from the earnings history analysis, it may be concluded that forecasters' industries perform better during the forecasting year.

The above results do not appear to be biased by industry concentration. Lev and Penman's (1990) sample has excellent representation across industries, as does Cox (1985). This means that indicators of credibility may be gathered by investigating industry dynamics.

2.2.2 Ownership Factors

Rhuland, Tung, and George (1990) provide evidence of an association between forecasting and information asymmetry, number of forecasts, and stock offerings. Using a probit regression, with variables representing analyst forecast errors, capital offerings, and percent of inside ownership, they found all variables to be significant (with signs of -,+,-, respectively). The model correctly classified 73% of the forecasting firms and 59% of nonforecasters between 1980-1985. In this dissertation, I view capital offerings as

an adverse selection problem, and percent of inside ownership as an information asymmetry problem.

Frankel, McNichols, and Wilson (1995) extend the Rhuland et al. (1990) study. The purpose of the Frankel et al. study is to examine the relation between forecasts and external financing. With an unrestricted sample drawn from COMPUSTAT, they confirm that if a firm seeks external financing there is a high probability that the firm issues a MF during the sample period (1980-83). But, the likelihood that the firm will forecast within 9 months of the external financing transaction is insignificant. They conclude that MF disclosures are made by firms seeking external financing because those firms disclose MF more often. The rate of disclosure does not increase around the financing transaction.

The level of asymmetry has also been investigated using analyst following. It was noted above that analysts interact with managers in providing forecasts. Waymire (1986) found that if fewer than three analysts provide forecasts (it is usually the composite of analysts' forecasts that make up AF), then AF's released after MF's are not as accurate as the MF. Jennings (1987) used multiple regression to determine that an AF revised subsequent to a MF is significantly associated with the abnormal return during the week of the MF release, but the MF is not. This implies

that, the more analysts that follow a firm, the more informed is the public (for theoretical support for this implication, see Bushman, 1991). It must be remembered, however, that databases, such as IBES, do not include analysts employed by insurance companies, mutual funds, etc. Information asymmetry should account for analysts from such employment.

2.3 SUMMARY

Empirical investigation has identified the general usefulness of MFs. In particular, consistently significant market reactions have been observed. Firms that issue MFs that do not meet with a market reaction, however, have not been analyzed. It is known that firms with little MF surprise will have insignificant market reactions. Further investigation is warranted in order to understand why some significant news content does not cause a market reaction. Direct tests of the credibility of disclosures under these circumstances are needed. The one-shot disclosure phenomenon has not been addressed, either. Although the results of Rhuland et al. (1990) implies that financing may impact on the timing, Frankel et al. (1995) suggest that financing firms will be among the multiple disclosers.

CHAPTER 3

THEORY

At least two theories describe the release of earnings forecasts:[15] disclosure theory and signaling theory. For disclosure theory, the proponents of which include Diamond (1985), it is asserted that it is less expensive for a firm to gather (and disclose) information about itself than it is for individual investors to perform such a task. Disclosure theory assumes disclosures are credible.

For purposes of this dissertation, credibility refers to believability. The accuracy cannot be determined by shareholders, *ex ante*. Because disclosures of MF do not belong to the regular reporting activities, even histories of accurate forecasts cannot be used by shareholders to determine credibility. How investors discern credible from incredible disclosures is a concern of this dissertation.

This current study is concerned with forecasts as part of signaling theory. Dye (1986, p. 332, fn. 4) notes:

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[15] King Pownall and Waymire (1990) (KPW) regard the two streams as signaling theory and agency theory. As discussed in the first chapter, signaling theory is also related to agency theory. The cites of KPW parallel those in this study. KPW nominate another theory, the Expectations Adjustment Hypothesis (EAH) of Ajinkya and Gift (1984). EAH describes forecasts as efficient and effective mechanisms to minimize the information discrepancy between principles and agents. EAH assumes credible disclosures, and therefore, is not examined in this study.

> disclosures... (do) not completely eliminate the desirability of... signaling activities when credible disclosures of information are possible. Signaling becomes a substitute for disclosure, undertaken to convey information about the firm's earnings' generation power without divulging the information itself.

Evidence presented in the studies cited in Chapter 2 is consistent with disclosures being credible. It is assumed that a firm's **future** earnings generating power is difficult, if not impossible, to credibly describe, ex ante. That is, without third party verification, investors find claims about a firm's future earnings difficult to believe. But, a signal can substitute for direct disclosure when it is impossible to communicate the information itself, as indicated by Dye in the above quote.

Previous research has described the effect of forecasts on managers' reputations (e.g. Trueman, 1986). Inaccurate forecasts negatively impact reputation. If a management forecast is disclosed in the last period of a multiperiod setting, there is no incentive for management to maintain its reputation. Kreps (1990) describes such a scenario as a centipede game, which unravels because of this last period problem.

For a game of "infinite" periods (the end is not known), Kreps notes that, empirically, the unraveling is not observed until the later periods, and cooperation occurs in the early periods. This means that the effect of reputation may impact management behavior. In this dissertation, with the end one period away, an infinite period setting may have less of an application. Thus, reputation may have less of an impact than commonly believed and credible forecasts may be restricted.

This chapter presents a model of voluntary earnings forecast disclosure that relies on signaling theory to describe the costs for credible disclosure. The two-market simultaneous signaling model demonstrates that the observability of the forecast by investors and competitors provides benefits and costs of disclosure. A general review of signaling theory with regard to voluntary management earnings forecast disclosures (MF) is presented in section (3.1). The next section (3.2) ties the signal of management earnings forecasts to the stock price and to the release of product demand information to the public. The third section (3.3) utilizes the two-market signaling model developed by Gertner, Gibbons, and Scharfstein (1988). Their model is used to present the possibility that costs may be incurred when the company issues MF because the public release of the

demand information can be used by competitors. Just how costly is an empirical question that is tested in Chapter 5.

In summary, this chapter describes the association of the release of MF to a cost. This cost is the public release of demand information that was previously private information held by the company. This cost is necessary for a signal to be credible.

3.1 MANAGEMENT FORECASTS AS SIGNALS

In general, signals are necessary because credible direct disclosures cannot be made between parties to a transaction. If credible communication cannot be made, then transactions that are to both parties' best interests may not occur.

The use of MF as a signal has been established in the literature. Whether the signal is to communicate firm value (Verrecchia, 1983) or management quality (Trueman, 1986), the general story is the same. The release of MF impacts the stock price of the firm. If the MF signals sufficiently high future earnings (Verrecchia), or is sufficiently early (Trueman), then investors observe a signal that other companies cannot imitate, and bid the stock price higher.

Both these papers are lacking in two aspects: (1) the adverse selection problem is not highlighted, and (2) the costs of the signals are not specifically described.

First, the adverse selection problem is not clearly identified. Information asymmetry may be described as either moral hazard or adverse selection problems. In moral hazard problems, solutions often involve reporting requirements written into contracts. Regular releases of MF are not observed, so it is difficult to conclude that MF disclosures address moral hazard problems.

In adverse selection problems, solutions often require signaling. It may be said that investors are continually in an adverse selection dilemma because they are always deciding whether to keep the investment or to sell it. This implies that MF should be released year after year, but empirically this is not observed. If a forecast is released by a firm, and it is costly to release such a forecast, it is reasonable to assume that the firm is included in the list of players who receive benefits from disclosure. This doesn't happen in the secondary market. The firm receives benefits when it is seeking capital from the market. A new share offering would make the current shareholders' adverse selection problem more difficult. Not only must they decide to keep their current shares, but they also must decide to buy new shares.

In an adverse selection environment, less value is assigned to the shares being traded. Current shareholders of high-earning firms will not sell their shares because they

are not getting a sufficient price. Because investors believe that only low-earning firms' shares are being sold at the current price, no purchases will occur. Trade breaks down. This parallels Akerlof's lemons problem. Even if a firm is doing well, it will have to credibly communicate justification for the high price it seeks in the offering.

The possibility of no share exchange is the result of an adverse selection scenario. Stronger evidence that such a selection problem exists may be found not from just a trade of existing shares, but, instead, from the need for new capital. This leads to the first hypothesis:

> *Hypothesis 1. A firm's anticipated need for new capital will affect the timing of the MF disclosure* (the adverse selection hypothesis).

An adverse selection environment is accentuated when new shares are issued by a firm. What shareholders are "buying" is an interest in the future earnings generated by the firm. Publicly disclosed MFs give new shareholders (as well as other parties) estimates of the future earnings of the firm. It is expected that evidence of the firm's need for new capital will exist at the time of MF disclosure.

The second aspect that the early signaling theory lacked was that costs of disclosure were not explicitly described, so the disclosures were assumed to be credible. Verrecchia (1983) finds a signaling equilibrium whenever the

proprietary costs are positive.[16] Trueman (1983) mentions a cost (a legally imposed penalty for incorrect disclosures) but does not explain the cost further. Although Skinner (1994) found empirical support for the impact of legal sanctions, he also noted that little additional guidance is offered for empirical research.

Other measures of costs have been theoretically established. Hughes (1986) identifies a penalty as a cost of incorrect MF disclosures. The penalty is based on the difference between actual earnings and the previously released MF. The cost to the firm's management is enhanced by increased management shareholdings. The result of these increased shareholding is that managers share in a greater amount of the penalty. Sansing (1992) describes the quality of the accounting system as a cost. Similar to Verrecchia (1983), a higher MF signals a higher quality firm. The MF is credible because investors have been kept informed about the value of the firm through the firm's accounting (and reporting) system, which has previously been complete in its capturing the firm's true value.

This dissertation presents another cost of MF release. This cost, public knowledge of proprietary demand information, has been described by management as a deterrent

[16] Proprietary information is that which affects a firm's cash flows directly. Nonproprietary information affects traders expectations about a firm's valuation, but does not directly affect the firm's cash flows (Dye, 1985). Proprietary costs have a negative effect on a firm's cash flows.

to the public disclosure of MF (Lees, 1981; McGrath and Walsh, 1973). Dontoh (1988) does not use a signaling model but demonstrates that the release of information that implies demand for the firm's product is costly to the discloser.

Gigler (1994) provides analytical evidence that proprietary information leads to credible disclosures. His intention, like that of this dissertation, is to determine how unverified public disclosures are credible. He finds that no disclosing equilibrium exists where all firms will fully and consistently disclose demand information truthfully. His paper, however, does not provide for empirical surrogates.

The cost is explored more fully in Section 3.3. The next section, however, will first relate MF to information on product demand and to the stock price.

3.2 FORECAST DISCLOSURE TO THE CAPITAL MARKET

The previous section showed that MF can act as a signal to alleviate an adverse selection problem. This was demonstrated by referring to the stream of published studies that has formed a base of accepted literature. This section provides an explicit connection for the release of MF and the resulting update of the stock price and public disclosure of product demand information. Because the model

relies on the "tension" between investors and competitors, this section describes how the release of proprietary information benefits investors.

Investors seek to maximize return on their investment (**R**), $R_1=(S_1 - S_0 + d_1)/S_0$, where $\mathbf{S_i}$ is the share price at period i, and $\mathbf{d_1}$ represents dividends in period 1. "R" for a very brief window around the time when new information is released to the public is called the market reaction. Foster (1986) presents four possible determinants of S: earnings, cash flows, dividends, and net individual assets and liabilities.

Ohlson (1990) discusses the first three determinants and concludes that "ultimately only payoffs count, and dividends alone can be consumed," (p. 666). Any uncertainty associated with the dividend stream means that other information, especially earnings, becomes relevant to the pricing of the shares. Thus, in general,

$$S_t = \sum_{\tau=t+1}^{\infty} \rho^{t-\tau} E[\pi_\tau | z_t], \qquad (3.1)$$

where ρ is a discount factor that incorporates risk and the dividend payout rate, π_τ is a random variable representing earnings at time τ, and $\mathbf{z_t}$ is the information set at time t. In the following equations, $\sum_{\tau=t+1}^{\infty} \rho^{t-\tau}$ is replaced by λ. This means that, for each firm, the risks associated with the cash flows to investors is held constant:

$$\rho_0=\rho_1=\rho_i, \ \forall \ i's, \qquad (3.2)$$

where "i" refers to time periods of a particular company. It also requires the assumption that the expectations operator has a similar distribution through time. These assumptions are not destructive due to the short term nature of MF.

z_t can be represented by **AF**, or the analysts forecasts, which include all information up to the date "t". At time t,

$$AF = E[x_t](P-k), \qquad (3.3)$$

where $\mathbf{x_t}$ is the demand for the firm's product in period t, **P** is the selling price per unit of the product, and **k** is the marginal cost per unit. Fixed costs are ignored because the forecast covers a relatively short period of time (one year).

Consider a management earnings forecast (**MF**) that comes out in period $t+\varepsilon$ ($t<t+\varepsilon<t+1$), and is the only new piece of information. An assumption that the price and the marginal cost per unit are relatively similar from year to year allows the analysis to focus on the ambiguity surrounding the demand. Thus,

$$MF = E[x_{t+\varepsilon}](P-k). \qquad (3.4)$$

If MF and AF are isolated, then the public disclosure of MF after AF is known will provide the public with $E[x_{t+\varepsilon}]-E[x_t]$. In this way competitors of the disclosing company can observe what the company expects demand to be.

$MF_{t+\varepsilon}$ (assumed to be a truthful estimate here, but shown to be credible in Section 3.3) embodies new and independent information beyond z_t (assume $AF \in z_t$). Because expected earnings are not a certainty, investors will utilize MF, as z is used, in the pricing formula to determine $E[\pi_{t+\varepsilon}]$.[17] Investors, therefore, see MF disclosure as value relevant information:

$$S_{t+\varepsilon} = \lambda\{E[\pi_{t+\varepsilon} | z_t, MF_{t+\varepsilon}] \qquad (3.5)$$

Now, $S_{t+\varepsilon} \neq S_t$ if $MF_{t+\varepsilon} \notin z_t$ because the two terms are assumed to be independent. If MF is the public disclosure, then the $(S_{t+\varepsilon} - S_t)$ reaction will be greater when MF-AF is greater. This difference between MF and AF is termed the "surprise". The reaction, however, is dampened by the term "λ". This term represents the risk of the future cash payouts. If investors and managers have different objectives, then less credibility may be assigned to information released by managers and more risk is assigned to the payouts. This implies information asymmetry between investors and managers, and λ will differ between firms with different asymmetry. This discussion leads to the second hypothesis:

Hypothesis 2. The amount of firm-to-investor information asymmetry helps to explain the market

[17] McNichols (1989) empirically demonstrates that investors have information sets to evaluate MF that are beyond MF.

reaction to the surprise (the information asymmetry hypothesis).

It is expected that with increased levels of asymmetry, there will be less of an investor response to the MF disclosure for a given amount of surprise.

This section has explicitly tied the release of MF to the stock price using the theory described in Ohlson (1990, 1991). It was also seen that, with some assumptions, the publication of MF allows the public (including competitors) to determine the firm's estimate of demand. The next section describes how the release of such proprietary knowledge of demand may harm the disclosing firm.

3.3 COSTLY DISCLOSURES

The previous sections have presented MF as signals of firm quality. Firm quality is based on future earnings generating ability: high quality firms earn more. The discloser releases the information in order to have an up-to-date assessment of stock value by potential purchasers of new shares from the firm. In order to release this information to potential investors, the company must also incur the cost of releasing demand information to competitors. This section justifies the existence of such a cost. Section 3.3.1 demonstrates that competitor knowledge of a firm's demand estimates is costly to the firm. Section

3.3.2 demonstrates that this cost can be decreased by the high quality firm (which forecasts higher earnings) providing the public with a **correct** forecast.

Payoffs to the MF discloser (Π_f, where the subscript "f" represents the forecast disclosers) may be described as,

$$\Pi_f(q,MF,g) = V(g) - c(MF,q). \qquad (3.6)$$

The payoff is defined by three factors, "**q**", "**MF**", and "**g**". "**q**" represents firm quality, either high (q_H) or low (q_L), and $q_H > q_L$. **MF** is the forecast message, or signal, received from the MF discloser. In the present study, $MF \in M=[0,\infty)$, where M includes all MF. M represents the amount of information that is released: none or a great amount. For instance, companies release different amounts of quantitative information (whether just directional, or else detailed sales, expense and income projections), with differing time horizons (monthly to multi-year projections), and different contents (earnings as well as production forecasts). M represents the consolidation of these many amounts of information in a linear relation. **MF** is the annual earnings forecast. M is bounded on the low side by 0 because the forecast signals the amount in the earnings pool from which dividends can be paid.[18] "**g**" is the action taken

[18] It is assumed that, when net assets equal capital investment, owners will liquidate the assets; thus, the boundary of 0 on the lower side of M is reasonable. Additionally, bankruptcy issues that arise from forecasts are not considered.

by the investor, who can either do nothing (0) or trade shares; and if more shares are purchased, then the discloser receives greater capital proceeds. If the signal fails, g=0 and no trades are made. "**V**" represents the total value that is received if the firm (manager) issues (sells) the shares, and "**c**" represents the cost of the forecast.

The costs (**c**) from equation (3.6) occur because managers dislike providing forecasts, but (as seen from Section 3.2) investors would like to have higher forecasts (higher share prices). Management's reticence to disclose may be due to any number of factors, such as negative effects on manager reputation if forecasts are not achieved (Lees, 1981), lower year-end information quality because of a tendency to manage earnings to achieve the forecast (Brown, Foster, Noreen, 1985), or negative effects from the release of proprietary information (Dye, 1985). Evidently, some costs are present. Thus, the assumptions of $c_{MF}>0$ and $c_{MFMF}<0$ (where the subscripts represent first and second partial derivatives) are reasonable. It is important to note that there are many costs from disclosure, but this dissertation seeks to provide evidence of costs that result from the release of proprietary information. This focus is motivated by the many papers (see Section 3.1) that rely on the release of proprietary information to justify a signaling model.

The second determinant of costs (c) in equation (3.6) is firm type. If the cost of the signal, MF, is greater for q_L firms than it is for q_H firms, then the signal will not be duplicated by a low quality firm for the same level of S. This cost differential is assumed to be:

$$c_{MF}(MF, q_L) > c_{MF}((MF, q_H) \quad . \qquad (3.7)$$

Equation (3.7) is critical to a signaling model (where the subscript refers to the incremental cost, or the first derivative) and is critical to this dissertation. The intuition behind this assumption is as follows. It may be thought that firms of any quality can provide MF of any level because MF are not verifiable. The market knows this may occur and firms know this may occur. Higher quality firms, then, will want to disclose an MF that cannot be copied by a low quality firm. In equation (3.7) it is assumed that if a disclosure is too costly, then low quality firms (that cannot afford the cost) will not copy the disclosure.

In equation (3.5), the adjustment to share price was seen to be decreased, through λ, due to the unbelievability of MF. If costs are associated with MF, and these costs can correctly identify the releaser as of high quality, then MF becomes more credible. Finding evidence of such a cost is the purpose of this dissertation. Although the presence of a cost should negatively impact stock price, the riskiness of

the information should be reduced, so λ should measure a reduced risk when the proprietary information is released.

3.3.1 Competitor Informedness[19]

This section describes how the revelation of private demand information can be used by competitors. It provides rationale for the proposition that the publication of the MF is costly to the firm. In this section it is assumed that the disclosure is truthful. The next section addresses the possibility that the MF may be incorrect.

Assume two similar firms with constant marginal costs (**k**) of producing a single good. Demand is linear: X=a-P (**X** is quantity, **a** is a constant, and **P** is price).

A duopoly is modeled here to investigate the interplay between competitors, while keeping the analysis simple. The two firms have *Cournot* beliefs in that they behave as if the rival strives to keep quantity fixed.

Suppose firm 2 has output level x_2. Firm 1, with *Cournot* conjectures, sets price equal to $a-x_2-x_1$ (there are only two firms that produce the total output). Profits are $(a-x_2-x_1)x_1-kx_1$. Firm 1's reaction function maximizes profits, given firm 2 output, at

$$X_1^*(X_2)=(a-k-X_2)/2. \qquad (3.8)$$

Firm 2's reaction function is

$$X_2^*(X_1)=(a-k-X_1)/2. \qquad (3.9)$$

[19] The following explanation is developed from Gertner, Gibbons, and Scharfstein (1988).

Solving the reaction functions results in an equilibrium output of (see Appendix I at end of this dissertation):

$$x_1=x_2=(a-k)/3. \qquad (3.10)$$

Now, assume that knowledge of demand is incomplete. Also, drop the constant, k, from the analysis because it is assumed to be the same across firms. Firm 1 possesses private information about the demand. Firms may voluntarily disclose expected demand through an earnings forecast (as explained in the previous section). Firm 2 believes that the demand intercept, a, is $\bar{a}$ with prior probability $\rho \in (0,1)$, and $a=\underline{a}$ with prior probability, $1-\rho$. Now, (3.10) becomes, for each firm (see Appendix I):

$$x_2=[\rho\bar{a}+(1-\rho)\underline{a}]/3, \qquad (3.11)$$

$$x_1(\underline{a})=[2\underline{a}-\rho\Delta)/6, \qquad (3.12)$$

$$\text{and } x_1(\bar{a})=[2\bar{a}-(1-\rho)\Delta]/6, \qquad (3.13)$$

where $\Delta=\bar{a}-\underline{a}$.

For firm 1, the firm with the private information, profits (price times quantity) are:

$$\underline{p}^{p}=[2\underline{a}-r\Delta]^2/36 \qquad (3.14)$$

and

$$\bar{\pi}^{p}=[2\bar{a}+(1-\rho)\Delta]^2/36. \qquad (3.15)$$

The p superscript represents a pooling equilibrium strategy because the derivations were made when firm 2 was not able to discern the true demand intercept, a. Thus, the knowledgeable firm produces to actual demand (either $\bar{a}$ or

$\underline{a}$), but the ignorant firm produces to the prior common beliefs ($\rho\bar{a}+(1-\rho)\underline{a}$).

A separating equilibrium emerges when it is rational for high value and low value firms to correctly identify their expected profits, given the cost of an incorrect identification, and they willingly communicate these expectations to recipients. For this to happen, the firms must correctly identify the demand. Thus, a separating equilibrium occurs when both firm 1 and firm 2 know the demand intercept, a. Firm 1 separating profits are:

$$\underline{\pi}^s=(\underline{a}/3)^2 \text{ and } \bar{\pi}^s=(\bar{a}/3)^2 \qquad (3.16)$$

It can be shown that the ex ante expected profits for firm 1 are higher when firm 2 is uninformed; that is, pooling profits are greater than separating profits (see Appendix I):

$$\rho\bar{\pi}^p+(1-\rho)\underline{\pi}^p>\rho\bar{\pi}^s+(1-\rho)\underline{\pi}^s. \qquad (3.17)$$

This implies that truthful disclosures are costly to any firm.

Equation (3.17) provides the basic rationale for this dissertation. Because truthful disclosures are more costly than no disclosure, it is not rational for a firm to make a public forecast. This is due to the cost of providing competitors with information on the "true" demand. The cost, however, is only formulated with respect to the firm's production. The purpose of the signal, from equation (3.5),

is to adjust an undervalued share price, S, for private information that is not otherwise credibly communicable. Therefore, a low quality firm may duplicate the signal if the resulting increase in share value exceeds the cost depicted in equation (3.17).

Trade-offs between the cost of disclosure and the benefits of disclosure require further analysis. The purpose of this dissertation is to identify the applicability of proprietary information costs to a signaling model. Omission of an analysis of trade-offs limits conclusions drawn about the costs of disclosure. For instance, it may also be that the firm would like to inform competitors. The reason for this firm's action is because of resulting benefits that are not addressed in this model. Instead, specification of the cost and evidence of the existence of such a cost are sought. Trade-offs between benefits and costs are left for future research.

The next section demonstrates that it is possible that truthful (accurate) forecasts are less costly than untruthful forecasts. The purpose is to describe conditions when the market can believe the forecast and appropriately adjust the share price.

3.3.2 Truthful Disclosure

This section demonstrates that the cost of disclosure is specific to the firm type. The cost of a forecast for a

low quality firm must be greater than the cost for a high quality firm, for all forecast levels (equation 3.7). If this were not the case, then a q_L firm could mimic a q_H firm's communication of future earnings and the signal would fail. Thus, cost is a critical ingredient to signaling theory. To date, costs that encourage accuracy have not been presented. Of the studies cited in Section 3.1, for instance, only Sansing (1992) assumes no exogenous penalties for false disclosure. But Sansing's model does not allow for new information previously unavailable to the market.

The analysis is divided into overestimates of the forecast and underestimates of the forecast. In these two ways, the forecast could be incorrect. Overestimates of MF are shown to be more costly than truthful disclosures; therefore, higher quality firms can credibly communicate the high forecasts. Again, high quality firms are those that expect to have higher earnings.

3.3.2.1 Overestimating Forecasts

It is assumed that higher (lower) forecasts are positively correlated with higher (lower) demand. In this first case, the firm discloses MF_H, when MF_L should be disclosed. x_1 is the quantity produced by the disclosing firm; x_2 is produced by the receiver. From equation (3.11), Firm 2 believes the signal, MF_H, and produces for $\bar{a}$. x_2 becomes,

$$x_2=(\bar{a})/3. \qquad (3.18)$$

The discloser, Firm 1, produces

$$x_L=(2\underline{a}-\Delta)/6. \qquad (3.19)$$

Because the signal is hypothesized here to be credible, then $\rho=1$. x_L is presented in equation (3.13), and is referred to as the Lie Quantity in equation (3.19).

If the discloser tells the truth, MF_L is disclosed. In this case Firm 1 produces (from (3.16) without k),

$$x_1=x_T=(\underline{a})/3. \qquad (3.20)$$

x_T, defined in (3.20), is referred to as the Truth Quantity. The Lie Price (P_L) is calculated by

$$P_L=(2\underline{a}-\Delta)/6. \qquad (3.21)$$

In these price equations, a numeraire is assumed that allows price to be stated in terms of quantity. Note in equation (3.21) that $\Delta<2\underline{a}$ and $\bar{a}<3\underline{a}$ (see Appendix I). This means that in this two player system in which it is known that a firm that discloses demand may disclose an incorrect demand, and in which each player acts rationally on its own beliefs, then an equilibrium price and quantity will evolve if the high estimate of demand is less than three times the low estimate of demand. This makes sense in that if the two parameters are very far apart, then the public cannot adequately assess information releases because there is too

much noise in the environment. This restriction is also identified by Gigler (1994).

The Truth Price (P_T) is calculated as

$$P_T=(\underline{a})/3. \qquad (3.22)$$

For a firm to have incentive to disclose MF_H when MF_L should be disclosed, the profits from lying must exceed the profits from telling the truth, i.e., $(x_L \times P_L) > (x_T \times P_T)$. Now (see Appendix I),

$$1.\ (x_L \times P_L) = (2\underline{a}-\Delta)^2/36$$

$$= [(\underline{a}^2-\underline{a}\Delta)/9] + \Delta^2/36. \qquad (3.23)$$

$$2.\ (x_T \times P_T) = \underline{a}^2/9. \qquad (3.24)$$

A failed signal requires a large overestimated demand $\bar{a}>5\underline{a}$ (see Appendix I). It has already been shown that $\bar{a}<3\underline{a}$ for the signal to work initially. Therefore, there is some incentive for firms not to overestimate in order to obtain a separable signal; otherwise, the information is not credible and will be pooled.

It is interesting to see what the effect of differences in firm quality has on the outcome. Note that $x_L<x_T$ for Firm 1. Additionally, P is positively associated with k. If the signal is successful and Firm 2 overproduces, then there is more of Firm 2's k in the calculation of average k. When k is from a low cost producer, as will be the case if Firm 2 is a more profitable firm, then *ceteris paribus* $k_L<k_T$ (subscripts for the Lie and Truth Quantities). In a

monopoly, the competitive price would be P=(A+k)/2, and in pure competition the price would be P=k. Cournot pricing falls between the two, so the price would decrease with lower values of k. Not only does Firm 1 have lower output, it also faces lower prices.

The conclusion from the preceding paragraph is not as clear when the high quality firm lies. $x_L<x_T$, but $k_L>k_T$. Now, total quantity is (see Appendix I),

$$X_C=(4\bar{a}-4k-3\Delta)/6,. \qquad (3.25)$$

Therefore, $|dX_C/dk|>|dP/dk|$ (remember that P=[a+k]/2). The increase in k due to proportionately more q_L goods has a more depressing effect on quantities than an increasing effect on prices, so q_H receives lower profits.

This section has demonstrated that there is incentive for the costly MF signal to not be overestimated. Because MF is more costly than no disclosure (equation 3.17) and an overestimate is most costly, poorer quality firms are better off with no disclosure and good quality firms are better off telling the truth (at least not overestimating). Therefore, what makes the high quality firm MFs credible is that proprietary demand information is released. This leads to the third hypothesis:

Hypothesis 3. The amount of proprietary knowledge of expected demand released by forecasting firms through Management Earnings Forecasts affects the market

reaction to the release of the forecasts (the proprietary cost hypothesis).

If it is assumed that high quality firms are the firms that are able to predict higher earnings, then it has been demonstrated that when a high quality firm discloses MF_H, it is unprofitable for a company that cannot predict MF_H truthfully to copy such a prediction. It is expected that when there is evidence of the release of greater proprietary knowledge, the market will have stronger beliefs about the MF disclosure.

3.3.2.2 Underestimating Forecasts

In this second general case, the firm discloses MF_L, when it should give MF_H. The disclosing firm knows the demand to be high, so equation (3.19) is now described as,

$$x_L=(2\bar{a}+\Delta)/6. \qquad (3.26)$$

$(1-\rho)$ now equals 1 because of the successful signal. The Truth Quantity has been derived at equation (3.20), but with reversed subscripts to identify the discloser type and demand intercept changed,

$$x_T=(\bar{a})/3. \qquad (3.27)$$

The Lie Price is similar to equation (3.21), but has a sign change on the last term in the numerator,

$$P_L=(2\underline{a}+\Delta)/6. \qquad (3.28)$$

The Truth Price has been derived at (3.22), but has a demand intercept change,

$$P_T=(\bar{a})/3. \qquad (3.29)$$

In contrast to the overestimate of a forecast, lowballing may provide higher profits, such that $(x_L \times P_L) > (x_T \times P_T)$ (see Appendix I):

$$[(2\bar{a}+\Delta)^2]/36 > (\bar{a})^2]/9. \qquad (3.30)$$

Unfortunately, receivers of a forecast may not be able to be assured a forecast is not underestimated. This problem, however, does not destroy the signaling benefit. Receivers can be assured the forecast is not overestimated.

3.4 Conclusion

It has been established that the disclosure of management earnings forecasts may be costly so that firms are motivated to provide some truthful disclosures. If a firm discloses, then per equation (3.17) the disclosure is initially costly when MF is credible. From Section 3.3.2.1, MF_H is credible; therefore, costs occur with MF_H. Consequently, when MF_H is disclosed "S" will be revised. In conclusion, when firms want price to be revised upward, MF_H will be provided. q_H firms are separated and the signal is successful.

Critical to Hypothesis 3 is the assumption of a correlation between the earnings forecast and the demand intercept. Firms that exhibit this correlation fit the model best. In reality, most companies produce more than one

product. The simple analysis presented here is insufficient to deal with the complexity of multiple product demand estimation. On the other hand, competitors are quite sophisticated. It may be that forecasts from companies encourage all competitors to reassess their own demand estimates with further investigation and focus on the discloser's activities.

Additionally, the short time period between the forecast and the year-end results may not allow for extensive profit differentials between firms that have proprietary knowledge and firms that don't. Because the setting is in an adverse selection dilemma, investors may be getting ready for investment opportunities or shares may be issued in the interim period. The effects of too low a share price, or lost investors with already committed funds, may be costs that extend beyond the short time frame. In the end the measure of the cost amount is an empirical question.

The model is also limited because investors and firms (and their managers) are assumed to be risk neutral. Secondly, trade-offs between untruthful disclosure and the benefits from stock price effects (in other words, tradeoffs between competitor and investor informedness) are not explicitly considered. Moreover, the model represents a single period and strategies that will give results in a second period, such as those affecting reputation, are not

considered. The subject matter may support the simple formulation that MF are early disclosures of actual earnings. If the "truth" will become public knowledge within a year, strategies of multiperiods may be limited. Further, if investors are more interested in long-term performance, there is less incentive to manipulate the stock price for a short period, after which the true earnings (as well as the forecast error) will become public knowledge.

The purpose of the simplified model is to demonstrate the possibility that the **disclosure** of proprietary information may generate a cost beyond costs associated with the information's **preparation**. Additionally, this initial formulation of the model is kept simple in order to concentrate on variables not previously tested.

CHAPTER 4

METHODS

4.1 RESEARCH HYPOTHESES

The prior chapters have identified disclosure costs from a signaling model of management earnings forecasts (MF) that incorporates investor and firm characteristics. These disclosure costs involve the release of proprietary information to competitors. By releasing this information, firms are able to convince shareholders that the MF are credible. Some assurance of credibility is required because of the asymmetry between investors and management.

The signaling model is an information asymmetry model which demonstrates that information needs of investors increase as asymmetry increases. The model led to the following testable hypotheses (in the alternative form).

1. When a management earnings forecast is publicly disclosed, there is evidence of the firm's need for new capital (the adverse selection hypothesis).
2. Investor response to MF will be reduced for those firms which exhibit greater amounts of information asymmetry between the firm and the investors (the information asymmetry hypothesis).

3. Forecasts are most credible when the forecasting firms are known to have proprietary knowledge of expected demand levels (the proprietary cost hypothesis).

This chapter describes the statistical tests of the hypotheses. The first section (Section 4.2) identifies the surrogates of the concepts identified in the theory section. Section 4.3 presents the statistical tests. Section 4.4 describes data collection and section 4.5 describes how the original sample was reduced to a more reliable testing sample. Section 4.6 presents the general conclusion that the testable sample is reliable and valid.

4.2 VARIABLE MEASUREMENT

4.2.1 Adverse Selection Hypothesis

Capital requirements can be financed through issuing shares, taking on debt, or internally generated funds. Tests of the first hypothesis relate to adverse selection. Greater levels of adverse selection exist prior to a contract. The issuance of stock is similar to a contract, and prior research has found subsequent issue of stock to be significantly associated with MF releases. This measure, however, is an ex post measure. But adverse selection problems may escape the stock issue measures because some event may have occurred after a firm determined it needed capital, which permitted it to use internal funds. For this

reason, the propensity for seeking external financing should also be measured, at the time of the MF release. Hypothesis 1, in testable form, is:

1a. $CR_t < CR'_{t-n}$;

1b. $DE_t > DE'_{t-n}$;

where CR is the current ratio, DE is debt-to-equity ratio, t refers to the quarter that the MF is released, and CR'_{t-n} (DE'_{t-n}) is the mean CR (DE) for same quarter for n prior years. Rejection of this hypothesis will occur when the ratios are not in the hypothesized direction. The following provides justification for the variables.

According to Myers (1984), internal financing is the most advantageous of capital sources because it is cheapest. As one source is fully utilized, a more costly source is accessed. Public common shares are the final and most costly capital source. To measure this process the current (CR) and debt to equity (DE) ratios are used. CR measures how full the internal sources are: if CR is high, then more internal funds may be available. DE measures how full debt sources may be: if DE is high, then there may be less borrowing ability by the company. These variables were retrieved from the Compustat PST files.[20] MF is expected to be preceded by lower CR and higher DE.

[20] The definitions of CR and DE according to COMPUSTAT (from which the data are drawn) are as follows. CR represents cash and other assets that are expected to be realized over the next 12 months, divided by liabilities due within one year, including the current portion of long term debt. DE represents

4.2.2 Information Asymmetry Hypothesis

Tests of the second hypothesis relate to information asymmetry that results from different types of owners. The market responds in a positive fashion to (MF-AF). Greater levels of asymmetry between investors and management means that announcements by management may be less credible. Two variables are discussed here: the level of asymmetry and the "surprise" earnings. Hypothesis 2, in testable form, is:

$$CADJR_i = SURP_i + NUM_i + IOPCT_i + IONUM_i + IBD_i,$$

where $CADJR_i$ is the cumulated market adjusted returns for firm i, NUM_i is the number of analysts following firm i, $IOPCT_i$ is the percentage of firm i common shares owned by institutions, $IONUM_i$ is the number of institutions that own firm i common shares, and IBD_i is the percentage of insiders that serve on the Board of Directors of firm i. It is expected that SURP will have a positive impact on CADJR. After considering the full impact of SURP, the variables NUM, IOPCT, IONUM, and IBD are expected to depress any reaction. The following provides justification for these variables.

Bushman (1991) shows that the release of public information increases the information search costs of analysts, thereby reducing their profits. Analysts, in turn, concentrate their efforts in markets where there is a

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debt obligations due more than one year from the company's balance sheet date, divided by quarterly shareholders' equity (including both the common and preferred shareholders' interests).

greater difference between private and public informedness (Lundholm, 1991). Analysts supply their services when a sufficient amount of information disparity exists to make the resale of such information profitable (O'Brien and Bhushan, 1990) and, therefore, when more analysts follow a firm asymmetry is reduced. The number of analysts (NUM) following the company is one measure of asymmetry. Greater levels of NUM result in reduced asymmetry. NUM was determined from the IBES Summary File for the month prior to MF. The IBES field is called "Number of Estimates."

NUM may not adequately capture the number of informed analysts because many are employed by private institutions. The IBES measure does not account for institutional owners (IO). Bhushan (1989) found a positive association between the number of analysts following a firm and the degree of institutional ownership. IO may provide a valid complementary measure.

IO is determined from S&P's Security Owners' Stock Guide. The Stock Guide is a monthly publication with gross institutional ownership.[21] IO was determined for the closest month prior to the MF, and is represented by two variables: the percentage of common shares owned by institutions

[21] Brickley et al. (1988) report that voting behavior differs by institution type. Although specific institutional ownership can be gathered from Spectrum 3, this latter publication covers holdings at quarter's end only. Determination of holdings at the time of the MF can, therefore, only be made roughly. The Stock Guide obtains information from Vickers Stock Research Corporation that follows almost 2,700 institutions.

(IOPCT) and the number of institutional investors (IONUM); both variables were measured at the end of the month prior to MF.[22] Greater levels of IOPCT and IONUM imply lower asymmetry.

A fourth variable, IBD, represents the percentage of insiders that sit on the firm's Board of Directors. As in Weisbach (1988), directors' occupations are categorized as inside (employee), gray (extensive dealings or familial relationship), or outside. The ratio of insiders to total members forms the operational variable, IBD.[23] Rosenstein and Wyatt (1990) found that most firms have slightly more outsiders than insiders (65% vs. 35%), but Weisbach (1988) found more insiders (48% vs. 52%). Therefore, it may be anticipated that the sample firms will have a sufficiently different board membership to allow for diverse measurement. A larger IBD implies greater levels of asymmetry.

The characteristics of the board members were generally obtained from proxy statements included in the 10-K's issued prior to the MF. The proxy statements were read from the Q-Data Corporation's SEC-File. The SEC-file is a microfiche

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[22] Both of these measures are from the Stock Guide for the month of the MF publication date in the WSJ because the current month is revised up to the last business day of the prior month. The IO percentage was calculated by taking the number of shares in the "Institutional Holdings" column divided by the number of shares outstanding as recorded in the "Capitalization: Common" column. The number of institutions is recorded in the Institutional Holdings column.

[23] Rosenstein and Wyatt (1990) did not find a statistically significant correlation between firm size and OBD, the proportion of outside members of the boards of directors. OBD is inversely related to IBD.

database of corporate annual reports and SEC documents. The collection available for this dissertation did not include the years subsequent to 1990.

The "surprise" (SURP) is the unexpected difference between the MF and the current market expectations, as represented by analyst forecasts (AF).[24] The measure is: SURP=(MF-AF)/|AF|, where |AF| is the absolute value of the AF.

AF are gathered from the Institutional Brokers Estimate Service (IBES). Philbrick and Ricks (1991) examined the IBES database in detail. They compared Value Line forecasts and IBES forecasts to Compustat actuals and concluded that the IBES forecasts are more accurate (with respect to Compustat). Other benefits from using IBES include the large number of traded firms covered, the large number of analysts followed, and the broad use of the database by other researchers and analysts. The limitations of the database include the delay by the analyst in reporting the forecast to IBES, the lag in publishing the forecast, and the

[24] There are several surrogates for market expectations. One is an algorithm that adjusts prior historical earnings to determine the current expectations, such as a martingale process. This is rejected because the "surprise" measure is critical (note the above discussion of bias), so the expectations measure should be as timely as possible. Foster's (1986) review of the literature confirms the superiority of analyst forecasts to mechanical methods for predicting current year's earnings. A second surrogate is the actual earnings, with the assumption being that informed investors will have a good idea of what the actual earnings will probably be. This is rejected because, if the MF differs, then a contradiction occurs because management should be among the most "informed" players.

inability to directly determine the components of the earnings per share.

O'Brien and Bhushan (1990) have demonstrated that the reporting delay is rational behavior: private information is valuable to those who hold it. But, empirically, the concern is that the AF may not match the MF in event time; AF may include the information disclosed in MF, but the AF has been withheld because of its value. Studies such as McNichols (1989) demonstrate that MF tend to occur later in the year, even though corporate budgets and expectations are continuously prepared during the year. MF, therefore, may also have a reporting delay. Further, the IBES prior month measures are used in many related studies.[25] The use of the prior month AF adequately corrects for the reporting delay.

The publishing lag results from the information gathering requirements of IBES (Brown, Foster, and Noreen, 1985). To be published in IBES, the forecasts must be received by the third Thursday of the month (Brown, Foster, and Noreen, 1985). O'Brien (1988) observes that if the actual forecast dates are used, rather than the IBES publishing date, then forecasts more accurately represent timely expectations. These actual dates are from another data tape supplied by IBES, and are more costly to gather.

[25] Some of these are Baginski, Hassell, and Waymire (1994), Pyo and Lustgarten (1991), Rhuland, Tung, and George (1990), O'Brien and Bhushan (1990), McNichols (1989), and O'Brien (1988).

She measures the average delay between the analyst's forecast date and the publication date to be 34 days. This supports the use of prior month AF, as reported by IBES. The use of the prior month AF adequately corrects for the publishing delay.

Questions about the inclusion of extraordinary and other items in income arose in Philbrick and Ricks (1991). Adjusting for these items similarly produced the most accurate forecast when compared with Compustat actual. Their research compared forecast to actual, but the present study compares two forecasts: management and analysts. What components are included in forecasts are seldom identified by management; therefore, it is impossible to control for these differences. An algorithm that addresses the problem of component compatibility is described in Section 4.5.1. Because of the reasons noted above, the IBES median AF for the month prior to the MF release is used as the surrogate for the market expectations in this study.[26]

4.2.3 Proprietary Cost Hypothesis

Tests of the third hypothesis are concerned with the importance of proprietary information costs. These costs

[26] In an attempt to control for the described problems, Brown, Foster, and Noreen (1985) use an average of the reported monthly forecasts over a period that includes the event month, rather than just the month prior to the event. But most studies (e.g. Philbrick and Ricks, 1991) use the mean or median forecast prior to the event. If there are fewer AF available during the prior period, then a mean measure may not be representative of a (possibly) bimodal, or skewed, distribution. Because of the relatively fewer number of AF available for many of the companies during any given period, the median is chosen as the composite measure of AF.

result from the public release of proprietary knowledge of demand estimates to competitors who may not have the same information. It is expected that because of the costs of disclosure, there will be more of an incentive to receive greater benefits and there will be stronger market reaction (greater credibility). The variables discussed below measure the level of proprietary costs. Hypothesis 3, in testable form, is:

$$CADJR_i = SURP_i + MKBKFB_i + H_i + HM_i,$$

where $CADJR_i$ and $SURP_i$ are defined above, $MKBKFB_i$ represents the market-to-book value ratio for firm i, H_i represents the concentration of the industry of firm i, and HM_i represents the contribution of firm i to the concentration of the industry. As before, SURP is expected to be positively related to CADJR. MKBKFB, H_i, and HM_i are expected to enhance the strength of the direction of the reaction. If the surprise is negative (positive) the variables MKBKFB, H, and HM will be associated with greater negative (positive) reaction.

The basic idea is that, in a competitive environment, the successful firm will jealously guard its proprietary information. Competitors will strive to discover this information in order to replicate the success of the firm. The task is to measure successful firms and competitive

environments. The following provides justification for the variables.

One measure of success is the ratio of firm market value to book value. Successful firms exhibit larger market to book value (MKBKFB)[27] ratios. Fama and French (1994) demonstrate how important this ratio is to the determination of abnormal returns. Both Fama and French (1994) and Collins and Kothari (1989) interpret this ratio as measuring growth prospects. Firms with low MKBKFB ratios seek proprietary information about high ratio firms; therefore, it is costly for high MKBKFB firms to disclose any proprietary information that may lead competitors to better determine demand. It is anticipated, assuming a competitive environment, that the firms with relatively higher MKBKFB ratios will have disclosures that are more credible.

The second variable, H, measures a competitive information environment. This measure is used because MKBKFB leaves out any measure of the specific environment in which demand information is sought; therefore, the two measures are complementary. Concentration ratios are traditional measures of competition. Schmalensee (1992) concludes that concentration is positively associated with market share. Thus, concentration is a valid measure of demand knowledge.

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[27] MKBKFB is measured by the COMPUSTAT Compact Disk, 1994, which uses the definition: monthly close price multiplies by Quarterly Common Shares Outstanding, divided by Quarterly Common Equity as reported (including common stock, capital surplus, and retained earnings).

A more concentrated industry will have industry members that are better known to each other. When MF is disclosed by a member firm, the relation between the earnings estimate and the demand estimate is more easily understood. As concentration increases, the proprietary cost of MF increases.

The Herfindahl index is a measure of concentration that accounts for differences in firm size (Shepherd, 1979).[28] It is calculated as,

$$H = \sum_{i=1}^{n} p_i^2 ,$$

where n is the number of firms considered critical for determination of concentration, and p_i is the market share of the i^{th} firm.[29] If an industry with one firm with a

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[28] Shepherd (1979) reviewed several alternative measures of concentration. He found the indices highly correlated. The Herfindahl index is chosen for this study because of its weighting on size.

[29] The market share information was gathered from COMPUSTAT Compact Disk, 1994, by ranking the prior fiscal year sales (defined in COMPUSTAT as gross sales reduced by cash discounts, trade discounts, and returned sales and allowances) of all the firms that have the same three digit primary SIC code as the disclosing firm. The SIC codes are those assigned by Standard and Poor's Compustat Services.

Because COMPUSTAT includes only publicly traded companies, the calculation of the concentration may be inaccurate. In order to verify the results of the Herfindahl calculations (which are based on COMPUSTAT figures), regular Concentration Ratios were also calculated. These concentration ratios are of the form:

$$CR_8 = \sum_{i=1}^{8} p_i ,$$

where p_i has been described above as market share of the ith firm. The data for these CR_8 ratios came from Ward's Business Directory of Largest US Companies, 1986 and 1992 editions. These editions were used because no other editions, or comparable sources were located. What makes this source important is that the information, which is obtained from 1985 and 1991 Annual Reports and 10-K's, is for public and private companies. The 1986 edition includes revenues for the public and private companies, but the 1992 edition includes assets where the revenue amounts could not be located. Foster (1986) cites a high correlation between assets and revenues, so the 1992 information is deemed satisfactory. The CR_8 ratios for the two years (1986 and 1992) show a correlation significant at p=.0001, and the difference between the two measures, based on SIC3 levels of accumulation, is not significantly different from 0

significant share (or similarly, an industry made up of many firms with much smaller market shares) is compared to an industry with several firms with average and similar measures of market share. The H-measure squares this market share measure, thus making the differential between the high market share and the moderate market share greater. When the squared market shares are summed, the greater number of firms that are in the "concentrated" end have a cumulatively larger effect than the single firm and the other much smaller members, but the effect of the squared market share for the large firm impacts more on the ratio relative to the impact of the individual firms exhibiting the more moderate market share. Market share is measured by sales, and industry is classified by a 3 digit SIC code (hereinafter SIC3).

An additional variable is included in this dissertation. The Herfindahl index is an industry measure and will be the same for firms with the same SIC. By using the variable

$$HM = p_i^2 / H,$$

where p_i^2 is the squared market share for the disclosing firm i, the importance of the disclosing firm to the industry concentration can be measured. Firms with high HM will be disclosing greater proprietary information.

(t(mean=0)=-.402). This indicates that the CR_8 ratios are fairly stable through time. Results of the tests using CR_8 instead of H are reported in footnotes.

4.2.4 Proxy variable for market reaction

It was hypothesized in the theory section that credible MF provide investors with relevant information. This relevant information allows investors to identify the disclosing firm as a relatively high or low quality firm in comparison to the market. This implies that the investors assign a return that differs from the market when the value related signal is communicated. The appropriate measure for such an assignment is the "market adjusted return metric" (ADJR).

4.3 STATISTICAL METHODS

4.3.1 Adverse selection methods

The first hypothesis is tested using a standard t-test. A time series could not be formed because of the large number of NASDAQ firms in the sample, which limited the number of sequential same-quarter observations available from COMPUSTAT. Instead, the available data from COMPUSTAT quarterly files were used to calculate mean CR and DE ratios for each firm. The t-test tested for equality between the CR and DE ratios measured during the current (disclosing) period and the means of the CR and DE ratios measured in the seven prior years.

The fiscal quarter of MF was identified for each firm, and the available same-quarter ratios were retrieved for the

prior seven years from COMPUSTAT, if available. These same-quarter ratios were averaged to form an expectation. Very few studies have been performed on time series of accounting ratios. Richardson, Cunningham, and Brown (1995) performed an extensive analysis on 19 years of firm ratios that include CR and DE. They concluded that the two ratios exhibit little autocorrelation (or results are inconsistent), although they point out that there is a "nontrivial" number of firms where these ratios do not follow a random walk. When a preliminary study was performed in this dissertation using just the prior same quarter as an expectation, little significance was found, little normality was observed (consistent with Richardson, et al., 1995), and the behavior of some of the ratios was inconsistent.[30]

The means were then calculated in order to smooth out any noise. The differences were then standardized according to the same method as the surprise: $(X-E(X))/|E(X)|$, where X represents the ratio of interest and $|E(X)|$ is the absolute value of the expectation of the ratio. The expectations were the means of the prior seven years of same-quarter ratio observations for each firm. A two-tailed t-test is used to test for mean measure (the difference or the standardized difference) being different from 0.

[30] For the current ratios, the mean difference was observed to be negative, but standardizing according to the same method (but for the prior quarter only) discussed in the next paragraph proved to be positive.

4.3.2 Information asymmetry and market reaction methods

The second hypothesis was tested using standard event study methods. Abnormal returns were determined from the model:

$$ADJR_{it}=R_{it}-R_{mt}.$$

R_{it} represents the return of firm i at time t, and R_{mt} is the market (m) return at time t. These ADJRs are cumulated over the three day event window centered on the MF release date (day prior to WSJ publication):

$$CADJR_{i,t}=\sum_{1}^{3} ADJR_{i,t}.$$

The CADJR measures the response of investors to MF. Prior research has consistently demonstrated that the CADJR results from SURP (surprise as defined above). The theory in Chapter 3 predicts that CADJR, given SURP, may be associated with NUM, IOPCT, and IONUM (IBD was not generally included in the tests). OLS regression procedures were used to test this relationship according to the following model, which is inconsistent with p.62 (see section 4.5.3):

$$CADJR=B_0+B_1SURP+B_2NUM+B_3IOPCT+B_4IONUM+B_i(D_i),$$

where D_i are dichotomous variables representing weekday and calendar-year of disclosure and the other variables have been described in Section 4.2.2. It was expected that the signs for the asymmetry variables would all be positive.

The second hypothesis was also tested using logistic regression procedures in accordance with the description by

Maddala (1991). This is because the model includes a dichotomous dependent variable that represents the observed outcome of a latent attribute, the disclosure (or not) of MF. Underlying this decision to disclose MF is the propensity of a firm to disclose in general. The decision to disclose is not a simple "if..then" decision. Indeed, recent studies have shown that disclosure of MF is only a part of the disclosure set (e.g. Pownall et al., 1993; and Baginski et al., 1993). Maddala (1992) notes that the existence of such a latent variable implies the applicability of the logistic regression method.

The form of the statistical model is:

$$P_i=F(B_0+\Sigma B_j X_{ij}),$$

where $F(Z)=[\exp(Z)]/[1+\exp(Z)]$, $P_i=1$ if discloser or 0 if a matched nondiscloser, and the X_{ij}'s are the explanatory variables for firm i for the j different variables; the B's are estimates of the coefficients: herein, $P_i=F(B_0+B_1IOPCT_i+B_2IONUM_i+B_3NUM_i)$. The variables are defined above. The firms are from those in the clean sample (see below) that could be matched.

4.3.3 Proprietary information and market reaction methods

The third hypothesis was tested using standard event study methods. Abnormal returns were determined from the model:

$$ADJR_{it}=R_{it}-R_{mt};$$

the variables and model are described in the previous section. These ADJRs are cumulated over the three day event window centered on the MF release date (day prior to WSJ publication):

$$CADJR_{i,t}=\sum_{1}^{3} ADJR_{i,t}\ .$$

The theory in Chapter 3 predicts that CADJR, given SURP, is associated with MKBKFB, H, and HM. A simple OLS regression was estimated to test this relationship:

$$CADJR=B_0+B_1SURP+B_2MKBKFB+B_3H+B_4HM+B_i(D_i),$$

where D_i are dichotomous variables representing weekday and calendar-year of disclosure and the other variables have been described in Section 4.2.3. One other refinement to this basic OLS regression is that the CADJR and SURP are deflated by market value of the firm at the beginning of the fiscal year of disclosure in which heteroscedasticity was not rejected (see Appendix II).

In addition, a logistic regression was run to identify factors contributing to the high vs low CADJR firms. No tests were run to differentiate the disclosers and nondisclosers because the firms were matched on size and on industry. The discussion in the previous section applies to the methodology in this section, also. The specific form of the function tested is:

$$P_i=F(B_0+B_1MKBKFB_i+B_2H_i+B_3HM_i).$$

4.4 DATA COLLECTION

4.4.1 Alternative Data Sources For Events

The management forecasts were selected from the Wall Street Journal, Eastern Three Star Edition (WSJ).[31]

The WSJ is published by Dow Jones & Co. It is a requirement of the NYSE and AMEX that any material information be disclosed to Dow Jones, the parent company of WSJ (Thompson, Olsen, Dietrich, 1987). Because MF are not required disclosures, no formal policy exists for distribution to the SEC; therefore, Dow Jones is the major conduit for this information.

Dow Jones has three main outlets: the Broadtape, the Wall Street Journal, and the Barrons newspaper. The Dow Jones News Retrieval Service, DJNRS, is made up of news releases from these three sources and is, therefore, a wider information set. Thompson, Olsen, and Dietrich (1987) selected a sample of news items from DJNRS that dealt with NYSE and AMEX firms. Thompson et al. (1987) found 24% not included in the WSJ. They found, however, that 21% of WSJ news items were not in any other source. With regard to management forecasts, Pownall et al. (1993) noted a substantial loss of data: 52% of the DJNRS sample was not

[31] There are four published versions of WSJ, the eastern, midwestern, southwestern, and western editions. The news articles are not identical for all editions, according to the librarian at the WSJ offices. Further, there are two and three star editions. The three star edition is the "late breaking" edition, and is delivered only within 100 miles of the printer. Articles may appear in the two star edition, but not in the three star, and vice versa. The two star edition is on microfilm and was used in this study to collect data.

included in the WSJ. Comparing Thompson et al. with Pownall et al., NASDAQ firms probably account for the 52% sample reduction. Although Wright and Groff (1986) concluded that WSJ is no worse than any other source of financial information, it is apparent that limitations do exist. Editorial decisions by WSJ staff, therefore, may bias the sample selected for this dissertation.[32] It must be pointed out, however, that further analysis by Thompson et al. revealed that market reactions to information releases not included in the WSJ were insignificant.

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[32] In an attempt to correct for this, I utilized the Data-Times Inc. retrieval service's full text review of Wall Street Journal's three editions, which was located at the University of Minnesota. The Service uses a key word search procedure that allows for up to a seven word separation of the key words. For example, the combination of "earnings" and "forecasted" could be separated in such a sentence as, "The company forecasted the next fiscal year's earnings to be..." Additionally, various suffixes could be incorporated; for instance, expects, expected, or expecting.

The key word combinations (with alternative suffixes) tried included: (1) earnings within 7 words of forecast; (2) earnings, or profits, or net, or income within 4 words of project; (3) earnings, or profits, or net, or income within 7 words of expect. Other less successful, and less complicated combinations were tried. Combination (2), for instance, resulted in 5859 citations over the 7 year sample period. It would have taken two to three weeks of the computer running 24 hours a day to download just the article references onto diskettes because of the restricted batch size of information able to be retrieved on-line from Data-Time's Oklahoma headquarters. Therefore, the only citations that were retrieved were those that, in my judgment, were fairly broad descriptors of the event to be captured.

Working with the citations revealed three things. First, many of the references were not in the WSJ available on microfilm at the University of Manitoba. Data-Times representatives noted that the data services accessed articles in all WSJ editions; the microfilm version of the WSJ was the Eastern Three Star Edition. This possibility was confirmed by the librarian at the WSJ. The customer service representative said that the reference numbers in the citation were not able to be systematically related to editions. Second, the Data-Times output referred to the date and page of the article only for the (three) years 1989-1992. Before 1989, only the date was mentioned: if the forecast was buried in an article on another subject it was difficult to find. Compounding the problem was that I was unsure of whether I could not find the article, or if it was in one of the other editions. Third, upon review of the WSJ for completeness of information, many forecasts were in WSJ but not included in the data base because of missing key words. Therefore, I decided to read the microfilm version of the WSJ page by page and use the retrieved citations as verifications for completeness.

Both Abdel-khalik (1984) and Thompson et al. (1987) found that the timing of information releases was sufficiently accurate in the WSJ. Abdel-khalik concluded that a 3-day window adequately captures the surprise to the market. Thompson et al. found 99.7% of news releases in the WSJ occurred within the three-day window centered on the day prior to the WSJ publication date.

4.4.2 Original Sample Selection

The first step in sample selection was a page by page review of the WSJ for the seven year period, January, 1986, to December, 1992.[33] While reviewing the articles, references to foreign companies were excluded. For completeness, the results of the first step were compared to output from a Data-Times Inc.'s full text search of WSJ.[34]

[33] Changes in the WSJ format made the search easier as time went on. Alphabetical (by company name) indexes referring to pages where coverage of a news event about a company were included in editions after 1987. Prior to this date, verification of coverage using the Data-Times output (see fn. 4) was more difficult, and more intensive reading strategies had to be used. Further changes included sections in the WSJ. Before 1988 and after 1991 the "Business Briefs" section typically included shorter announcements by companies. Between these years, it was more difficult to find announcements because the section was not published. The "Industry Focus" column was also not published prior to 1992. Additionally, prior to October, 1986, the section, "OTC Focus" was not published. This section also focused on shorter announcements by companies. Prior to October, 1988, the "Corporate Focus" section, which included shorter announcements by companies, was not published. Lastly, "Abreast of the Market" identified announcements by companies that may have caused market reactions and was not published prior to May, 1988.

The following general reading strategy was used. The front page, the political, the international, the bond news, "Heard on the Street", and the management change sections were not read. The following sections were consistently read: "OTC Focus", "Abreast of the Market", "Business Briefs", and "Corporate Focus". All other pages were scanned by focusing on the headline: if the topic was the general economy, political, travel, or descriptive in nature, the article was not read. If the headline was concerned a specific company's operations or performance, the article was read.

[34] The text-search used the two keyword combinations (and various alternative suffixes to the keywords) of (1) "earnings" or "profit" or "net" or "income" and "expect", and (2) "earnings" and "forecast". These word combinations resulted in 3466 references. The verification process was easier in the years after 1988,

In order to be included in the basic sample, all earnings forecasts had to meet the following standard criteria:

1. The forecast must be attributed to a U.S. company or an official of a U.S. company;
2. The forecast must be an estimate of the annual earnings of the company. The form of this estimate could be a point, or two endpoints to a range from which an average could be computed and used as a point. Open ended and one-sided (earnings will be "at least" or "at most" some value), and qualitative forecasts are not included.[35] If the forecast was made in the fourth quarter but was only an estimate of the fourth quarter earnings, then an annual figure could be determined (because the three previous quarters would have been published) so the forecast was included in the sample;
3. The forecast must be the first forecast of the fiscal year and be made before the year end (Foster, 1986, for instance, studied estimates of annual

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because the Data-Times output included specific page references. When the citation was not found in the microfilm WSJ on the quoted page during the years after 1988, I could safely infer that it was from another edition. Prior to 1989, however, it was more difficult to find the related WSJ article from the citation; thus, sufficient data about those cited articles (but without page references) for inclusion in the research sample was not retrievable from the WSJ.

[35] An example of the kind of decision made when allowing inclusion in the sample is the phrase, "in the range of x". In this case, x is taken to be a forecast.

earnings occurring after year end but before audited results).

Despite the verification difficulties noted above, 995 U.S. company annual earnings forecasts were found to be attributable to management. Tables IV, V, and VI describe the original sample.

Table IV, Panel A, describes quite consistent search results over the years of the sample. Other studies (e.g. McNichols, 1989, and Lev and Penman, 1990) also produced fairly consistent distributions through time. Panel B provides a similar annual disclosure frequency for the original sample broken down by exchange. As can be seen, there is an increase in the number of NASDAQ firms through time. Panel C identifies the percentage of the sample that disclosed on any particular day of the week, through time. There appears to be a greater emphasis on Thursday/Friday disclosures for the later years, compared with relatively strong Monday/Tuesday/Wednesday disclosures in the earlier years in the sample.

These early-late years contradictions are born out by the analyses in Tables V and VI. Table V presents the detailed quarterly disclosure frequencies. Table VI summarizes conclusions from the prior two tables by dividing

the sample into two time periods. Subsample A presents the mean of the years 1986-88;

TABLE IV

ORIGINAL FORECASTER SAMPLE FREQUENCY PERCENTAGES

year	1986	1987	1988	1989	1990	1991	1992	Total
Panel A								
n	126	163	124	147	146	119	170	995
%	13%	16%	12%	15%	15%	12%	17%	100%
Panel B								
NAS[1]	18%	19	25	33	37	34	39	28%[2]
NY[1]	82%	81	75	67	63	66	61	72%[2]
Total	100%	100	100	100	100	100	100	100%
Panel C								
Mon[3]	18%	26%	28%	18%	8%	9%	19%	18%[2]
Tues	21	25	23	17	11	8	14	17%[2]
Wed	28	17	22	14	11	19	18	18%[2]
Thurs	18	13	16	32	38	45	25	26%[2]
Fri	15	19	11	19	32	19	24	21%[2]
Total	100%	100%	100%	100%	100%	100%	100%	100%

[1] NAS are disclosures by NASDAQ firms; NY are disclosures by NYSE/AMEX firms.
[2] Percentages are calculated by summing the actual number of firm-disclosures and dividing by total firm-disclosures.
[3] The day of the week is the day prior to the WSJ publication date.

TABLE V

PERCENTAGE OF DISCLOSURES PER FISCAL QUARTER: ORIGINAL SAMPLE

Qrtr	1986	1987	1988	1989	1990	1991	1992	Total
1	13%	10%	12%	9%	12%	11%	14%	12%
2	32	37	37	23	25	25	22	29%
3	17	23	12	29	19	18	26	21%
4	38	30	39	39	44	46	38	38%
	100%	100%	100%	100%	100%	100%	100%	100%

TABLE VI

ORIGINAL FORECASTER SAMPLE DIVIDED INTO EARLY AND LATE YEARS[1]

%	NAS	NY	M	T	W	TH	F	1	2	3	4
A[2]	21	79	24	23	22	15	16	12	36	18	34
B[2]	37	63	12	11	16	35	26	13	24	22	41

[1] Column labels are: NAS=NASDAQ firm disclosures; NY=NYSE/AMEX firm disclosures; M,T,W,TH,F refer to the days of the week; 1,2,3,4 refer to the fiscal quarter.

[2] Subsample A represents the years, 1986, 87, and 88; B represents 1990, 91, and 92.

subsample B presents the mean of the years 1990-92. Because previous studies have not included similar sample descriptions, it is difficult to say whether these conclusions are sample specific.

The number of multiperiod disclosers (repeaters) is smaller than samples in previous studies. Comparison of this sample's multiple disclosures to the rates of other studies (Table III) indicates lower rates of two-time repeaters for this study. These rates are based on the sample of MF that has been "cleaned" of concurrent firm announcements (see below for further description). For the original sample, the percentages of one time, two times, and three or more times are 81%, 14%, and 5%, respectively. Despite the differences in the samples, it is evident that MF are not part of the regular disclosure package of most firms.

The second step was to determine the other news releases for the same firm around the forecast date. Information announcements concurrent with the MF were found by looking through the Wall Street Journal Index (WSJI) for ten days on either side of the forecast date. Concurrent events were categorized using the same scheme as Thompson, Olsen, and Dietrich (1987).[36] Data from firm-event dates on

[36] Foster (1986) and Gibbons et al. (1990) had alternative schemes, but provided no useful distributional evidence.

The Thompson, Olsen, and Dietrich (1987) categories adopted for this paper are: earnings announcements (both annual and quarterly), dividend announcements, accounting policy changes, management changes, ownership changes (including buyouts and takeovers), labor announcements, asset acquisitions, asset divestitures, product announcements and financial distress announcements (including

which there were no concurrent firm announcements are referred to as "cleaned" data in this dissertation.

Table VII provides the number of forecasts within a significant event window of the concurrent event. The width of the significant window is determined from previous empirical studies (see fn.37). As can be seen, many forecasts are accompanied by concurrent events. The most prevalent event is quarterly or annual earnings announcements (21% of the original sample), followed by dividend announcements (8% of the original sample). The importance of MF is made evident by the 551 disclosures without confounding events. MF with confounding events are eliminated from further study because it is difficult to attribute the response of shareholders at the time of disclosure to the MF, rather than the concurrent event. Additionally, when concurrent disclosures are made,

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bankruptcy). A last descriptor, "other", captures other news announcements within 3 days of the concurrent event.

The significant concurrent event windows and the reference for their widths follow. The width refers to number of days relative to the announcement of the concurrent event.

1. Earnings announcements: -1 to +1 (Ball and Kothari, 1991);
2. Dividends announcements: -1 to +1 (Foster, 1986);
3. Accounting changes: 0 (Thompson et al., 1987);
4. Management changes: -1 to +1 (Weisbach, 1988);
5. Labor announcements: 0*;
6. Asset acquisitions: -3 to +2 (Tehranian et al., 1987b);
7. Asset divestitures: -3 to +1 (Tehranian et al., 1987a);
8. Product announcements: 0*;
9. Distress announcements: -2 to +1 (Thompson et al., 1987).

* Thompson et al. (1987) present evidence of no significant market reaction to these events, so the window is confined to day 0 (a same day announcement).

motivation for disclosing MF may be more complex than described by the two-market signaling model.

TABLE VII

NUMBER OF ORIGINAL SAMPLE MF WITH CONCURRENT EVENTS

Earnings Announcements	210
Dividend Announcements	84
Management Changes	20
Ownership Changes	23
Asset Acquisitions	27
Asset Divestitures	16
Accounting Changes	12
Contracts Announcements	13
Product Announcements	7
Labor Related Announcements	0
Financial Distress Announcements	0
Other Announcements	32
Total	444

4.4.3 Descriptive Distributions: Cleaned Sample

Tables VIII, IX, and X present descriptions of the cleaned sample that are similar to the original sample descriptions in Tables IV, V and VI. The discussion that follows focuses mainly on the cleaned sample. These tables include MF released in more than one fiscal year by the same firm as separate disclosures.

Table VIII reflects some of the characteristics previously observed in the original sample. Panel A presents the relative use of MF by NASDAQ and NYSE/AMEX disclosers; NASDAQ disclosures increase between 1986 and 1992. The

average makeup of the full cleaned sample is 32% NASDAQ disclosers and 68% NYSE/AMEX disclosers. During the first three years of the sample, NASDAQ firms made up a lower percentage than during the last three years (Table X). Again, no other study has documented the exchange partition, so it is difficult to compare this sample to others on this matter. One possible reason for the greater percentage of NASDAQ disclosures may be the increased exposure given to OTC activities by the WSJ (see fn.34). The calendar day releases are also described in Table VIII (Panel C). With fairly consistent percentages of disclosures over the days, there is no evidence of sample bias, given that bad news tends to be released on Fridays or over the weekend.[37] Mann-Whitney tests of each day's number of disclosures compared with all the other days are not significant for any day.

Table IX provides a quarterly analysis. The percentages of disclosures in each of the quarters are similar to those of Waymire (1984), who observed 12%, 32%, 25%, and 30%, and to Baginski and Hassell (1990), who observed 9%, 29%, 19%, and 43%. Given the dates of the samples of these studies (early 1970's and early 1980's, respectively), disclosures during fiscal periods seems consistent through time. The

[37] Pownall and Waymire (1989a), considering the Monday effect, find a similar 19% of their sample falls on a Monday WSJ release day (i.e. Friday or weekend disclosure), when they also measure a lower proportion of good news releases.

TABLE VIII

CLEANED FORECASTER SAMPLE FREQUENCY PERCENTAGES

year	1986	1987	1988	1989	1990	1991	1992	Total
Panel	**A**							
n	72	88	83	88	83	60	77	551
%	13%	16%	15%	16%	15%	11%	14%	100%
Panel	**B**							
NAS[1]	18%	21	28	38	41	36	43	32%[2]
NY[1]	82%	79	72	62	59	64	57	68%[2]
Total	100%	100	100	100	100	100	100	100%
Panel	**C**							
Mon[3]	17%	25%	29%	17%	6%	8%	17%	18%[2]
Tues	18	23	24	18	14	4	11	17%[2]
Wed	31	17	19	16	13	26	13	18%[2]
Thurs	18	13	17	32	36	45	29	26%[2]
Fri	16	22	11	17	31	17	30	21%[2]
Total	100%	100%	100%	100%	100%	100%	100%	100%

[1] NAS are disclosures by NASDAQ firms; NY are disclosures by NYSE/AMEX firms.
[2] Percentages are calculated by summing the actual number of firm-disclosures and dividing by total firm-disclosures.
[3] The day of the week is the day prior to the WSJ publication date.

TABLE IX

PERCENTAGE OF DISCLOSURES PER FISCAL QUARTER: CLEANED SAMPLE

Quarter	1986	1987	1988	1989	1990	1991	1992	Total
1	14%	10%	11%	10%	14%	14%	16%	10%
2	30	34	32	21	19	22	17	25%
3	17	23	12	26	20	7	24	20%
4	39	33	45	43	47	57	43	45%
	100%	100%	100%	100%	100%	100%	100%	100%

quarterly disclosure patterns are also similar during the early years and later years of this study's sample (Table X).

Table XI compares the fiscal monthly disclosures of this sample to that of McNichols (1989). A similar pattern exists, with releases rising to the middle of the year, then dropping off a bit with most releases occurring in the last quarter of the fiscal year. McNichols found a more even spread over the 3 months of the last quarter, while this study's sample has a greater presence in the last month.

TABLE X

CLEANED FORECASTER SAMPLE DIVIDED INTO EARLY AND LATE YEARS[1]

	NAS	NY	M	T	W	TH	F	1	2	3	4
A[2]	22%	78%	24%	22%	22%	16%	16%	11%	32%	17%	40%
B[2]	40%	60%	10%	10%	17%	39%	24%	14%	19%	19%	48%

[1]Column labels are: NAS=NASDAQ firm disclosures; NY=NYSE/AMEX firm disclosures; M,T,W,TH,F refer to the days of the week; 1,2,3,4 refer to the fiscal quarter.
[2] Subsample A represents the years, 1986, 87, and 88; B represents 1990, 91, and 92.

TABLE XI

MONTHLY DISCLOSURES: THIS STUDY (TS) AND McNICHOLS (1989) (MC)

%	1	2	3	4	5	6	7	8	9	10	11	12
TS	2	3	7	8	9	8	6	5	8	7	7	30
MC	4	6	5	10	8	6	8	4	6	14	10	19

4.4.4 Clustering

Analysis of industry clustering utilizes the original sample to draw general conclusions. The act of forecasting, whether with concurrent news releases or not, provides the market and competitors with proprietary information. Statistical tests that use measures of the costs and

benefits of such proprietary disclosures use the cleaned sample.

Descriptions based on 2-digit SIC codes (SIC2) give evidence of general clustering (Table XII). A comparison of the percentage of forecasting firms sorted by SIC2 code with the percentage of ranked SIC2 code firms in the 1993

TABLE XII

SUMMARY OF INDUSTRY DISCLOSURES

SIC CODE	INDUSTRY	% OF MARKET[1]	% OF DISCLOSERS	% OF INDUSTRY[2]
0000-0999	Agriculture	.368	1.091	56.52
1000-1499	Mining	5.195	2.456	4.425
1500-1999	Construction	1.195	1.637	11.538
2000-3999	Manufacturing	38.404	57.3	12.571
4000-4999	Transportation	8.333	7.64	7.724
5000-5199	Wholesale Trade	4.023	3.001	6.286
5200-5999	Retail Trade	5.851	6.412	9.234
6000-6999	Finance	24.092	7.776	2.719
7000-8999	Services	12.540	12.687	8.524

[1]This column represents the percentage of total 1994 Compustat Active Firms that are made up by firms in the respective industries. The next column (% of Disclosers) represents the percentage of the cleaned sample that are made up by firms in the respective industries.
[2]This column represents the percentage of the total firms in the industry, as measured by the 1994 Compustat Active Firms, that disclose MF (i.e. are members of the cleaned sample).

Compustat PST active files (columns three and four, Table XII) yields a Spearman rank order correlation coefficient of .6573, which is not very large. This emphasizes that the disclosing industries (measured as SIC2) are not as one would expect, given the participants in the market. The fifth column of Table XII gives further evidence of clustering. There are substantial percentages of industry members that participate in the MF disclosures.

Details of Table XII are as follows. Agricultural crop producers (SIC2 of 01), agricultural animal producers (02), paper product producers (26), transportation equipment (37), and automobile services (75) are the industries whose members disclose most often during the sample period. Metal mining (10), oil and gas mining (13), wood products manufacturers (24), leather products producers (25), motor freight and warehousing (42), water transportation (44), communications (48), durable goods-wholesale (50), buildings supplies-retail (52), home furnishings-retail (57), banks (60), lending agencies (61), insurance carriers (63), investment companies (67), and hotels (70) disclose the least often (of the industries that provide MF).[38]

[38] SIC2s without disclosures over the sample period are: Forestry (08), Fishing (09), Nonmetal Mining (14), Passenger Transit (41), Postal Service (43), Natural Gas Pipelines (46), Transportation Services (47), Auto Dealers and Gas Stations (55), Real Estate (65), Legal Services (81), Educational Services (82), Social Services (83), Museums (84), Membership Organizations (86), Private Households (88), Necessary Services (89), and Government Services (90's).

It is difficult to determine at what level of SIC code aggregation that competition exists, so analyses of 3-digit SIC codes (SIC3) are also presented. Table XIII shows the

TABLE XIII

SUMMARY OF 3-DIGIT SIC CLUSTERING

\FY SIC3	86	87	88	89	90	91	92	93	Tot #	MD	Net #
131	1	3	1	1	2	2	4		14		14
153		2	1	2	1	2	1		9	2	7
200	2				2	2	2		8	4	4
203				2				2	4	1	3
271	1	3	2	2	2	2	2		14	9	5
283	3	6	6	9	3	6	5		38	11	27
284	1	1	1	3	2	3			11	4	7
331		1			2	2		2	7		7
357	5	6	6	8	4	6	5	4	44	3	41
366	3		2	4	1		5	1	16	1	15
367	1	1	1	3	5	4	4		19	2	17
371	4	6	3	3	5	1	4		26	5	21
372	4	1	2		5	2	5		19	4	15
382	2	2	4	1	4	5		2	20	1	19
384		2	2	2	3	2	2		13	1	12

394	1	1	2	1	3		2		10	2	8
481	3	4	1	2	2		1		13	3	10
491			3				2		5	1	4
492	3				2				5		5
493		2				2			4	1	3
495	1	1			2	5	2		11		11
541	2	2	1			2	1		8	1	7
602	4	5	7	6	8	3	8		41	11	30
737	2	4	1	2	6	5	6	2	28	3	25
738		1	2			2	2		7		7
Tot	43	54	48	51	64	58	63	13	394	70	324

Table XIII represents the SIC3 industries with the most disclosures in the original sample. From the total number of disclosure events (Tot #), those from the same firm are subtracted (MD), leaving the number of individual firms within an industry that disclose over the sample period (Net #).

==========

SIC3 Code distributions for industries with multiple disclosures in a single year. Lev and Penman (1990) find industry clusters within a year, but no clustering over their sample period using a 4-digit classification. My sample also exhibits annual clustering, as well as some interperiod clustering using SIC3.

Industries (SIC3 Codes) with consistently high numbers of disclosers over the sample period include food producers (SIC3 of 200/203), newspaper publishing (271), drug

producers (283), computer equipment manufacturers (357), electronic equipment producers (366/367), truck and bus manufacturers (371), aircraft manufacturers (372), laboratory equipment manufacturers (382/384), utilities (491/492/493/495), banks (602), and computer and information processing (737).

The preliminary evidence of clustering is consistent with a signaling model because as one industry member signals, others are forced to provide similar information in order to be separated from the low quality firms. Firms are forced to disclose proprietary information in an effort to separate themselves from the poor quality firms. The cost of the proprietary information, according to this model, is derived from industry competitors. As pointed out by Lev and Penman (1990), firms apparently separate themselves from industry members.

4.4.5 Multiperiod Forecasters

Table III compares multiperiod forecasters of my sample with those of other studies. Although the sample exhibits a relatively lower volume of repeaters, the sharp decline in repeaters is consistent. Table XIV presents a comparison of the multiple disclosers and the single disclosers. There are significantly more NYSE/AMEX firms that utilize MF information releases often, compared to NASDAQ firms. It also appears that multiple period disclosers are less

reluctant to release the forecasts early (compare Quarters 2 and 4). It is clear that repeat forecasters do not wait until virtual certainty to announce the MF, but there is a greater tendency for the single discloser to wait. Both types of forecasters, however, disclose MF on a quarterly basis that is consistent with previous studies (e.g. Waymire, 1984).

TABLE XIV

COMPARISON OF MULTIPLE DISCLOSERS TO SINGLE DISCLOSERS

%'s	NAS[1]	NYS[1]	M[1]	T[1]	W[1]	TH[1]	F[1]	1[1]	2[1]	3[1]	4[1]
MD[2]	19	81	17	19	17	27	20	11	33	21	35
SD[2]	42	58	19	16	18	26	21	12	25	21	42
TOT	32	68	18	17	18	26	21	12	29	21	38

[1] NAS are NASDAQ firms, NY are NYSE/AMEX firms; M-F represent the week-day of disclosure; and 1-4 represent the fiscal quarter of disclosure.
[2] MD refers to multiple disclosures from firms, and SD refers to single disclosures

4.4.6 Summary

The sample drawn for this study appears to be similar to the samples of other studies. Even though the search strategy was not comprehensive in scope, it did cover a main information outlet (WSJ) in a quite intensive manner. Therefore, it may be concluded that a valid sample of MF was found. The general impression that relatively few firms

disclose MF is confirmed by this sample. Further, the similarity to other samples implies that this sample is reliable.

4.5 Sample Reduction

4.5.1 Disclosing Sample

Table XV presents a summary of the data reduction process. The difficulties with using IBES information were referred to above. It was impossible to ensure that the management forecast and the analyst forecast measured the same attribute. For instance, only a handful of the MF were described by management as primary or fully-diluted EPS. Further, whether the MF included all estimates of extraordinary items was not adequately described in the typical WSJ article.

A quick cutoff was determined. The mean MF from the original sample was $2.146; the mean AF was $2.262. If MF differed from AF by at least $1.00, it might be that the two are not measuring the same attribute. The maximum error might be 50% on the negative side ((1-2)/2) and 100% on the positive side ((2-1)/1). Therefore, arbitrary cutoff points of -100% and +100% were imposed on the surprise.[39] Table XVIa depicts a graph of the frequency distribution of the surprise from the original sample (n=750). The test of

[39] Pownall and Waymire (1989b) also used these cutoffs and defined the excluded amounts as "outliers".

TABLE XV

SAMPLE REDUCTION

Original Sample		995
Concurrent Events		444
Cleaned Sample		551
Unable to determine EPS[40]		19
Unable to find on CRSP		20
Unable to find an Analyst Forecast within 2 months prior to MF release		29
Basic Testing Sample		483
Unable to find in Stock Guide		33
Max sample for tests of IOPCT IONUM		450
Unable to find on Compustat	23	
Max sample for tests of MKBKFB	460	
Unable to match Herfindahl measures for the industry	19	
Max sample for tests of H	441	
Unable to match Herfindahl measures for the company	31	
Max sample for tests of H and HM	410	

[40] Reasons for the inability to determine the EPS include information not given on a per share basis in the original WSJ article, and number of shares outstanding was not found on Compustat or Moody's; or, primary vs diluted eps determination difficulties.

normality for this distribution sample (n=750) is the Shapiro-Wilks (W) measure (the default test in the SAS package for small sample sizes). For the original sample, normality was rejected because S-W=0.1069 and p<.0001. Table XVIb provides a frequency graph for the sample after the cutoffs were imposed. The surprise data look more normal even though there appears to be large kurtosis (see Appendix II).

In Table XV, sample sizes for the various tests are positioned below the basic testing sample of 483. These represent maximum sample sizes. If the test included the variables "MKBKFB" (Market to book value for the fiscal year end immediately before date of disclosure) and "H" (Herfindahl measure of industry concentration), the sample may have been smaller than both the maximum samples indicated because a single company may not reflect both measures; therefore, the observation may have been dropped from the test if either variable was missing (as was the case in the logistic regressions). Lastly, observations with a market to book value ratio (MKBKFB) less than 0 and a market value of common shares at the end of the fiscal year prior to MF disclosure (MKVALFB) less than 0 were eliminated.

TABLE XVIa

DISTRIBUTION OF SURP PRIOR TO REMOVING OUTLIERS

SURP Midpoint		Freq	Cum. Freq	Percent	Cum. Pcent
-1.0	**	32	32	4.27	4.27
-0.8		9	41	1.20	5.47
-0.6	*	28	69	3.73	9.20
-0.4	**	40	109	5.33	4.53
-0.2	******	125	234	16.67	1.20
0.0	**********	376	610	50.13	1.33
0.2	****	72	682	9.60	0.93
0.4	*	28	710	3.73	4.67
0.6	*	13	723	1.73	6.40
0.8		2	725	0.27	6.67
1.0	*	13	738	1.73	8.40
2.0		5	743	0.67	9.07
5.0		3	746	0.40	9.47
10.0		2	748	0.27	9.73
15.0		0	748	0.00	9.73
20.0		1	749	0.13	9.87
25.0		1	750	0.13	0.00

100 200 300

TABLE XVIb

DISTRIBUTION OF SURP AFTER REMOVING OUTLIERS

SURP Midpoint		Freq	Cum. Freq	Pcent	Cum. Pcent
-5.0		0	0	0.00	0.00
-1.0	*	9	9	1.97	1.97
-0.8	*	6	15	1.31	3.28
-0.6	**	16	31	3.50	6.78
-0.4	****	28	59	6.13	12.91
-0.2	**********	85	144	18.60	31.51
0.0	**********	237	381	51.86	83.37
0.2	******	42	423	9.19	92.56
0.4	***	19	442	4.16	96.72
0.6	**	12	454	2.63	99.34
0.8		2	456	0.44	99.78
1.0		1	457	0.22	100.00
2.0		0	457	0.00	100.00
5.0		0	457	0.00	100.00

100 200

4.5.2 Matched Sample Selection

A matched sample was selected from the April, 1994, Compustat II compact disc. The 3 digit SIC codes of disclosing firms were identified from the Compustat data base. All other firms with the same 3 digit SIC code were ranked according to the annual sales from the previous fiscal year. The nondisclosing company with the closest rank was selected if the difference in sales was not more than 50%. If no match could be found, 2 digit SIC codes were ranked by sales and the closest nondisclosing firm was selected as long as the difference in sales between the disclosing company and the nondisclosing company was not more than 50%. Of the 457 clean firms, 288 matches were found based on SIC code and sales.

4.5.3 Selection of Sample to Study Board of Directors

Measuring IBD is costly. Measuring IBD for a matched sample is even more costly. Given that the IBD is complementary to NUM, IOPCT, and IONUM, a test sample was selected first to see if any significance was indicated. The clean sample was arranged in date order and every fifth disclosing company was selected. The company was traced to the Q-files (Q-Data Corporation SEC-File) to see if a Proxy Statement or 10K Report was on hand for the date around the disclosure date. If it was available, then the matched sample list was checked to see if a match was able to be

obtained for that company. If one was obtained, then the Q-files were checked for that matched company. If all these steps were successful, the matched pair was included in the logistic regression sample. Q-files were obtained and examined for the years 1986-90. IBD information was selected for a total of 78 disclosing companies and 78 nondisclosing matches.

Test results indicate that the variable IBD is not significantly associated with returns or the surprise. Further, forward and backward selection regressions were run using the market residual as the dependent variable, with significance set at .20 (a measure greater than the usual alpha levels in order to give the variable a chance for inclusion). For both the forward and backward elimination, the variables IONUM and IBD did not enter the final model.

IBD is not included in the reports on the subsequent market tests. IONUM is included because it had a low marginal cost for collection. In the logistic regressions, results will be reported on the use of the IBD in the smaller sample.

4.6 Overall Summary and Analysis of Sampling Procedures

Gathering data from sources such as WSJ is costly. Other studies have used WSJ Index (Baginski, 1986) or the DJNRS (McNichols, 1989). The Index was considered to be too

rough a source, and this may be verified by comparing the sample size for this study to the smaller sample size of Baginski (1986). The DJNRS is considered a more encompassing data source. A comparison of the sample size of this study and that of McNichols (1989) reveals that this study's sample is relatively smaller because the time period under investigation was two years longer than McNichols.

Despite the different sources, it is concluded that a valid and reliable sample of the population is presented herein. The Tables provide information on the timing of the disclosures. This timing is comparable to other studies.

More relevant to the theory developed in Chapter 3, *a priori* support was found for signaling by way of forecasts. Forecasters appear to be clustered by industries identified with 3-digit SIC codes. Lev and Penman (1990) hypothesized such a result.

CHAPTER 5

RESULTS AND ANALYSIS

The results of tests of the hypotheses are presented in this chapter. In general, Hypotheses 1 and 3 are supported but Hypothesis 2 is not. The outline of this chapter is as follows. Section 5.1 presents the results of tests that give strong support to the adverse selection hypothesis. Variables that represent firm liquidity are shown to be significantly smaller than expected at the time the firm discloses the MF. Additionally, variables that represent the potential dependence of the firm on external share capital financing are shown to be significant. This result supports the proposition that the firm is preparing the market for a possible capital stock issuance.

Section 5.2 presents some preliminary evidence of the reliability of the data used for tests of the next two hypotheses. The management forecasts (MF), on average, were associated with a significant market reaction. These results confirm that credibility exists for the MF of this sample, and demonstrate that the procedures used to "clean" the sample worked very well.

The results of the information asymmetry tests are presented in Section 5.3. The tests provide support for the

proposition that as more investors obtain knowledge of a firm, there is less of a market response to MF disclosures but more of a likelihood that the firm will issue MF. With increased asymmetry the response to the surprise associated with the management forecast is greater. The asymmetry measures are highly correlated; therefore, conclusions based on specific variables may not be valid. OLS regression results indicate that information asymmetry does account for variations in the market response. Logistic regression results provide weak support for the proposition that different levels of asymmetry can identify strong versus weak market responses. There is strong support for the conclusion that companies that do not release MF are not followed by the market as well as those companies that do release MF.

Section 5.4 contains the analyses of the proprietary information variables. The analyses indicate that higher market reactions are caused by the release of proprietary information. The OLS regressions show that the model contributes to the explanatory power of the market response and the variables H (industry concentration), HM (firm contribution to industry concentration), and MKBKFB (market to book value as of the fiscal year-end prior to the release of the MF) are individually significant. The logistic regression results also identify proprietary cost variables

as critical for separating the strong versus weak response firms. The major problem that remains is that the results are driven by the negative surprise firms. Reasons for the market believing the positive surprise firm MF disclosures (i.e. when the firm says that earnings are going to be greater than is generally thought) are still unclear.

5.1 Adverse Selection Hypothesis

5.1.1 Results

Table XVII presents the results of preliminary tests that concerned the adverse selection hypothesis. In the alternative form, the hypothesis predicts that the current and the debt-to-equity ratios will be significantly different than expected at the time of MF disclosure. CR should be lower and DE should be greater than expected. The table includes the means and two-tailed t-values for four variables by fiscal quarter of MF disclosure. The four variables are CR0DIF (the difference between the current ratio for the quarter of disclosure and the expected value of the same firm's current ratio for the disclosure. The four variables are CR0DIF (the difference between the current ratio for the quarter of disclosure and the expected value of the same firm's current ratio for the same fiscal quarter), CRBDIF (the same difference as CR0DIF, but for the

TABLE XVII

QUARTERLY RATIO DIFFERENCES

mean, t(mean)=0, p(t), sample size

Ratio	QUARTER IN WHICH THE MF IS DISCLOSED			
	Q1	Q2	Q3	Q4
CR0DIF	-.708919	-.38297	-.49717	-.43335
	(-1.01)	(-3.98)	(-2.93)	(-2.81)
	(.3167)	(.0001)	(.0044)	(.0055)
	58	126	75	155
CRBDIF	-1.1289192	-.349943	-.49914	-.76938
	(-1.55)	(-3.47)	(-2.79)	(-2.17)
	(.1249)	(.0007)	(.0067)	(.0313)
	61	125	75	152
DE0DIF	-.12682	.258206	.961667	67.89708
	(-.6764)	(1.821922)	(2.3063)	(11.77)
	(.5014)	(.0707)	(.0238)	(.0001)
	61	136	77	178
DEBDIF	-.0597153	.034702	.142175	.271169
	(-.42868)	(.1222)	(1.43195)	(3.9226)
	(.6696)	(.9029)	(.1563)	(.0001)
	66	134	77	168

fiscal quarter prior to MF disclosure), DE0DIF (the difference between actual and expected Debt to Equity disclosure. The four variables are CR0DIF (the difference between the current ratio for the quarter of disclosure and the expected value of the same firm's current ratio for the same fiscal quarter), CRBDIF (the same difference as CR0DIF,

but for the fiscal quarter prior to MF disclosure), DE0DIF (the difference between actual and expected Debt to Equity ratio for the same quarter as MF disclosure), and DEBDIF (same as DE0DIF, but for the quarter prior to MF disclosure).

As can be seen, all but the first quarter's current ratio differences are generally significant and in a direction consistent with the theory. The debt to same-quarter equity ratio differences (DE0DIF) are significant in the second, third and fourth quarters. Prior-quarter debt to equity ratios are significant for only the last quarter disclosures. A review of the Shapiro-Wilks statistics reveals some of the distributions may not be quite normal. Additional testing was therefore performed by combining the data from the quarters into an overall test, after standardizing the variables and eliminating outliers. This resulted in the elimination of 41 to 79 observations (there were 411 observations included in the current ratio tests, and 449 observations for the debt-to-equity ratio tests), and resulted in 370 variables in the final tests. The final sample had a Shapiro-Wilks statistic for the two lowest measures of .56 (for DE0R and DEBR, which are both defined in the next paragraph). The normality statistics for all other variables were above .8 (the statistic lies between 0 and 1, with more normal distributions being closer to 1),

although p values reject the null that the distribution is normal. Normality is not critical to the t-test, but it is an assumption of the test.

Table XVIII lists the mean differences and the t-values for the hypothesis that the means are equal to 0. The ratios are aligned in event-time in the years 1986 to 1992. Each

TABLE XVIII

RATIOS AND STANDARDIZED RATIOS (1986-92)

Ratio	mean	t(mean)=0	p(t)
CR0DIF	-.317919	-6.5	(.0001)
CR0R	-.078087	-3.49	(.0005)
CRBDIF	-.3365764	-6.66	(.0001)
CRBR	-.0843042	-4.27	(.0001)
DE0DIF	.1919381	6.75	(.0001)
DE0R	1.4234205	8.25	(.0001)
DEBDIF	.1797975	6.39	(.0001)
DEBR	1.351121	7.53	(.0001)

variable's mean is significantly different from 0. The variables CR0DIF, CRBDIF, DE0DIF, and DEBDIF were defined at the beginning of this sub-section. The standardization of these variables is in the form: $(X-E(X))/|E(X)|$, where X is the ratio of interest, E(X) is the mean of the firm's ratios

for the seven years prior to the MF disclosure, and the denominator is an absolute value. The standardized ratios are designated CR0R, CRBR, DE0R, and DEBR in the table. The mean values are stated in percentages (when the actual ratio equaled the expected ratio, the standardized ratio would have a mean percentage of 1). The mean differences for the current ratios are all negative and for the debt to equity ratios are all positive. All differences are significant at $p<.001$.

5.1.2 Conclusions

The results of this Section support Hypothesis 1 and extend the results of Rhuland, Tung, and George (1990). These authors conclude that companies tend to issue stock after a MF disclosure. This study's results demonstrate further that companies prepare the market for the possibility of capital issuance. The liquidity of MF disclosers declines prior to a MF release, and the debt financing ability of the companies appears to be severely weakened prior to the MF release. These results will be of interest to those who study the "pecking order" of capital financing (Myers, 1984). In terms of this dissertation, the adverse selection asymmetry has a significant impact on the timing of the firm's release of MF.

Waymire (1985) found less volatility in the earnings stream of forecasters, and Lev and Penman (1990) found that

disclosers had generally larger (and increasing) earnings. The results of the present study imply a dampening of performance around the disclosure date (lower current ratio and increased debt to equity ratio). This conclusion is heightened by the generally negative surprise. There are few longitudinal studies of forecasters (for some of the reasons revealed by this study's attempt at gathering data for a time series study), but the apparent conflicting results of this study with those of Waymire (1985) and Lev and Penman (1990) emphasize that longitudinal analyses should be pursued. Such studies may uncover greater earnings management during periods of disclosure.

5.2 Market Reaction

The implication from equation (3.5) is that MFs affect stock prices. This affect has previously been well established but is discussed here to introduce the tests that use market reaction. A significant reaction implies unexpectedness and credibility are present. This dissertation separates the credibility for separate analysis.

A significant market reaction was found over the three days surrounding the MF release. Table XIX provides market-adjusted returns for the day before (ADJR1), the day of (ADJR2), and the day after (ADJR3) the release of the management forecast for the cleaned sample after outliers

have been removed. It is assumed that the date the MF appears in the WSJ is the day after the forecast is released to the public. The efficiency of the market is demonstrated by the lack of significant reaction on the day before and the day after the news release. The adjusted returns are not significantly different from 0 on Day -1 and Day +1 (t=-1.3237 and p=.1863, and t=-1.163 and p=.2454, respectively), but on Day 0, t=-4.2129 and p=.0001.[41] Over the three days, the accumulated adjusted return (CADJR) is significantly different from 0, with mean of -0.01888, t=-4.1224 and p=.0001. The surprise announcement (SURP) is also significantly different from 0 (t=-4.6186, p=.0001). The

TABLE XIX

SIGNIFICANCE LEVELS OF VARIABLES

Variable	mean	std dev	t(mean)=0	p(t)
ADJR1	-0.002278	0.0367993	-1.32373	.1863
ADJR2	-0.014134	0.0717205	-4.21289	.0001
ADJR3	-0.002472	0.0454434	-1.16300	.2454
CADJR	-0.018883	0.0979212	-4.12241	.0001
SURP	-0.059685	0.2762515	-4.61869	.0001

[41] McNichols (1989) graphs the returns over her sample's event period. There is little evidence of stock price reversions over the 100 days following a MF. Indeed, the price drifts up (down) for positive (negative) surprises and continues to do so throughout the sample window.

mean, based on the original sample, is negative, indicating that management forecasted earnings to be less than previously projected by analysts.[42]

The finding that the release of management's forecast is met with a significant market response implies that the information content of the MF is significantly associated with the market response. The market response variables (CADJR, ADJR1 ADJR2, and ADJR3) were individually regressed against the surprise (SURP) of the MF for a sample size of 457 (see Section 4.5.1 for sample size determinants). The results are in Table XX. With CADJR as the dependent variable, the single factor model has an F=6.971 (p=.0001), and an adjusted R^2 of .1259.[43] The coefficient of the SURP is significant (t=7.112, p=.0001) and has a positive sign, indicating that cumulative adjusted returns (CADJR) are positively associated with the size of surprise, as is consistent with prior studies. Tests in subsequent sections use smaller sample sizes in order to accommodate data for all variables. The surprise is also positively associated with the response of each day in the event window. This is consistent with McNichols (1989), who concludes that responses are directionally consistent before and after the

[42] Prior to removing surprise outliers, the mean surprise from the original sample was .155946 (N=750) with a standard deviation of 4.72, a t(mean=0) of .9046, and a p=.3659. After removing the outliers, the mean of the surprise was -.06196, standard deviation was .2747, t(mean=0) of -6.02243, and p=.0001.

[43] For all results in this dissertation, adjusted R-squared is given because of the frequency of comparison between models of differing amounts of variables.

TABLE XX

SURPRISE MODEL FOR THREE DAYS AROUND EVENT

t(mean)=0, p(t)

Indep\Dep Var	CADJR	ADJR1	ADJR2	ADJR3
INTERCEPT	.616	1.059	.405	-.207
	(.5381)	(.2901)	(.6858)	(.8364)
SURP	7.112	4.713	4.679	3.569
	(.0001)	(.0001)	(.0001)	(.0004)
R^2	.1259	.0717	.0648	.0326
F	6.971	4.203	3.872	2.399

MF disclosure. Note that this is true despite the finding that the mean ADJR1s and ADJR3s are not significantly different from 0 (Table XIX).

Some additional tests showed that the surprise parameters may not be stable through time. Panel A, Table XXI, presents a sub-study of the early and late years covered by this dissertation. The coefficient of the surprise is shown to be different for the two periods. It was shown above that the early years were dominated by NYSE/AMEX firms and the later years by NASDAQ firms. Controls for the year of disclosure were therefore imposed on the tests because of this apparent instability through

TABLE XXI

PARAMETER SPECIFICATIONS

Panel A: Basic Model With Early and Late Years				
Year	B_1	$t(B_1)$	R^2	F
1990-93	.151602	5.296	.1288	28.049
1986-88	.064328	3.626	.0562	13.145
Panel B: Basic Model Omitting (or not) Black Monday				
No omission	.109308	6.915	.0931	47.816
Omitting Black Monday	.112185	6.898	.0961	47.587
Panel C: Basic Model for Each Day of the Week				
Monday	.102333	3.057	.0955	9.344
Tuesday	.112088	2.841	.0728	8.07
Wednesday	.141966	3.702	.1314	13.704
Thursday	.128384	3.706	.1005	13.735
Friday	.071529	2.454	.0558	6.023

time (see discussion Appendix II). Panel B, Table XXI, presents the base sample model and a model that excludes MF from the period, October 1, 1987, to December 31, 1987. This period surrounds "Black Monday" (October 19, 1987), when the New York Stock Exchange (and all worldwide markets) lost value precipitously. During the surrounding period of volatility, a significant amount of noise may have accompanied the stock market reactions. The number of MF released during the Black Monday period is 14. As can be seen from Panel B, Black Monday effects are relatively insignificant. No controls were therefore included for Black Monday. Panel C, Table XXI, presents coefficients and other information for single-factor OLS regressions for the days of the week. The coefficients for the surprise vary from .07 on Friday disclosures to .14 on Wednesday disclosures. The model's explanatory ability is also quite low on Friday compared to Wednesday and Thursday. Thus, the weekend effects may be significant. But, the mean surprise for each of the days was also quite different (Mon=-.0644, Tues=-.0979, Wed=-.0674, Thur=-.027, Fri=-.0325). Controls for day of week were therefore instituted because of apparent instability of the coefficients across days of the week (see discussion in Appendix II).

5.3 Information Asymmetry Hypothesis

There were two general tests of the information asymmetry hypothesis. First, market reaction tests were conducted on the effect that information asymmetry may have on the response of the market to the MF disclosures (Section 5.3.1). For all these tests, dummy variables representing the calendar-year and week-day of disclosure are used to control for heteroscedasticity. No residuals are normal (see Appendix II). Second, logistic regression tests were conducted on the differing levels of asymmetry between disclosers and nondisclosers, and between strong and weak market reactions by the market to disclosures (Section 5.3.2).

5.3.1 Market Reaction Test Results

The importance of the surprise to the market reaction was noted in Section 5.2. It is expected that the surprise is stronger when there is greater asymmetry. The surprise may be measured by the earnings surprise, SURP, or the market surprise, CADJR. SURP would indicate information content; and CADJR, after removing the effects of the SURP, may give a relative measure of credibility. Asymmetry is measured by the variables IOPCT (institutional ownership as a percentage of common shares), IONUM (number of institutional owners), and NUM (number of analysts who forecast a company's EPS).

5.3.1.1 SURP as the Dependent Variable

Two tests were run with surprise as the dependent variable. If surprise to the market is measured by the SURP variable (the market reaction, CADJR, being too noisy), then asymmetry may affect the surprise measure. All the tests with CADJR as the dependent variable include SURP as the independent variable that represents new information to the market (information content).

Table XXII presents the results of regression using SURP as the dependent variable (the sample size is 448). It may be expected that less asymmetry reduces the surprise from a discretionary MF disclosure. In Table XXII, the dummy variables for the days and for the years were not significant. Model 1, with SURP as the dependent variable (Table XXII), demonstrates little association. NUM is negative and marginally significant. This makes sense when the source of the surprise is considered. The AF would be more informed if more analysts follow the firm, thus (MF-AF) would be reduced. IONUM is positive and marginally significant. Perhaps the institutions are as ignorant as the main body of investors.

It may be that the effect of the asymmetry works similarly for both the positive and the negative surprise, so the absolute value of the surprise (SURPR, in Table XXII)

TABLE XXII

REGRESSION WITH SURPRISE AS DEPENDENT VARIABLE

t(coefficient)=0, p(t)

Ind Var \ Dep Var	SURP	SURPR
INTERCEPT	-2.386 (.0175)	5.85 (.0001)
IOPCT	1.288 (.1986)	-1.926 (.0547)
IONUM	1.652 (.0992)	-2.007 (.0454)
NUM	-1.748 (.0812)	.394 (.6940)
R^2	.0175	.0253
F	1.18	1.869

was run against the asymmetry variables. As can be seen, greater significance is found. Model 2, however, is still marginally significant with an R^2 of .0253, and an F=1.869. The percentage of institutional ownership (IOPCT) is significant and negative (t=-1.926 and p=.0547); the number of institutional owners is also significant and negative (t=-2.007 p=.0454). The lower the asymmetry, the less the size of the surprise. It is reasonable that as NUM increases, SURP decreases because SURP is based on AF. It is

unexpected that NUM is insignificant in the SURPR regression.[44]

Because these results do not directly address the purpose of this dissertation, the results are not discussed further. The results are useful, though. Multiple correlations among the independent asymmetry variables may impact on the lack of significance of NUM in the SURPR regression. Multicollinearity may cause incorrect measures and interpretations of the coefficients of the regressors, so cross-correlations were measured (Table XXIII). The asymmetry variables are highly correlated.

TABLE XXIII

CORRELATION MATRIX: ASYMMETRY SURROGATES

Pearson Correlation Coefficients

	SURP	SURPR	IOPCT	IONUM	NUM
SURP	1				
SURPR	-.3871*	1			
IOPCT	.05875	-.1536*	1		
IONUM	.06233	-.1754*	.50698*	1	
NUM	.04453	-.1704*	.5680*	.78053*	1

* significant at p<.002

[44] Other regressions were run with the surprise scaled by beginning of fiscal year market values. Correspondingly, the asymmetry variables were scaled by the same measure. The results may provide a good explanation for changes in levels of surprise. The model, SURP=IOPCT IONUM NUM, with all variables scaled, has an R-squared of .0878, and an F=12.294. The percentage of institutional ownership (IOPCT scaled) is negatively associated with the surprise (t=-3.981 and p=.0001). These scaled model results are not reported in the main because residuals from the scaled tests appear to violate the normality assumption. See Appendix II for tests on the assumptions and the results of the tests on the unscaled models.

5.3.1.2 CADJR as the Dependent Variable

Table XXIV presents the basic models of analysis of the market reaction for the sample.[45] As expected, the surprise is significant and positive, indicating usefulness of MF to investors. Model 1 is the basic surprise presented again for comparative purposes. Model 2 presents the results of the asymmetry variables alone: none is significant. Model 3 presents the three variables with the surprise: the adjusted R^2 is marginally smaller than for Model 1, meaning that the additional variables offer no additional explanation. Tests of each of the variables alone with the surprise yielded similar results. For each of these models, the dummy variables for Tuesday, Wednesday and the year 1992 are significant and negative (not shown in the Table).

Some further analyses of the basic asymmetry model were performed. Partitioning the sample into positive (negative) CADJR and positive (negative) SURP produced two portfolios, "pos-pos" and "neg-neg".[46] The R^2 for the pos-pos portfolio (n=119) is .0902 for a regression with CADJR as the dependent variable and SURP and the dummies for the weekday and the year as the independent variables. The parallel R^2 for the neg-neg portfolio (n=186) is .2854. Moreover, the

[45] The sample is reduced from 483 to various sizes, depending on the availability of data.

[46] When just a negative surprise defined the portfolio, n=289; when negative surprise and negative return (i.e. neg-neg) defined the portfolio, n=187. This indicates that a high amount of negative surprises ended up with positive market reactions. When just a positive surprise defined the portfolio, n=187; when positive surprise and positive return (i.e. pos-pos) defined the portfolio, n=113.

TABLE XXIV

ASYMMETRY ON CADJR

t(coefficient)=0, p(t)

Ind Var \ Dep Var	CADJR	CADJR	CADJR
INTERCEPT	.8333 (.4052)	.184 (.8538)	.939 (.3484)
SURP	6.524 (.0001)		6.475 (.0001)
IOPCT		-.096 (.9236)	-.505 (.6136)
IONUM		1.285 (.1995)	.822 (.4113)
NUM		-.863 (.3884)	-.352 (.7249)
R^2	.1047	.013	.099
F	5.625	1.439	10.71
Sample Size	448	448	448

response coefficient of the SURP variable (i.e. CADJR and SURP are scaled by market value of the firm as at the year-end prior to MF release) is .189 for the pos-pos portfolio (and significant with p=.0533) and is .0511 for the neg-neg portfolio (and significant at p=.0001). For the neg-neg portfolio NUM is positive and significant with p=.0361. It

appears that the negative MF accounts for a greater percentage of the market response than does the positive MF. The positive NUM indicates that there is a more moderate reaction, which is consistent with there being less asymmetry. The positive MF is not ignored: the market assigns a greater response to the positive information.

Table XXV introduces the absolute value of the reaction as the dependent variable. This variable is used to attempt to assess the reaction without considering the direction. The theory predicts that greater asymmetry made the disclosure less credible and does not depend on direction. Because the reaction is restricted to an absolute value, so too is the surprise. The basic model (with only SURPR as the dependent variable) has an R^2 of .0680 and a smaller t and p-value associated with the absolute value of the surprise than did the regression in Table XXIV. The increase in explanatory power for the next two models (Table XXV) is substantial.

In Table XXV the asymmetry variables are consistently negative after giving effect to SURPR, indicating that with lower asymmetry (higher asymmetry measures) there is a decreased market response. Individual regression were run because of the multicollinearity. IOPCT, IONUM, and NUM are each negative and highly significant ($p<.001$ for each variable). For these absolute value regressions, the dummies

for Monday, Tuesday, Wednesday, 1992, 1991, and 1990 are positive and significant.

TABLE XXV

ASYMMETRY VARIABLES ON CADJRR (ABSOLUTE VALUE OF CADJR)

t(coefficient)=0, p(t)

Dep Var Ind Var	CADJRR	CADJRR- RESIDUAL	CADJRR- RESIDUAL	CADJRR- RESIDUAL	CADJRR- RESIDUAL
INTERCEP	.718 (.4731)	2.674 (.0078)	2.861 (.0044)	2.627 (.0089)	3.166 (.0017)
SURPR	3.797 (.0002)				
IOPCT		- .936 (.3498)	-3.501 (.0005)		
IONUM		-1.818 (.0697)		-4.696 (.0001)	
NUM		- .894 (.3717)			-4.476 (.0001)
R^2	.0860	.0462	.0245	.0449	.0408
F	5.091	8.231	12.26	22.056	20.034

Each variable was also run as an interaction with surprise, and the interaction regressed on the market reaction (Table XXVI). The results when CADJR is the

dependent variable are not in the table. With CADJR, the interaction between surprise and IOPCT is marginally significant and no other variable attains significance.

In Table XXVI (n=437), the interaction terms are all negative, with **SURPR*IONUM** and **SURPR*NUM** highly significant (the absolute value of the surprise is SURPR). **SURPR** remains significant in all cases. The lower asymmetry depresses the reactions, which is consistent with previous results.

TABLE XXVI

INTERACTION TERMS

t(coefficient)=0, p(t)

Ind Var \Dep Var	CADJRR	CADJRR	CADJRR
INTERCEPT	1.222 (.2223)	1.109 (.2682)	.629 (.5295)
SURPR	2.634 (.0087)	4.008 (.0001)	5.064 (.0001)
SURPR*IOPCT	-1.334 (.1828)		
SURPR*IONUM		-3.037 (.0025)	
SURPR*NUM			-3.308 (.0001)
R^2	.0604	.0761	.1051
F	3.398	4.074	5.677

The results to this point demonstrate that each of the asymmetry variables is important, even though there are strong intercorrelations. In subsequent tests, all asymmetry variables are used, but because of the multicollinearity, interpretations of each variable individually are invalid.

The theory and the results also demonstrate that the absolute value of CADJR is the more appropriate dependent variable. Subsequent tables depicting asymmetry test results will therefore present tests with CADJRR as the dependent variable.

Further analyses on the market reaction were conducted in order to clarify interpretations of the depressing effect of lower asymmetry.

Four portfolios were constructed, and are summarized in Table XXVII. If information asymmetry is hypothesized to cause a greater market reaction, then it may be more evident when the reaction is greatest. The portfolios were formed so that a similar surprise resulted in mild or strong reaction. For instance, portfolio 1 consists of firms with a strong negative surprise and a correspondingly strong negative market reaction. Portfolio 2 includes firms with a similarly strong negative surprise, but a near zero reaction. Portfolios 3 and 4 are mirrors of 1 and 2, but on the strong (and moderate) positive side of the surprise. The cutoffs for the measures were at the fourth and seventh deciles for the two variables (see Table XXVII). In order to better analyze the market response to the asymmetry variables, the portfolios were then combined: the two large response portfolios (portfolios 1 and 3) were combined (Portfolio 5) and the two lesser response portfolios (portfolios 2 and 4)

TABLE XXVII

PORTFOLIO FORMATION

Portfolio 1

SURP ≤ -.04688

CADJR ≤ -.01754

mean CADJR = -.1246
mean SURP = -.2954
n = 116
mean MKVALFB = 2194.47
mean IOPCT = 41.29
mean IONUM = 154.09
mean NUM = 11.68

Portfolio 2

SURP ≤ -.04688

-.01754 ≤ CADJR ≤ .01861

mean CADJR = .0001
mean SURP = -.2406
n = 40
mean MKVALFB = 1948.50
mean IOPCT = 46.18
mean IONUM = 164.75
mean NUM = 13.4

Portfolio 3

SURP ≥ .08571

CADJR ≥ .01861

mean CADJR = .0663
mean SURP = .3252
n = 43
mean MKVALFB = 1156.32
mean IOPCT = 40.12
mean IONUM = 137.36
mean NUM = 9.48

Portfolio 4

SURP ≥ .08571

-.01754 ≤ CADJR ≤ .01861

mean CADJR = .002
mean SURP = .2646
n = 22
mean MKVALFB = 1996.98
mean IOPCT = 43.39
mean IONUM = 189.77
mean NUM = 12.65

TABLE XXVIII

PANEL A

REGRESSIONS IN PORTFOLIO 5

t(coefficient)=0, p(t)

Portfolio	5	5	5	5
Dep Var	CADJRR	RESID	RESID	RESID
Sample size	159	144	144	144
Ind Var				
INTERCEPT	-1.149 (.2522)	.002 (.9985)	-.066 (.948)	.701 (.492)
SURPR	6.657 (.0001)			
IOPCT		-1.161 (.2477)		
IONUM			-2.654 (.0089)	
NUM				-2.598 (.0104)
R^2	.2422	.0024	.0403	.0384
F	5.728	1.347	7.043	6.75

PANEL B

REGRESSIONS IN PORTFOLIO 6

t(coefficient)=0, p(t)

Portfolio	6	6	6	6
Dep Var	CADJRR	RESID	RESID	RESID
Sample Size	66	64	64	64
Ind Var				
INTERCEPT	-.331 (.7417)	.035 (.927)	-.185 (.854)	-.151 (.8805)
SURPR	12.416 (.0001)			
IOPCT		-.071 (.9437)		
IONUM			.188 (.8517)	
NUM				.131 (.8959)
R^2	.7190	0	0	0
F	16.121	.005	.035	.017

were combined (Portfolio 6). This also has the effect of increasing the sample sizes.

In Table XXVII, the two strong portfolios have higher IOPCT, IONUM, and NUM measures. The resulting tests are described in Table XXVIII (the differences in sample sizes with the residuals occurs because not all residuals have all the independent variables). In both portfolio 5 (Panel A) and 6 (Panel B) the size of the surprise explains much of the size of the market response. The residuals are from a regression with the surprise only, as depicted in the first column of each panel, and are used to address the multicollinearity problem identified in Table XXIII. As is evident, the market response is reduced when there is lower asymmetry because IONUM and NUM are each significant and negative. This dampening effect accounts for differences when the reaction is strong, but accounts for nothing when the reaction is weak. It may be that the moderate response portfolio members are all at a similar level of asymmetry (but the surprises are still great). This is because of the insignificance of the asymmetry variables (as well as the 0 R^2's) in Portfolio 6.

In summary, the asymmetry variables did not help to explain the direction of the response for the weak portfolio. Can the level of asymmetry identify the weak vs

strong response expected by a MF discloser? This question is examined next.

5.3.2 Logistic Regressions

A second set of tests on information asymmetry sought evidence that the asymmetry variables could separate groups into strong and moderate market responses, and into disclosers and nondisclosers. Strong and moderate market response groups are based on the portfolios formed in Table XXVII.

5.3.2.1 High and Low Market Response

Table XXIX presents the results of a logistic regression with strong response firms coded as 1, and moderate response firms coded as 0. Strong and moderate responses for negative and positive groups are based on the portfolios in Table XXVII. For the sample as a whole, asymmetry measures were not significant.[47] Panel A of Table XXIX presents negative response firms, and Panel B presents

[47] Rough groupings of the asymmetry variables produce the following results. Each of the asymmetry variables were divided into two groups, depending on whether the measure was above or below the mean measure for the sample. For the negative return portfolio, IOPCT is significantly negative and indicates that at higher levels of IOPCT (lower levels of asymmetry) there are more moderate responses. When all measures are combined to define the portfolios (i.e. high asymmetry portfolio needs IOPCT, IONUM, and NUM all to be at low levels), the model scores a chi-square of 3.056 (p=.0804), and the combined asymmetry variable is also negative and marginally significant with p=.097. For the positive return portfolio, IONUM is significant and indicates that at higher levels of IONUM (lower levels of asymmetry) there are more moderate responses. When the whole sample is used for the test and the combined measure is used to define the portfolios, the model scores a chi-square of 7.514 (p=.0061), and the combined asymmetry variable is also negative and significant with p=.014 (indicating that with low asymmetry the response is weaker).

TABLE XXIX
LOGISTIC REGRESSIONS

PANEL A: NEGATIVE RETURNS: STRONG RESPONSE VS MODERATE RESPONSE
n=175

Variable	Coefficient	Std Error	ChiSquare	P-value
Intercept	-.6632	.3733	3.1571	.0756
IOPCT	-.00005	.00162	.0008	.9773
IONUM	-.0116	.00937	1.5296	.2162
NUM	-.0129	.0324	.159	.6901

Overall model chi-square (3 d.f.) = 1.547
Overall model p-value = .6714

PANEL B: POSITIVE RETURNS: STRONG RESPONSE VS MODERATE RESPONSE
n=78

Variable	Coefficient	Std Error	ChiSquare	P-value
Intercept	-.2958	.544	.2957	.5866
IOPCT	-.00561	.0149	.1414	.8746
IONUM	-.00035	.0022	.0249	.7069
NUM	.0514	.0513	1.0024	.3167

Overall model chi-square (3 d.f.) = 2.115
Overall model p-value = .5488

PANEL C: DISCLOSER VS NONDISCLOSER (WITH IBD)
n=133

Variable	Coefficient	Std Error	ChiSquare	P-value
Intercept	.0599	.6952	.0074	.9314
IOPCT	-.00708	.0117	.3655	.5455
IONUM	-.00054	.00181	.0894	.7649
NUM	-.00932	.0311	.0896	.7647
IBD	-.0122	.0123	.9815	.3218

Overall model chi-square (4 d.f.) = 2.455
Overall model p-value = .6528

PANEL D: DISCLOSER VS NONDISCLOSER (WITHOUT IBD)
n=465

Variable	Coefficient	Std Error	ChiSquare	P-value
Intercept	.1656	.2282	.5269	.4679
IOPCT	-.00109	.0057	.0368	.8479
IONUM	.000239	.00081	.0868	.7683
NUM	-.0296	.0167	3.1345	.0767

Overall model chi-square (3 d.f.) = 8.337
Overall model p-value = .0395

positive response firms. As can be seen, chi-square measures for the individual variables and for the model as a whole are not significant. Further investigation found no difference between the means of the high and low responding firms for any asymmetry variable. By design of the portfolios, there was no difference between the means of the surprise of the two groups. The difference between the means of the adjusted returns of the two groups was highly significant (p=.0000).

5.3.2.2 Discloser/Nondiscloser Asymmetry

Table XXIX also presents results for disclosing firms (coded as 1) and matched nondisclosing firms (coded as 0). Panels A through C demonstrate negative coefficients, in general, for the asymmetry variables (although none is significant). Panel C also demonstrates for a sample size of 133 that the inclusion of the additional asymmetry variable IBD does not increase predictive ability. With a larger sample (n=465), the overall model (but without IBD) is quite significant (Panel D), with a chi-square of 8.337 (p=.0395). Logistic regressions run with each variable individually result in each being significant and negative, with NUM being most significant (p=.0072). The results are the same, but stronger, if groups of the asymmetry variables are formed. For instance, if the discloser/nondiscloser sample medians of IOPCT, IONUM, and NUM are computed and groups are

formed on each side of the median values, the IOPCT, NUM and IONUM groups are each significant and negative in the logistic regressions, and the models are highly significant. The model with all grouped variables is highly significant (chi-square=23.743, p=.0001), meaning that with lower asymmetry, there is a greater propensity to disclose.

5.3.2.3 Conclusions

The results in this section do not support predictions from the information asymmetry hypothesis. Instead the results indicate that with greater asymmetry there is greater response to management forecast disclosures. This is the opposite of what was expected, but conforms to previously documented evidence. In particular, the R^2 value of the regression model with the asymmetry variables increases when used to explain the "strength" of the market response (Table XXV). Each variable is individually significant. The asymmetry variables are almost always negative for all the tests, including the interaction tests in Table XXVI.

Tests of the surprise in Table XXII show that high asymmetry increases the difference between MF and AF. This may contribute to the greater market responses. While holding the level of the surprise relatively constant (Table XXVIII), however, the size of the surprise is still highly significant (even for the near-zero reaction portfolio) and

each of the asymmetry variables are significant and negative.

The results of the logistic regression between disclosers and nondisclosers demonstrate that information asymmetry impacts on MF disclosures. The results are not consistent with the theory. At greater levels of asymmetry, there is a less tendency to disclose. Comparing the mean and median values for this sample's asymmetry variables to those of Bhushan's (1989b) sample (which is broadly based) confirms this conclusion. Means for Bhushan's sample (my sample, which is MF focused) are: IOPCT 35.03 (42.15), IONUM 92.69 (200.54), and NUM 13.94 (13.67). Rough groupings described in footnote 47 enforce the conclusions. It appears that MF are used by firms to correct previously published expectations (King et al., 1990).

These conclusions are consistent with Dempsey (1989), who found that stock returns during the annual earnings announcement period were negatively associated with the number of analysts following the firm. Bhushan (1989b) also reports a significant negative correlation between the annual abnormal return and percent of institutional ownership (although he found abnormal annual market returns were positively associated with the number of analysts following a company).

If greater asymmetry does not depress the reaction to the surprise, how is the credibility of the information kept intact? The next section addresses this question.

5.4 Proprietary Cost Hypothesis

The third hypothesis concerns the cost of the signal. As demonstrated in Chapter 3, this cost helps impart credibility. The variables H (industry concentration), HM (the relative contribution of the disclosing firm to the industry concentration) and MKBKFB (end of prior fiscal year market to book value for the disclosing firm) are included in regressions with CADJR and the absolute value of CADJR (designated CADJRR) as the dependent variables. These same independent variables are included in logistic regressions that separate strong returns from near-zero returns. First, however, section 5.4.1 reports regressions with SURP as the dependent variable.

The week-day and calendar-year dummies included in the asymmetry tests (see introduction to Section 5.3) were also generally sufficient to control for heteroscedasticity in the proprietary costs tests. When heteroscedasticity could not be rejected, additional procedures were used to verify the results and are noted in the text.

5.4.1 SURP as the Dependent Variable

As with the asymmetry tests, the independent variables were regressed on the surprise. Neither the model nor the

independent variables are significantly associated with the surprise. The model had an F=1.1, and an R^2 of .003. H had a t-value (two sided) of .007 (p=.9944), and MKBKFB had a t-value of 1.433 (p=.1526). Similar results were found using HM (t-value of .379). Because using absolute values of dependent variables provided evidence of the impact of the information asymmetry variables, the use of absolute values for the proprietary cost hypothesis also appears warranted. The regression of H, HM, and MKBKFB on SURPR (the absolute value of the surprise) results in an R^2 of only .017 (F=1.634, p=.079). The variable H has a t-value of -1.401 (p=.162), but MKBKFB is more significant at t=-3.1 (p=.0021). Similar results were found for HM (t=-1.606, p=.1091). Table XXX shows that H and HM are not correlated with MKBKFB, although H and HM are correlated with each

TABLE XXX

CORRELATION MATRIX: PROPRIETARY COST SURROGATES

Pearson Correlation Coefficients

	SURP	SURPR	H	HM	GROUPA	GRPB	MKBK
SURP	1						
SURPR	-.248*	1					
H	-.005	-.0648	1				
HM	.036	-.0868*	.5433*	1			
GROUPA	.061	.0362	NA	NA	1		
GROUPB	-.009	.0530	NA	NA	.3408*	1	
MKBKFB	.030	-.1304*	-.0076	.048	-.0490	-.021	1

* significant at p<.1

other. Interpretations of the significance of each of the variables can therefore be made from the following tests if H and HM are not included in the same tests. It is the total model, however, that is the primary concern of this dissertation.

5.4.2 CADJR As the Dependent Variable

Table XXXI presents the results of the basic regression models. Consistent with prior tests, the surprise is highly significant. H is not significant, but HM is significant: the release of more proprietary information results in a stronger reaction. The R^2 value of the model with HM also increases slightly. The dummies for Tuesday, 1992, and 1991 are significant and negative.

TABLE XXXI

PROPRIETARY VARIABLES ON CADJR

Dep Var	CADJR	CADJR	CADJR	CADJR	CADJR
Sample size	409	409	409	409	409
Ind Var					
INTERCEPT	.243 (.8082)	-.871 (.3844)	-.976 (.3298)	-.162 (.8713)	-.233 (.8157)
SURP	7.014 (.0001)			6.923 (.0001)	6.915 (.0001)
H		.609 (.5426)		.625 (.5322)	
HM			1.882 (.0606)		1.858 (.0639)
MKBKFB		1.165 (.2448)	1.213 (.226)	.651 (.5155)	.699 (.4851)
R^2	.1465	.0427	.0503	.1439	.1505
F	7.38	2.521	2.805	6.289	6.573

Heteroscedasticity may be a problem for these results (chi-square=88.13, p=.1097). When CADJR is scaled by the market value of the company at the fiscal year end prior to the MF disclosure (MKVALFB), similar insignificant results were found for H (with a White's chi-square of 28.33 and p=1.0, but normality may be a problem with S-W=.496). With scaled results, HM is also insignificant, and while heteroscedasticity is controlled, normality is again compromised (S-W=.47).

A better measure of the strength of the market response may be the absolute value of the response, because significant association of the independent variables with positive and negative values of the dependent variables may cancel each other out.

Table XXXII presents results from a regression of H, HM, and MKBKFB on the absolute value of the market reaction (CADJRR). MKBKFB is included in all the regressions because it lacks correlation with the other proprietary cost variables. HM is significant and negative, while MKBKFB is significant and positive. Further, the proprietary cost variables add important explanatory ability to the basic SURPR model. SURPR alone is significant (t=3.887, p=.0001) and is useful in explaining the size of the reaction (R^2=.0888). H is insignificant. Including the proprietary

TABLE XXXII

PROPRIETARY VARIABLES ON CADJRR

Dep Var	CADJRR	CADJRR	CADJRR	CADJRR	CADJRR
Ind Var					
INTERCEPT	1.668 (.096)	1.453 (.1471)	.526 (.5993)	1.851 (.0649)	.934 (.3510)
SURPR	3.887 (.0001)		4.343 (.0001)		4.204 (.0001)
H		-.184 (.8538)	.025 (.9798)		
HM				-2.731 (.0066)	-2.458 (.0144)
MKBKFB		2.423 (.0158)	3.103 (.0021)	2.388 (.0174)	3.053 (.0024)
R^2	.0888	.0658	.1060	.0887	.1256
F	4.626	3.399	4.73	4.302	5.499

information variables raises the R^2 from .0888 to .1256. Dummies for Monday, Tuesday, 1992, 1991, 1990, and 1989 are positive and significant (not shown in the Table). Heteroscedasticity is controlled (chi-square=68.69, p=.6210 in the final model) but normality is rejected, although the removal of outliers does not alter results (see Appendix II).

The results in Tables XXXI and XXXII appear contradictory. How can the proprietary costs of disclosure increase the market reaction, but depress the reaction's absolute value? Further, the HM and MKBKFB variables have different signs.

Dividing the sample into positive and negative surprise subsamples indicates that the results are driven by the

negative subsample. For this group, the surprise is highly significant, the HM is positively associated with CADJR and negatively associated with CADJRR, and MKBKFB is (still) positively associated with CADJRR. This means that with increased release of proprietary information (as measured by HM), the negative returns are mitigated. For the positive subsample, the surprise is insignificant (as in Kasznik and Lev, 1995)! For the positive group, MKBKFB is positive and significant at p=.02 (in both CADJR and CADJRR regressions). It appears that MKBKFB and HM measure different attributes.

There is little doubt that the ability of H and HM to accurately represent the competitive environment is restricted. Baginski (1987), for instance, included SIC code, business risk, and financial risk measures to determine similar firms. The above tests are repeated using groupings of H and HM. The following tables present test results that use the median values of H and HM to classify the proprietary cost classes. If H (HM) values exceed the median, then the firm is identified in GROUPA (GROUPB) by 0; if the values are less than the median, the identifier is 1. Tripartitions were also formed based on three (equal) group partition of H and HM. Where significant results are obtained by using the two extreme values from such a tripartition, the results are reported in footnotes.

In Table XXXIII the results of Tables XXXI and XXXII are enhanced. GROUPB (HM) is highly significant and negative

TABLE XXXIII

GROUPED PROPRIETARY VARIABLES ON CADJR(R)

Dep Var	CADJR	CADJRR
Sample size	407	407
Ind Var		
INTERCEPT	.017 (.9866)	.056 (.9558)
SURP(R)	6.723 (.0001)	4.020 (.0001)
GROUPA	1.825 (.0686)	-1.231 (.2191)
GROUPB	-2.043 (.0417)	3.636 (.0003)
MKBKFB	.667 (.5052)	3.034 (.0026)
R^2	.1533	.1401
F	6.265	5.738

for CADJR and positive for the absolute value of CADJR (CADJRR).[48] This is consistent with the previous tables' results because the dichotomous variable is 0 for high HM values. Higher levels of HM are associated with stronger market reactions.[49] For these results, Wednesday and 1992

[48] Use of the extreme groups of a three group partitioning produced weaker results. No proprietary cost variable was significant for the CADJR regression. For the CADJRR regression, the t-statistic for the GROUPB variable was 2.552 (p=.0104). MKBKFB was significant for the CADJRR regression with a t-statistic of 2.423 (p=.0165). The GROUPA variable was not significant.

[49] GROUPB is significantly correlated with firm size, as measured by MKVALFB (the market value of the firm's common stock as of the fiscal year end preceding the MF disclosure). Supplementary tests were run that scaled CADJR, CADJRR, SURP, and SURPR by MKVALFB. The residuals from the two regressions CADJR=SURP and CADJRR=SURPR plus the proprietary cost variables, with all variables scaled, resulted in similar, but weaker results. For the residual from CADJR (scaled), GROUPA is positive and significant (t=1.723, p<.1); no other variables are significant. For the residual from CADJRR

are significant and negative. Heteroscedasticity is also rejected (chi-square=84.625 p=.5217 for CADJR; chi-square=91.3172 p=.3271 for CADJRR).

From the preceding discussions, it appears that the signs of the surprise and the proprietary cost variables are important to the reaction. To investigate the proprietary variables further, four portfolios were formed using the guidelines of Table XXVII.

The comparative mean H measures for each of the portfolios (1, 2, 3, and 4) are .1955, .1429, .1695, and .2050, respectively. The comparative mean HM measures are .0915, .0911, .0772, and .1327, respectively. The comparative MKBKFB measures for the four portfolios are 2.460, 2.120, 2.396, and 2.049, respectively. For the two "strong" response portfolios (1 and 3), the HM (MKBKFB) measures are smaller (larger) than those of the two moderate portfolios. On the surface, it appears proprietary costs differ by level of response, given the same level of surprise.

Little statistical significance, however, was found in OLS regressions within each portfolio. The surprise was not significant in any regression using CADJR as the dependent variable. In Portfolio 1, HM was significant and positive and MKBKFB was significant and negative. In Portfolio 3,

(scaled), GROUPB is positive and significant (t=1.877, p<.07); no other variables are significant. Residuals are homoscedastistic and normal for both sets of results.

MKBKFB was marginally significant and positive. In no other portfolio was there a significant variable. Combining the two strong reaction portfolios produced a significant and positive surprise variable and a significant and negative MKBKFB (the two moderate reaction portfolios combined produced no significant variables).

Using the grouping of H and HM by levels produced results reflected in Table XXXIV.[50] As can be seen, the strong reaction portfolio 5 is highly associated with the proprietary cost variables. For this portfolio, the surprise is significantly associated with CADJR, indicating that the greater the surprise the stronger the reaction; SURPR is significantly associated with CADJRR, indicating the larger the surprise the greater the reaction. When regressions were run on the individual variables (because of the cross-correlations between variables), similar results were obtained.

The weak reaction portfolio (6) does not have the same significant variables. In the weak reaction portfolio, little explanation is offered for the reaction. This is to be expected because there is little variance in the reaction (the dependent variable). In any event, no other independent

[50] Use of the extreme groups of a three group partitioning produced similar, but weaker, results for the strong portfolio; the weak portfolio produced biased estimates. The t-statistic for the (strong portfolio) GROUPB variable was 2.592 (p=.0104) for the CADJRR regression. MKBKFB was significant for the CADJRR regression with a t-statistic of 2.423 (p=.0165). GROUPA variable was not significant. When CADJRR is scaled GROUPB is insignificant with t=1.643 and p=.1023.

TABLE XXXIV

GROUPED PROPRIETARY VARIABLES IN COMBINED PORTFOLIOS

Portfolio	5	5	6	6
Dep Var	CADJR	CADJRR	CADJR	CADJRR
Sample	156	156	49	49
Ind Var				
Intercept	-.757 (.4505)	-.454 (.6506)	-1.237 (.2242)	1.009 (.3197)
SURP	7.869 (.0001)		1.179 (.2464)	
SURPR		1.777 (.0778)		-.846 (.4035)
GROUPA	1.662 (.0987)	-.566 (.5720)	-1.294 (.2041)	1.551 (.1300)
GROUPB	-1.431 (.1545)	2.640 (.0064)	1.439 (.1589)	-.810 (.4232)
MKBKFB	.525 (.6001)	2.767 (.0064)	-.533 (.5972)	1.024 (.3130)
R-squared	.3587	.1222	.0505	0
F	7.231	2.552	1.186	.884

variable was significant.[51]

The previous results appear to be asymmetric in that the negative reaction portfolio provides most of the results. The positive reaction portfolio provides little

[51] Because the GROUPB measures are correlated with firm size, as measured by the market value of the firm's common shares as of the fiscal year end preceding the MF disclosure, scaled versions of these results were tested. The results were consistent, but weaker.

For Portfolio 5, the regressions on the residuals from the regression CADJR(R)=SURP(R), with all variables scaled, are as follows. For the residual from CADJR (scaled), GROUPA is positive and significant (t=2.039, p=.0431); no other proprietary cost variable is significant. For the residual from CADJRR (scaled), GROUPB is positive but insignificant (t=1.203, p=.2311); no other proprietary variables are significant. Residuals are homoscedastistic and normal for both sets of results.

For Portfolio 6, the regressions on the residuals from the regression CADJR(R)=SURP(R), with all variables scaled, are as follows. For the CADJR model, GROUPA has a t=-1.567 p=.1258. For the CADJRR model (n=50), the SURPR is highly significant (p=.0001) and the R^2 with SURPR is .7252. No proprietary cost variable is significant. Residuals are homoscedastistic and normal for these results.

significance. The next set of tests represent an attempt to find results with the positive reaction portfolio.

5.4.3 Logistic Regression

The proprietary information variables were used to identify the ability to differentiate between levels of CADJR. This was done because prior tests indicated that positive reaction portfolios had no significant variables. Using a logistic regression procedure sought confirmation of a basic association of the proprietary variables and the sign of the surprise. The proprietary cost variables are categorized into groups separated by the median value of each variable, as was described in Section 5.4.2.[52]

In Table XXXV, Panel A presents the results for the strong and moderate negative responses where the dummy value 0 represented the strong response and the value 1 represented the moderate response. Consistent with the market reactions reported previously, the GROUPA and GROUPB variables are important in separating the two portfolios. Individual logistic regressions did not produce different results for either GROUPA or GROUPB in the negative portfolio, but MKBKFB individually is marginally significant (t=3.5985, p=.0578).

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[52] Use of the extreme groups of a three group partitioning produced weaker results. For the negative portfolio, MKBKFB is significant in separating the strong from the moderate responses. For the positive portfolio, GroupB has a chi-square of 2.660 (p=.1029). For the entire sample, MKBKFB has a chisquare=3.6013 and p=.0577.

For the positive returns in Panel B, with a smaller sample size (n=73 vs n=174 for the negative responses), there are no significant variables. For the whole sample together, no variable is individually significant.

TABLE XXXV

LOGISTIC REGRESSIONS

PANEL A: NEGATIVE RETURNS: STRONG VS MODERATE RESPONSE
n=175

Variable	Coefficient	Std Error	ChiSquare	P-value
Intercept	.0091	.3836	.0006	.9810
GROUPA	.6062	.3375	3.2264	.0725
GROUPB	-.6045	.3436	3.0948	.0785
MKBKFB	-.1250	.1197	1.0909	.2963

Overall model chi-square (2d.f.) = 7.477
Overall model p-value = .0545

PANEL B: POSITIVE RETURNS: STRONG VS MODERATE RESPONSE
n=73

Variable	Coefficient	Std Error	ChiSquare	P-value
Intercept	-.0376	.5452	.0048	.9449
GROUPA	-.0524	.4824	.0118	.9135
GROUPB	-.0517	.4832	.0114	.9148
MKBKFB	.0258	.1325	.0380	.8454

Overall model chi-square (2d.f.) = .046
Overall model p-value = .9974

5.4.4 Conclusions

The tests reported in this section provide evidence that supports the proprietary information hypothesis. Each of the three variables provides unique evidence of the reaction to the surprise. MKBKFB may relate to reputation

because of its relationship to historical performance and accumulated investor response. For this reason, its interpretation as a proprietary cost variable may be less accurate.

HM results are consistent with the theory. All tables demonstrate that higher levels of HM (the squared market share of the individual firm divided by the sum of the squared market shares of all firms in the industry) result in higher market values (CADJR). The results, however, are driven by the negative surprise observations because the CADJRR regressions show a negative sign on HM (which corresponds to a positive sign for GROUPB). These results appear to be robust to adjusting for firm size. In conclusion, HM shows the benefit to be received from the release of the proprietary information: the good firms are separated. For the positive surprise firms, only MKBKFB is significant and is positive.

H results are opposite to those of HM. HM is a firm specific measure and H (the sum of the squared market shares of all firms in the industry) is a broader measure of competition. While the H measures are not significant, grouping the H values into levels provides consistent results that appear to be robust to firm size. Higher levels of H (formed into levels under the variable GROUPA) imply stronger concentration measures. In this study stronger

concentration is associated with lower responses. This may be interpreted in the following manner. If there is greater competition, then there is higher cost associated with the disclosure. Because the HM variable is of opposite sign, if a firm were to disclose into a competitive environment (high levels of H), then firms releasing higher proprietary costs (higher levels of HM) would receive a higher market reaction (more moderate reactions for the negative surprise subsample).

The results from the logistic regressions also support the theory. Remembering that the dependent variable is firm status (strong vs weak respondent) where 0 is the strong response portfolio, the results imply that greater levels of H are associated with weaker responses, but greater levels of HM enhance the market response. These results are reflected in the portfolio regressions of Table XXXIV. The consistent signs and significance of the variables in the strong portfolio (portfolio 5) support the conclusion that increased competition costs the firm when disclosures are made; but the better firms (higher HM) receive a more positive reaction.

Chapter 6

Conclusions, Limitations, and Opportunities

6.1 Conclusions

This dissertation has presented evidence that implies support for surveyed responses of executives that indicate that required disclosure of earnings forecasts may compromise firms' competitive positions. This implication will be of interest to companies, regulators, and to researchers. The support is based on the following conclusions.

The first conclusion is that firms use earnings forecasts to inform the stock market when such information is most relevant, as when the firm may be considering raising capital. Thus, in an unregulated environment, the information is effectively provided by management. Evidence to support this conclusion includes decreased liquidity and increased debt load at the time of the publication of the forecast. This conclusion contradicts the evidence presented by Frankel et al. (1995). Their conclusions are based on ex post measures of adverse selection (external financing), whereas the measure in this study is an ex ante measure. This study lacks the additional in-depth investigations needed to analyze the implications of these results, so further study is needed (see Section 6.3).

The second conclusion is that the stock market finds earnings forecast disclosures to have information content. This conclusion is not new and is consistent with previous research. Evidence to support this conclusion includes the measure of contemporaneous stock price change that accompanies the publication of the forecast.

What are most puzzling are the differences between positive and negative surprise subsamples, previously identified by Kasznik and Lev (1995). When this study's sample is divided into positive and negative surprises, the surprise is insignificant for the positive subsample. Further clarification of the positive surprise firms included the identification of the positive responses to the positive surprises (the "pos-pos" portfolio). For the "pos-pos" firms the response coefficient is very strong. The question is still outstanding - what makes these positive surprises credible? A partial answer provided by Kasznik and Lev is firm size. An alternative explanation is provided here: the prior period market-to-book value ratio. More disturbing is the large number of positive surprise firms that receive a negative market reaction (see Section 6.2).

The third conclusion is that when there is less information asymmetry between investors and firms, there is a weaker response by investors to the release of earnings forecasts. This indicates that the market knows much of the

information already. The information asymmetry is identified by formal entities that follow the firm (for instance, institutions and investment analysts). Evidence to support this conclusion includes the finding that the absolute value ("strength") of the market response is depressed when less asymmetry is present (Table XXV). Also, the strong response portfolios (Table XXIX) have greater asymmetry than the moderate response portfolios. The asymmetry results are quite robust to controlling for firm size. Prior research has suggested that larger firms are the focus of more market attention (Bhushan, 1989b), so controlling for size has the danger of restricting the variables of interest.

These results also imply that firms with greater asymmetry keep investors less informed. It is mainly the number of analysts that differentiate the discloser-weak response from the nondiscloser-strong response firms. This is interesting because of the suggestions by Bhushan (1989a) that analysts place their efforts in areas of greater asymmetry. Given that the market is less informed about the firm (see Section 6.2 for comments on the variable selection limitations), the question remains, why is there such a strong reaction? The next conclusion helps address this problem.

The fourth conclusion is that investors find the information more credible when competition with rivals is

greater. The theory section identifies the act of disclosure as a cost. This is confirmed in this study by observing the variable H to have a negative impact on market reaction. The highest cost firms (identified by HM) were most successful because a greater market response was observed for these firms. This indicates credibility.

It is important to note that the results are driven by the negative surprise firms. The positive surprise firms that are greeted with a positive response are still unexplained as to credibility. At the outset, the release of proprietary costs was identified as just one way to enhance credibility (Section 3.1) and other costs are evident (Section 3.3). The fact that I was not able to explain the market responses to the positive surprise firms' disclosures does not mean that these responses were not credible. Section 5.3.1.2 found surprisingly strong responses to some positive surprises. What mechanisms are used by the market to ensure credibility are not yet clear.

6.2 Limitations

There are several limitations evident in this research. The limitations can be organized into theoretical, data, surrogate, and methodological categories.

The theoretical limitations have been previously identified. The two-market signaling model used in this

study provides only one of many explanations for the public disclosure of management forecasts. Other explanations may provide broader and more consistent justifications for disclosure. Further, explicit consideration of the trade-off between market price and proprietary information release was not considered. Lastly, the inability to provide theoretical support for "lowballing" forecasters means that empirical tests may be difficult to interpret.

The data limitations have also been previously identified. The original sample was collected in a nonrandom fashion. The use of the Wall Street Journal as a source may be a limitation because of any firm's ability to use other outlets, especially those under the control of the Dow Jones Company. Any resulting bias has not been analyzed. WSJ editorial policies, such as those identified herein, may bias the sample and limit the application of the results to other members of the population.

The surrogate limitation refers to the inability of the variables to capture their theoretical constructs. The use of the **market adjusted return** to measure investor response not only ignores volume based responses and responses by stakeholders with other securities, but also may not measure well the common shareholder response. Comparative measures (such as abnormal returns for the particular security) have not been included. Measurement of the response coefficient

herein, for instance, may not adequately consider firm specific characteristics.

The **surprise** may not measure the new information to the market because of the measurement problems noted in Section 4.2.2. This factor may have contributed to the positive surprise firms meeting with a negative reaction. Perhaps the measures did not capture positive surprises. This study did not omit these firms from the sample. Further, the validity of the cutoff described in Section 4.5.1 was not verified by analyzing the resulting companies that were omitted.

The **asymmetry variables** may not have fully captured the asymmetry of information between investors and the firm; for instance, different amounts of disclosure of other information during the year were not controlled for (although they were controlled for in the event window). Kasznik and Lev (1995) identify the extent of other disclosures outside the event window. Also, the asymmetry variables may not measure the knowledge of the firm by the market. Bhushan (1989a) identifies analysts as moving to firms of greater asymmetry. Typical with market-based research, the cause-effect relationship may be reversed. Maybe a greater number of analysts following a firm measures greater asymmetry, although other studies have interpreted the variable in a manner consistent with this study.

The **proprietary cost** surrogates may be most open to criticism. The variable **MKBKFB** has been used in many studies to represent many concepts, so interpretation of the results in this dissertation may not be accurate. It is reasonable to relate MKBKFB to reputation. If a firm has a good reputation, then it will have a higher MKBKFB. The variables **H** and **HM** may be open to mismeasurement because of the use of public company information only.[53]

The methodological limitations have been delineated elsewhere in the study. The return generating mechanism problems (i.e. use of market adjusted returns, rather than abnormal returns) has been mentioned above. Controls for heteroscedasticity reduced but did not eliminate the problem. Further, the proprietary cost hypothesis tests were plagued by reduced normality of the error terms. Small sample sizes also reduced the power of the tests, especially within the portfolio formations where interesting results were anticipated.

6.3 Opportunities for Further Research

Future research efforts include addressing the limitations addressed above. For instance, omitting the firms with the "incorrect" directional reaction to the surprise may provide a much cleaner sample with fewer

[53] Although not reported, CR_8 measures were calculated from the 1986 and 1992 editions of Ward's (see footnote 30). Results obtained mirror the results of H.

measurement problems. Additional research can be summarized in three directions.

First, it appears appropriate to conduct further investigation into liquidity implications. To satisfy concerns that the industry may be experiencing liquidity problems, a comparison of firm CR and DE ratios to other industry members should be made. As well, it may be interesting to see if there is any evidence of disclosing firms' management of year-end earnings, given that other studies have found stable earnings histories for disclosers.

Second, it is important to better identify the disbelief caused by the greater asymmetry between investor and management. Although evidence was not found, it is highly reasonable that greater asymmetry causes less credibility. Perhaps the reporting mechanisms currently in place are sufficient to deter "Lies" (as implied by Skinner, 1994), but the current press and court dockets do not suggest that all information should be believed.

Third, this study has found evidence of proprietary costs of disclosure. Along this line, further investigation into the sequence of industry-competitor disclosures will be useful. A clustering of disclosures in time as well as observations that higher quality industry members disclose (and sequentially disclose by costliness of disclosure, as

measured by HM), while lower quality members do not disclose would be consistent with a signaling theory.

Fourth, it may be interesting to observe the disclosure environment segregated by type of asymmetry. For instance, firms with low analyst following but high institutional following may have different disclosure results than firms with high analyst following but low institutional following. Further study in this area may provide evidence on private information markets.

APPENDIX I

DERIVATIONS OF SELECTED EQUATIONS

EQUATION 3.10

$$x_1^*(x_2) = (a - k - x_2)/2 \qquad (3.8)$$

$$x_2^*(x_1) = (a - k - x_1)/2 \qquad (3.9)$$

$$x_2 = \frac{a - k - (\frac{a - k - x_2}{2})}{2} \qquad (3.10A)$$

$$4x_2 = 2a - 2k - a + k + x_2 \qquad (3.10B)$$

$$3x_2 = a - k \qquad (3.10C)$$

$$x_2 = \frac{a - k}{3} \qquad (3.10)$$

EQUATION 3.12

$$x_1^*(x_2) = (a - k - x_2)/2 \qquad (3.8)$$

$$x_2 = \frac{\rho\bar{a} + (1-\rho)\underline{a}}{3} \qquad (3.11)$$

$$x_1(\underline{a}) = \frac{(\underline{a} - \frac{(\rho\bar{a} + (1-\rho)\underline{a})}{3})}{2} \qquad (3.12A)$$

$$6x_1 = 3\underline{a} - \rho\bar{a} - (1-\rho)\underline{a} \qquad (3.12B)$$

$$6x_1 = 3\underline{a} - \rho\underline{a} - \rho\Delta - (1-\rho)\underline{a} \qquad (3.12C)$$

where $\Delta = \bar{a} - \underline{a}$

$$x_1 = \frac{2\underline{a} - \rho\Delta}{6} \qquad (3.12)$$

EQUATION 3.17

$$\underline{\pi}^{p} = [2\underline{a} - \rho\Delta]^2 / 36 \qquad (3.14)$$

$$\bar{\pi}^{p} = [2\bar{a} + (1-\rho)\Delta]^2 / 36. \qquad (3.15)$$

$$\rho\bar{\pi}^{p} + (1-\rho)\underline{\pi}^{p} \qquad \text{(from 3.17)}$$

$$= \rho\frac{[2\bar{a} + (1-\rho)\Delta]^2}{36} + (1-\rho)\frac{[2\underline{a} - \rho\Delta]^2}{36}$$

$$= \rho[4\bar{a}^2 + 4\bar{a}(1-\rho)\Delta + (1-\rho)^2\Delta^2] + (1-\rho)[4\underline{a}^2 - 4\underline{a}\rho\Delta + \rho^2\Delta^2]/36$$

$$= \rho[4(\underline{a}+\Delta)^2 + 4(\underline{a}+\Delta)\Delta - 4(\underline{a}+\Delta)\rho\Delta + \Delta^2 - 2\rho\Delta^2 + \Delta^2\rho^2]$$

$$+ 4\underline{a}^2 - 4\underline{a}\rho\Delta + \rho^2\Delta^2 - 4\underline{a}^2 - \rho[4\underline{a}\rho\Delta + \rho^2\Delta^2]$$

$$= 4\underline{a}^2\rho + 8\underline{a}\rho\Delta + 9\rho\Delta^2 - 4\underline{a}\rho^2\Delta - 5\rho^2\Delta^2 + \rho^3\Delta^2 + 4\underline{a}^2 - 4\underline{a}^2\rho + 4\underline{a}\rho^2\Delta - \rho^3\Delta^2$$

$$= (8\underline{a}\rho\Delta + 9\rho\Delta^2 - 5\rho^2\Delta^2 + 4\underline{a}^2)/36 \qquad (3.17A)$$

$$\rho\bar{\pi}^{s} + (1-\rho)\underline{\pi}^{s} \qquad \text{(from 3.17)}$$

$$= \rho(\bar{a}/3)^2 + (1-\rho(\underline{a}/3)^2$$

$$= \rho\left(\frac{(\bar{a}+\Delta)^2}{9}\right) + (1-\rho)\left(\frac{\bar{a}^2}{9}\right)$$

$$= (4\underline{a}^2\rho + 8\underline{a}\rho\Delta + 4\rho\Delta^2 + 4\underline{a}^2 - 4\underline{a}^2\rho)/36$$

$$= (8\underline{a}\rho\Delta + 4\rho\Delta^2 + 4\underline{a}^2)/36 \qquad (3.17B)$$

$$\rho\bar{\pi}^{p} + (1-\rho)\underline{\pi}^{p} > \rho\bar{\pi}^{s} + (1-\rho)\underline{\pi}^{s}. \qquad (3.17)$$

$\Rightarrow$ (2.16A) > (2.16B)

$\Rightarrow (8\underline{a}\rho\Delta + 9\rho\Delta^2 - 5\rho^2\Delta^2 + 4\underline{a}^2)/36 > (8\underline{a}\rho\Delta + 4\rho\Delta^2 + 4\underline{a}^2)/36$

$\Rightarrow 5\rho\Delta^2 - 5\rho^2\Delta^2 > 0$

True because $0<\rho<1$, therefore $\rho^2<\rho$.

EQUATION 3.21

$$P_L=(2\underline{a}-\Delta)/6 > 0 \qquad (3.21)$$

$$2\underline{a}-\Delta > 0$$

$$\bar{a}-\underline{a}<2\underline{a}$$

$$\bar{a}<3\underline{a}.$$

EQUATION 3.23

$$(2\underline{a}-\Delta)^2/36=(4\underline{a}^2-4\underline{a}\Delta+\Delta^2)/36$$

$$= (\underline{a}^2-\underline{a}\Delta)/9 + \Delta^2/36 \qquad (3.23)$$

$$[\frac{a}{3}]^2 = \frac{a^2}{9} \qquad (3.24)$$

If $(x_L \times P_L) > (x_T \times P_T)$,

then (3.23) > (3.24)

$$\Rightarrow[(\underline{a}^2-\underline{a}\Delta)/9 + \Delta^2/36] > \underline{a}^2/9$$

$$\Rightarrow\Delta^2>4\underline{a}\Delta$$

$$\Rightarrow\Delta>4\underline{a}$$

$$\Rightarrow\bar{a}-\underline{a}>4\underline{a}$$

$$\Rightarrow\bar{a}>5\underline{a}.$$

EQUATION 3.25

$X_C = x_1 + x_2$

From (3.10), $x_2 = (\underline{a} - k)/3$. Firm 2 acts as if the signal were the truth.

From (3.8), $x_1 = \dfrac{\bar{a} - k - (\frac{\underline{a} - k}{3})}{2}$, because Firm 1 knows the true demand to be $\bar{a}$.

$\Rightarrow 6x_1 = 3\bar{a} - 3k - \underline{a} + k$

$x_1 = (2\bar{a} - 2k - 3\Delta)/6$

$X_C = [(2\bar{a} - 2k - 3\Delta)/6] + [(\underline{a} - k)/3]$

$= (4\bar{a} - 4k - 3\Delta)/6,$ (3.25)

EQUATION 3.30

$[(2\bar{a} + \Delta)^2]/36 > (\bar{a})^2]/9$ (3.30)

$\Rightarrow (4\bar{a}^2 + 4\bar{a}\Delta + \Delta^2) > 4\bar{a}^2$

$\Rightarrow (4\bar{a}\Delta + \Delta^2) > 0.$

APPENDIX II

ASSUMPTIONS FOR OLS REGRESSION

OLS regression procedures in general are of the form,

$$y_i = \alpha + \sum_j B_j x_{i,j} + u_i.$$

This appendix reviews the validity of assumptions that had to be made in order to employ the above noted model. The following five assumptions with regard to interpreting OLS Regression results have been well documented (e.g., Maddala, 1992).

1. $E(u_i) = 0$, for all i.

2. $Var(u_i) = \sigma^2$, for all i.

3. u_i and u_j are independent for all $i \neq j$.

4. u_i and x_j are independent for all i and j.

5. u_i are normally distributed for all i.

The first assumption concerns any bias in the residuals that may be implied in the models tested in this dissertation. In order to ensure that this assumption is not violated, relevant and systematic variables should not be excluded from the statistical models. The theoretical model has described the relevant variables. Any mismeasurement of these concepts implies that a residual amount may be

expected. The omission of any such relevant variables makes the null hypotheses more difficult to reject. OLS procedures force the mean of the error term to be 0.

The second assumption, that of common variance for all observations can be tested with White's statistic. The test is described in White (1980) and is used in the SAS programs with the "spec" option. Results from these tests for the respective basic models are given below:

#	Model	Chi-Sq	p-value
1	CADJR = SURP	9.435	.0089
2	CADJR = SURP IOPCT IONUM NUM	37.463	.0006
3	CADJR = SURP H HM MKBKFB	22.472	.0075

As can be seen, the chi-squares are quite significant, indicating violations of this assumption.

Investigating the heteroscedasticity began with Table XXI, where differences through time were noted. Dummy variables were included for the days of the week and for the calendar years of the sample. Including these variables in regressions related to Models 1 and 2 corrected for the heteroscedasticity. Although homoscedasticity was not rejected in regressions related to Model 3, further procedures were used when improvements could be made.

Another method to correct for this violation is to use a deflator, such as the prior year's market value of stock. Bernard (1987) justified the beginning of fiscal year market value as an appropriate deflator. Including this deflator (along with the dummies identified in the previous paragraph) controlled well the heteroscedasticity. Utilizing the deflator, however, enhanced non-normal tendencies in the errors (see below), so this correction was limited to regressions related to Model 3 where necessary and are identified in the text. By not otherwise correcting for heteroscedasticity, interpretations of the significance of the models may be incorrect.

Results from additional tests for the respective basic models are given below. These tests included controls for the heteroscedasticity identified in the previous two paragraphs.

#	Model	Chi-Sq	p-value
1	CADJR = SURP	54.417	.2392
2	CADJR = SURP IOPCT IONUM NUM	78.319	.7604
3	CADJR = SURP H HM MKBKFB	34.459	.9993

As can be seen, in no case is homoscedasticity rejected at normal levels of significance.

The conclusion from these various test for constant variance is that it is controlled.

Linearity of the relationship between the independent and the dependent variables was tested. In each of the models above, the square and the cube of the dependent variable were included with the model's dependent variables as repressors on the basic model's error term. For #1, for instance, the linearity test was:

$$u_i = SURP + y^2 + y^3,$$

where u_i is the error term from the regression model, y^2 and y^2 represent the square and the cube of the estimates from the linear equation. Out of the three models (#1, #2, and #3), only the cubed variable in the model #1 was significant; no other variables were significant at the .1 level. This indicates little violation of the linearity assumption.

The third assumption concerns the independence of the predictor variables. This was tested in the correlation matrix in Table XXV. Some interdependence of asymmetry variables was noted, and interpretations of the individual variable coefficients may be invalid. The proprietary variables are independent.

The fourth assumption asserts the independence of an observation's error term from other observations'

independent variables. This assumption may be violated if there were cross-dependencies between companies, for instance. Christie (1986) notes that there is a minimal effect from cross-sectional dependencies for event studies using daily returns. It is concluded that this fourth assumption is not violated.

The fifth assumption concerns the normality of the error term. The SAS program uses the Shapiro-Wilk statistic to measure error normality for sizes of the samples in this dissertation. The Shapiro Wilks statistic ranges from 0 to 1 and low values are indicative of non-normal distributions. The following statistics (S-W) were measured for the basic models noted above (after controlling for the heteroscedasticity:

#	Model	S-W	p-value
1	CADJR = SURP	.9388	.0001
2	CADJR = SURP IOPCT IONUM NUM	.9264	.0001
3	CADJR = SURP H HM MKBKFB	.5178	.0001

In no tests were the p-values above normal levels of significance. Because the p-values are highly significant, normality is rejected. It is noted, however, that the rejection occurs at higher levels of the S-W statistic, and that normality is not critical to the OLS regression model.

Plots of the residuals revealed eight outliers (in sample sizes of greater than 400). Removing these outliers resulted in means of the residuals close to zero for all three models, and standard deviations of around .9. Thus, the first two moments of the residuals were almost normal. Plots of the standardized residuals (after removing the outliers) revealed high kurtosis, but otherwise fairly normal looking frequency distributions. S-W statistics were around .96 for all models but the p-values remained at the .001 or less levels. Results from regressions after removing the outliers were almost identical to the results with leaving them in. Therefore, the results reported in this dissertation include as many observations as possible, including the eight outliers. It is concluded that violation of normality is not critical to the results of this dissertation.

The overall conclusion from this Appendix is that the conclusions from the main body are valid. Although normality may be problematic for the tests, OLS regressions are quite robust to violations of this assumption and it can be shown to not effect interpretations from the main tests.

APPENDIX III

SAMPLE FIRMS

Company Name	MF Date
AO Smith	861223
Allen Group Inc	860326
Anchor Glass Cont	861119
Apogee Enterprises	860925
Bell & Howell	860613
Bench Craft	860916
Borden Inc	860220
Burroughs	860703
CPC Int'l	860305
Capital Cities/ABC	860411
Capital Holdg	861230
Charming Shoppes	860626
Chryon Corp	861112
Claire's Stores	860115
Computer Products	861229
Dow Chemical	860702
Durakon Ind	861226
Electrospace Sys	860806
Energen Corp	860916
Finnigan Corp	860620
Florida Express	860130
Gull Inc	861021
Hillenbrand Ind	860724
Int'l Hydron	860604
Kellogg	861229
Kysor Industrial	860327
Laidlaw Transp	861212
Leggett&Platt	861210
Mediq Inc	861211
Meridian Bancorp	861204
Minn Mining Mftg	860408
Modine Mftg	860717
Mylan Laboratories	860616
Nalco Chemical	860617
Nicolet Instrument	860331
Norwest Corp	861009
Noxell Corp	860908
PPG Industries	861205
Pace Memb Whrhouse	860618
Paychex	861003
People`s Energy Co	860303
Perry Drug Stores	860326
Pioneer Hi-Bred	860610
Pitney Bowes	860423

Polaroid	860702
Prime Capital	860916
Schering Plough	861204
So New Engl Tel	860515
Stdnt Loan Mktg	860924
Storage Technology	860228
Subaru of America	861027
SunGard Data Sys	861226
Super Value Stores	860116
United Technolog	861024
Utilicorp United	861211
Wearever-ProcSilex	861211
Wilcox & Gibbs	860703
Zenith Labs	860805
AFG Indust	870529
Aca Joe	870728
Alco Health Serv	870630
American Sav Bnk	870710
Ameritech	870625
Anadarko Petrol	870908
Arvin Industries	870401
Aspen Ribbons	871119
Atlas Corp	870519
Atlas Corp	870908
Autodie Corp	870408
Barnett Banks	871209
Bell & Howell	870619
Beverly Enterprise	870511
Biotech Research	870330
Borden Inc	870219
Budget RentaCar	871223
Canrad Inc	870323
Capital Cities/ABC	870722
Charter Medical	870417
Cincinnati Milacr	870522
Claire's Stores	870612
Collagen Corp	870407
Comarco	870128
Commerc'l Shearing	870618
Computer Assctes	870119
Control Data	870604
DAY Int'l	870505
Data Card	870323
Dickey-John	870629
Dixon Ticonderoga	870210
Dow Chemical	870407
Dow Jones&Co	871210
Dynatech	870311
Eastman Kodak	870507
Equitable Res	871027
Federal Mogul	870408

Firestone Tire	870501
First Bk Systems	870624
First Capital Hldg	870520
First Fidelity Bk	870225
Fleet/Norstar	870914
Foothill Group	870925
Fort Howard Corp	871217
Franklin Resources	870317
Gundle Environ Sys	871109
Heritage Entert	870911
Jewelmasters	870112
Jiffy Lube Int'l	870720
Kaufman & Broad	871124
Knight-Ridder	871210
LE Meyers Co	870901
Laser Indust	870223
Lawrence Savings	871202
Lesco Inc	870817
Levitt Corp	870610
Limited Inc	870918
Loral Corp	870709
Lydall Inc	870520
MA Hanna	871118
Marion Labs	870407
Mark IV Industries	870202
Marriott Corp	870511
Maytag Corp	870626
Moto Photo	871203
Munford Inc	870625
Murray Ohio Mftg	870319
Nat'l City Corp	870630
New York Times	871210
Nord Resources	870630
Nova Corp Alberta	871210
PNC Financial	871223
PNC Financial	870202
Peerless Tube Co	870508
Pentair Inc	871202
Prepaid Legal Serv	871204
Ranger Oil	870511
Republic Gypsum	870224
Rohr Industries	871006
Schering Plough	871203
Sooner Fed Savings	870615
Southwest Bell	870729
Standex Int'l	871021
Stars To Go Inc	870427
TRW Inc	870225
Telex	870915
Time Inc	870406
Town&Count Jewelry	870623

US Surgical	870930
US West Inc	870302
Uni-marts	870611
Union Tex Petrol	871223
Utilicorp United	871209
Walbro Corp	871229
Windmere Corp	871026
Windmere Corp	871209
Woolworth	870619
A.L. Labs	880309
American SthW Mtge	881227
Bankof New Engl	881213
Bergen Brunswig	880607
Budget RentaCar	881018
Builders Design In	880407
Businessland Inc	880607
Carolina Power&Lt	880107
Chesapeak Biol Lab	880615
Chips&Technology	880908
Clairson Int'l	880309
Commercl Intertech	880524
CompU Check	880906
Core Industries	880603
County Savings Bk	881213
Cray Research	880518
Cullen/Frost Bkrs	880526
Dana Corp	881215
DeKalb Corp	880831
Digital Equipment	880309
Dow Chemical	881219
Dow Jones&Co	881215
Dress Barn	880718
Equimark	881215
Evans&Sutherland	880622
Fairchild Indust	880406
Federal Mogul	881220
First Bk Systems	881220
First Fidelity Bk	881214
First Union Corp	881228
Fisher Scientific	880929
Gelman Sciences	880617
General Nutrition	881101
George Banta	880629
Gerber Products	880706
Hasbro Inc	880519
Homeowners Group	881228
Honeywell	881221
Honeywell	880622
Inco	880718
Intel	880908
Intergraph	881208

Jackpot Enterprise	881213
Jerrico Inc	880621
Key Corp	880628
Lotus Dev't	880406
Lotus Dev't	881206
Lyphomed Inc	881215
Marriott Corp	880426
Maxwell Labs	881227
Mead Corp	881117
Medco Research	881227
Methode Electronic	880927
Micro D Inc	880519
Nat'l Semiconduct	881216
Ogilvy Group In	880603
Owens & Minor	880524
Pacific Gas&Elect	881227
Paychex	880525
Pentair Inc	880615
Philadel Electric	881125
Pillsbury Co	880218
Precision Castpart	881212
QMS Inc	880826
Quick&Reilly	881214
Ramada Inns Inc	881115
Reebok Int'l	881219
Reebok Int'l	881130
Scott Paper	881004
Skolniks Inc	881125
Smithkline Beckman	880617
Sun Microsystems	880609
Sundstand Corp	880927
TW Services	880929
Teleconnect	880621
Time Inc	881111
Town&Count Jewelry	880108
University Bk&Tr	880406
Washington Post	881216
Wendy's Int'l	881214
Wendy's Int'l	880624
AL Labarotories	890428
AST Research	890602
Action Auto Rent	890921
Ameri Film Tech	891106
American Cyanimid	891220
American Pacific	890814
Applied Biosystems	890614
Applied Power	890531
Associated Nat Gas	890601
Autodesk	890127
BFGoodrich	891117
Calprop Corp	891227

Carmike Cinemas	891113
Coca Cola Enterp	890831
CodeAlarm	890331
Colorocs	890828
Comdisco	890922
Commodore Int'l	890629
Contel Corp	890526
Crane	890804
Dell Computer	891020
Dennison Mftg	891215
Dennison Mftg	890922
Dexter Corp	891219
Digital Microwave	890320
Dow Chemical	891218
Dycom Indust	890419
Ecolab	890628
Electr Data Syst	890403
Emulex	890605
First Nat'l Corp	890714
First Wrld Cheese	891229
FirstofAmerica Bk	891219
Fleet/Norstar	891221
Foxboro	890929
Gannett Co	891215
General Nutrition	890614
Gentex Corp	891218
Giddings&Lewis	891120
Helen of Troy	890808
Horizon Indust	890117
Hospital Staf Serv	891110
Howard Sav Bk	891213
IMC Fertilizer	890612
Jeffries Group	891205
Johnson Controls	890928
Johnson Worldwide	890628
Johnson Worldwide	890526
Knight-Ridder	891017
Leo's Industries	890717
Mead Corp	890428
Michael's Foods	890601
Michael's Foods	890627
Minn Mining Mftg	890707
Morton Thiokol	890620
Mountaineer Bkshs	890928
Network Gen'l	890621
Niagara Exch Co	891226
Nordstrom	890526
North Cdn Oil	890215
North Hills Elect	890911
Nuclear Suppt Serv	891005
Optek Techn	891003

PPG Industries	890403
Pioneer Hi-Bred	890818
Porta Systems	891222
Ryder Systems	890524
Schering Plough	891201
Schwitzer	890622
Scott Paper	891219
Shorewood Pkging	891211
Staples Inc	891004
Surgical Laser	891214
Sysco	890301
Techknits	890331
Telematics Int'l	890104
Telxon Corp	890314
Toro Co	891004
Toro Co	891120
Ultimate Corp	890629
Warner-Lambert	890808
Westmark Int'l	891214
Woolworth	890623
AMP Inc	900316
Allegheny Ludlum	901214
Applied Materials	901022
Arctic Alask Fish	901214
Autom Data Proc	900914
Biomet	900221
Bizmart	900926
Boise Cascade	901127
Borden Inc	901116
Bristol Myers Sq	900427
Campbell Soup	900717
Citicorp	901219
Cytogen	901207
Dime Financial	901221
Durakon Ind	900406
Eagle Food Centers	900810
Federal Signal	901001
Ferro Corp	900820
Filtertek	901207
First Fla Bks	901221
Gannett Co	901214
Gendex	900614
General Kinetics	901102
Genlyte Graph	901210
Giddings&Lewis	900928
Goodyear Tire	900907
Goulds Pumps	900714
Goulds Pumps	900531
Hasbro Inc	901129
Hasbro Inc	900702
Healthcare Compare	900124

Hurco Co	900402
Hurco Co	900928
Hurco Co	900622
Intergraph	901217
Interpublic	900813
Ionics Inc	900629
J&J Snacks	900226
Johnson Controls	900910
K-Tron Int'l	900622
Keystone Int'l	901205
LA Gear	900907
Loral Corp	900822
MA Hanna	901116
MS Carriers	901227
Mack Trucks	900821
Martech USA	900523
Mead Corp	901218
Merry-Go-Round	901228
Metcalf&Eddy	900730
Microcom	900309
Modine Mftg	900611
Molecular Bisyst	900622
Molex	901203
Moorco	900917
NCNB	901221
NS Group	901217
NaTec Resources	900827
Nantucket Indus	900423
National Media	900510
Nike	900503
Nike	900516
Nike	900928
Nordson Corp	900216
Orthomet	900608
Pall Corp	900305
Pansophic	900424
PepsiCo	901228
Pharmacy Mgt Serv	900830
Phoenix Techn	900924
Pope & Talbot	901227
Professional Banco	900423
Reebok Int'l	900926
Reynolds Metals	900622
Rohm&Haas	900302
S&K Famous Brands	900330
Sage Software	900301
Schering Plough	901115
Security Pacific	900817
Sierra Tucson	900830
Star States Corp	901226
Stuart Hall Co	900509

Talley Indust	900507
Teledyne	901210
Telxon Corp	900914
Temple Inland	901221
Tiffany & Co	901227
Timberline Softwar	900605
Tseng Labs	900615
Tyco Toys	901022
US Bancorp	901120
USX Corp	901205
Vivigen	900207
Washington Post	901214
Westinghouse	900831
X-Rite	900511
A&W Brands	910816
Acme Cleveland	910222
Allwaste	910416
Amax	910114
American Greetings	911127
American Waterwork	910412
Archive Corp	910920
Aspen Imaging	910617
Autodesk	910128
BeautiContr Cosm	911011
Blockbuster Entert	910523
Browning Ferris	910628
Chem Design	911226
Cincinnati Milacr	910531
Cognex	911127
Corning Inc	911226
Data point Co	910204
Diagnostic Prod	911220
Duty Free Int'l	910111
Giddings&Lewis	910701
Glenfed Inc	910627
HJ Heinz	910207
Handleman	910913
Harding Assctes	910510
Health Images	911219
Helian Health	911114
Honeywell	910816
Houghton Mifflin	911212
Immunex	910510
Insitu-form MidAm	910918
Intercim	910801
Keithley Instr	910823
Knight-Ridder	911212
Lubrizol Corp	910412
Manor Care Inc	911028
Marcam	910919
Medical Care Int'l	910301

Medical Imaging	911224
Medusa Corp	910621
Merry-Go-Round	910117
Michael Stores	910920
Millipore	911011
Miltope Grp	910304
Mobley Environm	911205
Olsten Corp	911115
Pet Inc	910531
Philadel Electric	910215
PubServ of NewMex	910711
Readers Digest	911212
Richfood Hldg	910311
Rocky Mtn Helic	910313
SFFed Corp	911122
Schering plough	911107
Smithfield Foods	910128
St Paul Bancorp	911220
Stryker Corp	911112
Surgical Care Affi	910301
TJX	910104
Telxon Corp	910122
Tultex	910329
Ultimate Corp	910222
United Indust	910301
Wahlco Environm	911003
Western Energy	910823
Xilinx	910111
Yellow Freight	911220
3M	921218
AES Corp	921218
Alexander Energy	920520
Amerihost Prop	921102
Amtech	921002
Apache Corp	921203
Applied Bioscience	921223
Autodesk	920131
Brush Wellman	920911
Brush Wellman	921217
CSX	921221
Calif Microw	920604
Carlisle Plastics	920922
ChockFullONuts	920420
Computer Horizons	921204
Cray research	920514
Doskocill	920901
DowJones&Co	921211
Duriron Co	920323
DutyFree Int'l	921223
Eastman Kodak	921216
Fingerhut	920924

First Interst Bk	920917
Franklin Quest	920902
Fruehauf Trail	921204
Gannett	921211
Gerber Products	921216
Grt Lakes Chem	921222
Healthcare Comp	921204
Landmark Graphics	920311
Lifeline Syst	921208
Lifeline Syst	920325
Marvel Entert Grp	921209
Marvel Entert Grp	921218
MicroTouch	921113
Micronics Computer	920921
Natl Medic Enter	920302
Nike	920518
Norwest Corp	920302
Olsten Corp	920323
PHH Corp	921028
PPG Inudtr	920824
Pioneer HiBred	921009
Pioneer Hibred	920518
Ponder Indust	920813
Rax Restaurants	920313
Riddell Sports	920928
Right Start	920124
Rockwell Int'l	920316
Ryland Group	921012
Safety-Kleen	921217
SantaFe Pacific	921221
Shoney's Inc	920117
Sierra OnLine	921217
Society Corp	920506
TSI	920622
Tekelec	921221
Temple-Inland	921221
Terex Corp	921204
USBancorp	921106
USBanknote	920901
VF Corp	920723
Value Merchants	920113
Viatech	921013
Video Lott Techn	920916
Waverly Inc	921130
Western Digital	920415
Whole Foods Mkt	920929
Worthington Ind	921120
Zilog Corp	920316

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