AN ANALYSIS OF THE RELIABILITY OF MANAGEMENT EARNINGS FORECASTS PUBLISHED IN ALTERNATIVE FORMATS AND INVESTIGATION OF SELECTED MANAGEMENT FORECAST DISCLOSURE PRACTICES

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ABSTRACT

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by

William Charles Boynton

A diversity of views on the reliability of management forecasts continues to exist and important disclosure policy issues remain unresolved. As a result, neither the American Institute of Certified Public Accountants, the Financial Accounting Standards Board, nor the Securities and Exchange Commission have taken positions either encouraging or discouraging the disclosure of forecasts. Yet, in the view of many, forecast disclosures are the most significant financial information not now regulated. Suggested alternatives to the current status of unregulated voluntary forecast disclosures have included prohibiting or mandating forecast disclosures or regulating voluntary disclosures. It was the purpose of this study to provide empirical data relevant to evaluating these alternative policies. In particular, representing an extension of prior research, data were obtained on the frequency and reliability of past voluntary disclosures issued in alternative formats. Additionally, exploratory research was carried out to obtain data on factors associated with selected management forecast disclosure practices including the decision to disclose or not disclose a forecast,

and the format and timing of disclosures made. In this part of the study, emphasis was placed on determining whether comparable treatment has been given to the disclosure of favorable and unfavorable expectations.

The data base for the study consisted of selected forecasts of earnings per share (EPS) for an annual period issued during the period 1969 through 1972 by the managements of firms on the Compustat Primary Industrial File. The source of the forecasts was the Wall Street Journal. A total of 163 forecasts in point format, 70 in open-range format (minimum estimate stated), and 150 in closed-range format (both minimum and maximum estimates stated) were included, indicating that significant numbers of forecasts have been issued in each format. It was found that approximately 26 percent of the Primary File firms were represented in the data base.

A common shortcoming of the forecast disclosures observed was failure to specify the precise earnings variable being forecasted (i.e., simple, primary, or fully diluted EPS before or after extraordinary items). Based on this finding, it was recommended that, as a minimum, future standards for improving disclosures require that the variable forecasted be described fully and that it be one for which actual results will be published in the financial statements.

The reliability of forecasts issued in each of the formats was assessed in terms of bias and objectivity. Bias refers to the conservative or optimistic character of forecasts and was assessed by computing proportions of over and underpredictions and by computing the means of distributions of relative forecast errors. Objectivity refers to the

variability of the relative errors associated with forecasts in a given format. Comparisons among proportion, mean, and variance statistics computed on the frequency distributions of relative forecast errors for forecasts in each format were used to test hypotheses about differences in the bias and objectivity of forecasts in the different formats. Such comparisons were also made to test the validity of inferences which might be drawn by users based on the format of a forecast.

Based on the results of hypothesis tests, no evidence of either a conservative or optimistic bias was found for point forecasts. But, results indicating that forecasts labeled as minimum estimates in open and closed-range forecasts are not conservatively stated relative to point forecasts, that closed-range forecasts tend to be stated in arbitrarily narrow ranges, and that point forecasts appear to be no more objective than range forecasts suggest that forecasts like some of those studied may be misleading.

Because significant proportions of small relative errors were found for forecasts in each format, while at the same time substantial numbers of large relative errors were found, it was recommended that the disclosure of forecasts be neither prohibited nor mandated at the present time. But, the potential for misleading inferences to be drawn by users based on the format of forecasts like those studied was cited as evidence supporting recommendations that forecasts be accompanied by probabilistic or other statements about the certainty of the forecasts to facilitate users in determining the degree of reliability to attach to them.

The final part of the study dealt with the association between

selected independent variables and management forecast disclosure practice variables. No significant difference was found in firms' decisions to disclose or not disclose forecasts based on the accuracy of the firms' forecasts for the prior year. But firms issuing forecasts in two consecutive years tended to use a range format in the second year if the prior year's forecast was judged inaccurate. No association was found between the horizon of a forecast and its format.

Several hypotheses about the association between the favorable versus unfavorable nature of a firm's earnings expectations and disclosure practices were tested. No significant associations were found between the direction of change in expected earnings and the decision to disclose or not disclose initial or revised forecasts, or the time of issuance of initial or revised forecasts. These findings suggest that regulations aimed at ensuring comparable treatment of favorable and unfavorable expectations may not be necessary.

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by

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CHAPTER I

ECONOMIC DECISION MAKING, ACCOUNTING, AND THE DISCLOSURE OF MANAGEMENT FORECASTS

Introduction and Purpose of the Research

The challenge to incorporate forecasted information, particularly expected income, into the financial reporting framework was issued to the accounting profession early in the 1960s.[1] The challenge was kept alive for a decade as the profession searched for ways to develop more relevant financial reporting techniques. Yet aside from the research efforts of a few interested individuals, little was done by the profession to meet the challenge or even to evaluate its merits.

By the early 1970s, however, it was apparent that forecasts were increasingly being disseminated by corporate managements through various media including interviews, the financial press, and occasionally annual reports. In the view of some, forecasts had become unquestionably the most significant financial information left largely unregulated. Concerns arose over the fact that there were no standards or guidelines that the issuer, financial analyst, or the investor could rely on in issuing or interpreting a forecast. Moreover, the Securities and Exchange Commission, recognizing that forecasts had become widespread in the securities markets and believing them to be relied upon

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[1] Rudy Schattke, "Expected Income--A Reporting Challenge," Accounting Review 37 (October 1962): 670-76.

in the investment process, became concerned that all investors did not have equal access to this material information.

As a result of this situation, in November 1972, the Securities and Exchange Commission announced public hearings would be held relating to the disclosure, both in filings with the SEC and otherwise, of estimates, forecasts, or projections of economic performance by issuers whose securities are publicly traded.[1] This action signaled the need for an urgent and comprehensive review of all aspects of the disclosure of forecasted information. Less than a year later, further impetus to renewing and intensifying interest in disclosing forecasted information was provided by the publication of the long awaited report of the AICPA Study Group on the Objectives of Financial Statements. In this document the Study Group formally and publicly renewed the challenge to the accounting profession to incorporate forecasted information into the financial reporting framework under certain conditions.[2]

That these events did indeed stimulate further action in this area is apparent from a review of the literature of the ensuing period. Both the SEC and the AICPA have published major documents on forecasting. These documents, which are reviewed briefly in later sections of this chapter, were aimed at improving standards for the preparation and disclosure of financial forecasts. But the latest publications of both bodies state positions neither encouraging nor discouraging the disclosure of forecasts. And examination of the documents and comments on

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[1]Securities and Exchange Commission, "Securities Exchange Act Release No. 9844."

[2]Study Group on the Objectives of Financial Statements, Objectives of Financial Statements (New York: American Institute of Certified Public Accountants, Inc., 1973).

them by others reveals that considerable controversy continues to surround the issue of forecast disclosure.[1]

The central issue at hand is whether the status quo on forecast disclosure should be changed, and if so, how. Alternatives to the status quo include prohibiting forecast disclosures, regulating voluntary disclosures, and mandating forecast disclosures.

Any evaluation of proposals for change should involve a comparison of circumstances before and after the change. Unfortunately, at present too little is known even of the nature of past and present unregulated voluntary disclosures. For example, questions have been raised regarding the frequency with which forecasts are disseminated through various media, the reliability of the forecasts, whether favorable and unfavorable expectations are given comparable disclosure treatment, and what policies managements follow with respect to revisions.

The lack of substantive evidence on which to formulate policy is apparent in the cautious approaches taken by the AICPA and the SEC in their recent publications. Unfortunately, the lack of evidence makes it difficult even to evaluate the wisdom of certain aspects of the proposals made therein.

Accordingly, it was the purpose of this research to accumulate further evidence which would facilitate the evaluation of current and future proposals for change in the area of forecast disclosure. In particular, the research was designed to bear evidence on several questions concerning forecast disclosure practices prior to the proposed

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[1]For example, see "SEC Disclosure Plan on Profit Forecasts Challenged as Hindrance to Predictions," Wall Street Journal, May 20, 1975, p. 12.

regulation thereof. First, data were obtained on the frequency of forecasts published in point, open-range, and closed-range formats. Then the reliability of the forecasts issued in each format was analyzed. Finally, exploratory research on factors associated with management forecast disclosure practices was conducted. Disclosure practice variables examined were the decision to disclose or not disclose a forecast, and the format and timing of forecast disclosures. Emphasis in this part of the study was on ascertaining the comparability of disclosure practices relative to favorable and unfavorable expectations.

The remainder of this chapter presents a discussion of the function of accounting, the arguments for and against the disclosure of forecasts, and a more complete review of the positions of the accounting profession and the SEC on forecast disclosure. The final section provides a summary of this chapter and an overview of the organization and structure of the remaining chapters.

The Function of Accounting

Because of the traditional historical orientation of accounting, some accountants and others believe that forecasted information lies outside the purview of accounting. This section reviews the basis for incorporating the formal disclosure of forecasted information into the financial reporting framework.

The Committee to Prepare a Statement of Basic Accounting Theory defined accounting as "the process of identifying, measuring, and communicating economic information to permit informed decisions by users

of the information."[1] The facilitation of decision making is also embodied in the definition of accounting provided in APB Statement No. 4:

> Accounting is a service activity. Its function is to provide quantitative information, primarily financial in nature, about economic entities that is intended to be useful in making economic decisions.[2]

But while accounting produces primarily historical data, a great deal of decision making is based on expectational data. Schattke notes:

> . . . much must necessarily be done in our modern business world on the basis of expectations. Production must be planned, channels selected, volume of production set and labor hired, all in advance of the sale of product. . . . Thus plans and commitments are made and our economy moves on the basis of expectations, . . .[3]

Schattke further quotes economist John R. Hicks on the relevance of certain accounting data for decision making:

> Income ex post calculations (looking back) are objective; they have their place in economic and statistical history, they are a measuring rod of economic progress; but . . . they have no significance for conduct.[4]

Accountants have responded to the need for expectational data for internal decision making purposes primarily through the development of comprehensive budget systems. Less tangible response has been made to the need for expectational data for external decision making although

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[1]Committee to Prepare a Statement of Basic Accounting Theory, A Statement of Basic Accounting Theory (Evanston: American Accounting Association, 1966), p. 1.

[2]Accounting Principles Board, APB Statement No. 4: Basic Concepts and Accounting Principles Underlying Financial Statements of Business Enterprises (New York: American Institute of Certified Public Accountants, Inc., 1970), par. 9.

[3]Schattke, "Expected Income--A Reporting Challenge," p. 670.

[4]Ibid., p. 671, citing John R. Hicks, Value and Capital, 2d ed. (London: Oxford University Press, 1946), p. 179.

the need for such data particularly expected income, is widely recognized. For example, Hendriksen notes:

> . . . most of the decisions of creditors and investors, including the stockholders of large corporations, require a prediction of the future distributions by the firm.[1]

The Committee for ASOBAT also observed:

> Almost all external users of financial information reported by a profit-oriented firm are involved in efforts to predict the earnings of the firm for some future period.[2]

The relevance of expectational data for users' decision models has been emphasized repeatedly in the finance literature.[3]

More recently, the importance of expectational data was officially recognized by the practicing arm of the accounting profession. APB Statement No. 4 states under "Objectives of Financial Accounting and Financial Statements:"

> A related general objective is to provide financial information that assists in estimating the earning potential of the enterprise.[4]

The issue is emphasized again in the report of the AICPA Study Group on the Objectives of Financial Statements which states:

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[1]Eldon S. Hendriksen, Accounting Theory (Homewood, Illinois: Richard D. Irwin, Inc., 1970), pp. 128-29.

[2]ASOBAT, p. 23.

[3]For example, for a discussion of the relationship between investment value and earning power, see William S. Gray III, "Proposal for Systematic Disclosure of Corporate Forecasts," Financial Analysts Journal 29 (January-February 1973):64; and Henry A. Latane and Donald L. Tuttle, Security Analysis and Portfolio Management (New York: The Ronald Press Company, 1970), pp. 277-78 and 385-93. The importance of earning power in credit analysis is discussed in Robert W. Johnson, Financial Management, 4th ed (Boston: Allyn and Bacon, Inc., 1971), p. 316.

[4]Accounting Principles Board, par. 79.

> The basic objective of financial statements is to provide information useful for making economic decisions. . . .
>
> All economic decisions look to the future. . . . An objective of financial statements is to provide information useful for the predictive process. Financial forecasts should be provided when they will enhance the reliability of users' predictions.[1]

Thus, subject to the ability of expectational data in the form of financial forecasts to enhance the reliability of users' predictions, there appears to be theoretical support in the economics, finance, and accounting literature for incorporating forecasted information into the financial reporting framework. Whether providing external users with managements' forecasts does enhance the reliability of users' predictions has yet to be tested. The conduct of such a test is complicated by the necessity to contemplate multiple user decision models, the precise form of which may not be publicly known. But it seems logical to conjecture that to the extent management forecasts are relied upon in the investment process, their ability to enhance the reliability of users' predictions would be directly related to the reliability or accuracy of the management forecasts themselves. Thus the reliability of managements' forecasts is an issue in the decision to incorporate such forecasts into the financial reporting framework. Accordingly, a summary of the previous research of others into the reliability of management forecasts is reported in Chapter 2 of this study, and an extension of this research constituted a major part of this study.

But a decision to extend the formal financial reporting framework to include financial forecasts involves consideration of factors beyond the theoretical basis therefor and the reliability of forecasts.

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[1] Objectives of Financial Statements, pp. 61-65 passim.

Some of these factors are discussed in the following section.

Arguments For and Against the Disclosure of Management Forecasts

The principal argument in favor of the disclosure of management forecasts is their relevance for economic decision making. As implied in the quotation above from Objectives of Financial Statements, this relevance does not result from the forecasts as ends in themselves, but rather from their use as means to the enhancement of users' own forecasts of a company's financial prospects. Opponents of disclosing management forecasts contend that users have other sources of information from which to formulate their own forecasts, namely historical accounting data and forecasts prepared by investment analysts. But, the Accountants International Study Group had this to say about the usefulness of these sources relative to the disclosure of management forecasts:

> While these sources provide some information, the directors [management] may be expected to possess more knowledge of the internal workings of their company and at least a comparable understanding of the factors external to the company. It is therefore probable that the best source of a forecast about a company lies within the company itself.[1]

Using the same argument, the AICPA's Management Advisory Services Executive Committee concluded:

> The management of a company, through the use of its forecasting system, is in the best position to determine the single most probable forecasted financial result; . . .[2]

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[1]Accountants International Study Group, Published Profit Forecasts (n.p.: Accountants International Study Group, 1974), par. 16.

[2]Management Advisory Services Executive Committee, Guidelines for Systems for the Preparation of Financial Forecasts, Management Advisory Services Guideline Series Number 3 (New York: American Institute of Certified Public Accountants, Inc., 1975), p. 8.

A considerable amount of empirical data has been collected on the accuracy of forecasts available from alternative sources.[1] The Basi, et. al., study found management forecasts to be slightly more accurate than analysts' forecasts. On the other hand, studies by Green and Segall, Copeland and Marioni, and Lorek, et. al., produced conflicting evidence regarding the relative superiority of management forecasts versus forecasts of time-series models based on historical accounting data. Further details of these and other studies related to management forecasts are presented in Chapter 2 of this thesis.

A second major argument favoring the prompt and routine disclosing of management forecasts through the financial reporting framework is that forecasted information would thereby be made available equitably to all interested parties. It is possible that in the absence of the formal public reporting of forecasts, selected persons or groups

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[1] For examples of studies examining the predictive ability of historical accounting data, see Philip Brown and Victor Niederhoffer, "The Predictive Content of Quarterly Earnings," Journal of Business 41 (October 1968):488-97, and Werner Frank, "A Study of the Predictive Significance of Two Income Measures," Journal of Accounting Research 7 (Spring 1969):123-36. Other researchers have attempted to evaluate the relative superiority of managements' or analysts' forecasts versus forecasts of naive models. For example, see David Green, Jr., and Joel Segall, "The Predictive Power of First-Quarter Earnings Reports," Journal of Business 40 (January 1967):44-55, and "The Predictive Power of First-Quarter Earnings Reports: A Replication," Journal of Accounting Research 4 (suppl. 1966):21-36; R. M. Copeland and R. J. Marioni, "Executives Forecasts of Earnings Per Share Versus Forecasts of Naive Models," Journal of Business 45 (October 1972):497-512; Edwin J. Elton and Martin J. Gruber, "Earnings Estimates and the Accuracy of Expectational Data," Management Science 18 (April 1972):409-24; and Kenneth S. Lorek, Charles L. McDonald, and Dennis H. Patz, "A Comparative Analysis of Management Forecasts and Box-Jenkins Forecasts of Earnings," Accounting Review 51 (April 1976):321-30. For a comparative study of the accuracy of corporate and security analysts' forecasts, see Bart A. Basi, Kenneth J. Carey, and Richard D. Twark, "A Comparison of the Accuracy of Corporate and Security Analysts' Forecasts of Earnings," Accounting Review 51 (April 1976):244-54.

may have attained an unfair advantage by gaining private access to forecasted information. For example, many corporate managements have long maintained a practice of revealing corporate expectations at meetings held for investment analysts and institutional investors. This information may ultimately have reached a wider audience through news stories in the financial press, but often only after some delay if at all.

Numerous arguments have been presented against the disclosure of forecasts. Corporate managements have expressed concerns about resulting damages sustained in relation to competitors and about possible loss of credibility if forecasts are not achieved. Accountants have expressed concern that if forecasts are incorporated into the financial reporting framework and not achieved, the credibility of all financial reporting will be diminished. Accountants and others have also expressed concern about the lack of standards for the preparation and dissemination of forecasts. Both managements and accountants have been very much concerned about the legal liability associated with forecast disclosures. Other questions have been raised by various parties about the problem of forecasts rapidly becoming outdated and the possibility that management would disclose forecasts only when it would be advantageous. Concern has also been expressed that once short-range forecasts were issued managements might make decisions aimed at achieving those forecasts to the detriment of attaining long-term objectives. Finally, formal reporting, especially if it involved certification, might impair the timeliness and therefore the usefulness of forecasts.

Most of these arguments against disclosing forecasts can be overcome or mitigated to varying degrees by establishing proper standards and exerting judicious regulatory authority. The attempts

of the accounting profession and the Securities and Exchange Commission to deal with some of these arguments will be discussed in the following two sections.

Position of the Accounting Profession

The position of the accounting profession on forecasting at the time of the previously mentioned SEC sponsored public hearings in late 1972 was expressed by representatives from the AICPA and the NAA in testimony given at those hearings. Wallace Olson, speaking for the AICPA, noted that the senior technical committees of the Institute had not reached definite conclusions on the subject of forecasts and stated:

> We believe that after establishing suitable guidelines, the Commission should permit publication of forecasts for a trial period during which time it could encourage companies to disclose forecasts. This should provide the experience necessary to form a sound basis for reaching a decision as to whether prohibition or permissive or mandatory publication would best serve the public interest in the long run.[1]

The NAA Committee on Management Accounting Practices - Subcommittee on Forecasts testified:

> . . . the publication of foreward estimates of material aspects of the company with statements of the basic underlying assumptions is highly desirable, but at the discretion of management. However, before a mandatory requirement should be imposed, significantly more study and research work needs to be done.[2]

Thus, the AICPA and the NAA advocated pursuing the study of the viability of disclosing forecasts, withholding final conclusions pending the results of further study.

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[1]"Trial Period Suggested for Publication of Forecasts (News Report)," Journal of Accountancy 135 (January 1973):10.

[2]"NAA Testifies on Forecasts," Management Accounting 54 (February 1973):53-54.

Testimony by others at the public hearings influenced the accounting profession's further development of a position on forecasting. Most influential was the testimony from corporate executives, financial analysts, lawyers, and academicians which revealed widespread dissatisfaction with the lack of guidelines or standards for the preparation and dissemination of forecasts. The accounting profession's response to this testimony has been primarily through the work of three divisions of the AICPA - the Management Advisory Services Division, the Accounting Standards Division, and the Auditing Standards Division. The Financial Accounting Standards Board has not as yet involved itself in the matter of forecast disclosure.

Responding to the need for guidelines or standards for the preparation of forecasts, early in 1975 the AICPA's Management Advisory Services Division published Guidelines for Systems for the Preparation of Financial Forecasts. Significant in relation to the research questions studied in this thesis is the following conclusion quoted from Guideline No. 1:

> Because forecasts are not exact and are subject to varying degrees of inaccuracy, preparing a forecast in a manner that conveys the degree of uncertainty associated with it is very useful and should be encouraged. This guideline is intended to encourage the development of ranges, probabilistic statements, or estimates of error as supplements to the single most probable forecasted result. Such information is useful to underscore the essentially uncertain nature of all forecasts.[1]

Among other topics covered in the guidelines are accounting principles to be used, sources of information relevant to a forecast, identification of assumptions, and documentation and review of forecasts.

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[1] Guidelines for Systems for the Preparation of Financial Forecasts, p. 8.

The position of the AICPA as of early 1975 on the preparation of forecasts, and the motivation for the "Guidelines" document, are summarized in the following quotation:

> The publication of financial forecasts is neither advocated nor discouraged. This document has been prepared because financial forecasts are being disseminated and accordingly, there is a need for authoritative guidelines for their preparation.[1]

The need for guidelines or standards for the dissemination of forecasts was addressed by the Accounting Standards Division of the AICPA. In 1975, it issued a document titled "Statement of Position on Presentation and Disclosure of Financial Forecasts." The recommendations in this document parallel the guidelines in the MAS document for systems for the preparation of forecasts. For example, regarding format for forecast presentation and dissemination, the Statement of Position states:

> Financial forecasts should be expressed in specific monetary amounts representing the single most probable forecasted result. The tentative nature of a financial forecast would be emphasized if the single most probable result for key measures (e.g., sales and net income) was supplemented by ranges or probabilistic statements, and the presentation of such is encouraged.
>
> While a range informs the user of the probabilistic nature of the forecast, expressing a financial forecast solely in terms of ranges could result in the user's attributing an unwarranted degree of reliability to the forecast ranges, because many users might assume (a) that a range represented the spread between the best possible result and the worst possible result, or (b) that the range was based on a scientifically determined interval. Management should be in the best position to determine the single most probable result and this burden should not be placed on outsiders. Also, single point estimates are necessary to aggregate the forecasts of an enterprise's individual operations, as well as to facilitate comparison between the forecast and later historical results.[2]

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[1]Ibid., p. 2.

[2]Accounting Standards Executive Committee, "Statement of Position on the Presentation and Disclosure of Financial Forecasts," (New York: American Institute of Certified Public Accountants, Inc., 1975), p. 4.

Other significant recommendations pertain to the disclosure of assumptions deemed necessary for forecasts to be understood and properly evaluated, and disclosure of an issuer's intentions regarding the updating of forecasts.

The position of the AICPA as of 1975 regarding the dissemination of forecasts is summarized in the following quotation:

> This Statement provides guidance as to presentation and disclosure for those who choose to issue information about the future described as financial forecasts. Nothing herein should be interpreted to mean that the publication of financial forecasts is recommended or that a financial forecast is deemed to be a part of the basic financial statements.[1]

Finally, concurrent with the efforts of the MAS and Accounting Standards Divisions of the Institute, the Auditing Standards Division has been studying matters related to the CPA's involvement with financial forecasts. It has been argued that the credibility and utility of forecasted information would be diminished if it is not subjected to independent review. Consequently, the Auditing Standards Division is studying the development of auditing and reporting standards for the review and attestation of forecasts. Pending the publication of such standards, the current position of the profession on the CPA's involvement with the dissemination of forecasts is expressed in the AICPA's Code of Professional Ethics. Rule 204 of the Code prohibits a member from permitting his name to be used in conjunction with any forecast in a manner which may lead to the belief that the member vouches for the achievability of the forecast.[2]

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[1] Ibid., p. 3.

[2] American Institute of Certified Public Accountants, Code of Professional Ethics (New York: American Institute of Certified Public Accountants, Inc., 1972), p. 22.

Thus, the accounting profession has been actively involved in formulating positions on the preparation, dissemination, and independent review and attestation of forecasts. Concurrently, the SEC has been formulating its own position on forecasting.

Position of the Securities and Exchange Commission

As noted previously, in late 1972 the SEC ordered public hearings for the purpose of gathering information relevant to a reassessment of the Commission's policies relating to the disclosure of forecasts[1] of economic performance. In February 1973, the Commission released a statement which included the following general conclusions:

> Information gathered at the hearings reinforced the Commission's own observation that management's assessment of a company's future performance is information of significant importance to the investor, that such assessment should be able to be understood in light of the assumptions made, and that such information should be available, if at all, on an equitable basis to all investors.[2]

Consistent with these conclusions, the Commission announced plans to abandon its long standing policy of generally prohibiting the disclosure of forecasts in SEC filings. This policy change was to be implemented through the future issuance of forecast disclosure guidelines and changes in the securities laws.

The SEC released the first set of proposed implementing guidelines

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[1]The SEC uses the term "projection" throughout its releases to refer to estimates of most probable results. But the term "forecast" is more commonly used in this context in business literature in general and specifically in AICPA publications. Due to its wider acceptance, the term forecast is used throughout this thesis.

[2]"Statement by the Commission on the Disclosure of Projections of Future Economic Performance," Securities Act of 1933: Release No. 5362/February 2, 1973, and Securities Exchange Act of 1934: Release No. 9984/February 2, 1973, reprinted in SEC Docket 1 (February 13, 1973):4-5.

in April 1975.[1] That release included proposals which would have imposed a complex reporting system under the federal securities laws to be followed whenever a registrant publicly disclosed a forecast. Under the proposals, registrants could voluntarily make initial forecast disclosures in registration statements or on Forms 10-K or 8-K. But firms disclosing forecasts through any media other than SEC filings would have become subject to mandatory SEC reporting requirements. Specifically, the details and circumstances of all such forecasts were to be reported on Form 8-K. Additionally, comparisons of such forecasts with actual results were to be provided in subsequent registration statements and 10-K reports. All forecast information contained in an issuer's 10-K report was to have been included in the issuer's annual report to security holders. Finally, continuation of regular public forecasting would have been required or notification provided to the SEC of the reasons for no longer making public forecasts.

In spite of the inclusion of so-called "safe-harbor" rules which were intended to limit legal liability for inaccurate forecasts, strong opposition to the proposals was expressed by executives, accountants, and lawyers.[2] Moreover, there were indications that rather than comply with the complex forecast reporting framework proposed, many firms would cease disclosing forecasts altogether.[3]

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[1]"Notice of Proposed Rule[s]. . . and Proposed Amendments . . . to Implement the 'Statement by the Commission on the Disclosure of Projections of Future Economic Performance' . . .," Securities Act of 1933: Release No. 5581/April 28, 1975, and Securities Exchange Act of 1934: Release No. 11374/April 28, 1975, reprinted in the SEC Docket 6 (May 13, 1975):746-61.

[2]See "SEC Disclosure Plan on Profit Forecasts Challenged as Hindrance to Predictions," Wall Street Journal, May 20, 1975, p. 12.

[3]Ibid.

In the face of this opposition, the Commission issued a new release in April 1976 which included the following statement:

> Due to the important legal, disclosure policy and technical issues raised by the commentators with respect to the [1975] projection proposals . . . the Commission has determined that all of these proposals should be withdrawn, except for the amendment to Rule 14a-9 which is adopted as proposed. However, the Commission is also of the view that the question of inclusion of projections in Commission filings is an important one which should be addressed at this time. The extensive public record in this matter, supplemented by [the] staff's experience in processing filings that have included projections, even though limited, provides adequate bases for the publication for public comment of a new approach to this question.[1]

The amendment to Rule 14a-9 implements the Commission's original proposal to cease prohibiting the inclusion of forecasts in SEC filings. The proposed new approach is to make disclosure of forecasts in Commission filings entirely voluntary subject only to general disclosure guides.

Pertinent to the study of past forecast disclosure practices in this research are the following excerpts from the proposed guides regarding the format of forecast disclosures:

> . . . Traditionally, projections have been given for three financial items generally considered to be of primary importance to investors: revenues, net income and earnings per share. These three items usually are presented together in order to avoid any misleading inferences that may arise when the individual items reflect contradictory trends. There may be instances, however, when it is appropriate to present earnings from continuing operations, or income before extraordinary items in addition to or in lieu of net income. . . .

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[1]"Notice of Adoption of an Amendment to Rule 14a-9 Under the 1934 Act and Withdrawal of the Other Proposals Contained in Release No. 33-5581 . . . and Notice of Publication for Comment of Proposed Guide 62 and 4, "Disclosure of Projections of Future Economic Performance" . . .," Securities Act of 1933: Release No. 5699/April 23, 1976, and Securities Exchange Act of 1934: Release No. 12371/April 23, 1976, reprinted in SEC Docket 9 (May 11, 1976):472-75.

> . . . management must disclose what in its opinion is the most probable specific amount or the most reasonable range for each financial item projected. Ranges should not, however, be so wide as to make the disclosures meaningless. Moreover, several projections based on varying assumptions may be judged by management to be more meaningful than a single number or range and would be permitted.[1]

While not specifying that forecasts be accompanied by probability statements, the proposed guides would require the following additional disclosures: "Investors should be cautioned against attributing undue certainty to management's assessment and should be informed of management's intentions with respect to furnishing updated projections."[2]

Also pertinent to this research is the following statement from the April 1976 release:

> . . . the Commission wishes to remind issuers of their responsibility to make full and prompt disclosure of material facts, both favorable and unfavorable, regarding their financial condition, and that this responsibility may extend to situations where management knows its previously disclosed assessments no longer have a reasonable basis.[3]

Bearing on this concern, this research includes an analysis of the comparability of past disclosures of favorable and unfavorable expectations with respect to the issuance of both initial and revised forecasts.

The release does not include safe-harbor rules. But the Commission included the statement that it "is of the view that reasonably based and adequately presented projections should not subject issuers to liability under the federal securities laws, even if the projections

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[1] Ibid., p. 475.

[2] Ibid. The guides would also require the disclosure of key assumptions, and suggest that management give consideration to disclosing the accuracy of its previous forecasts.

[3] Ibid., p. 474.

prove to be in error."[1]

Thus, the latest SEC release appears to be aimed at setting broad standards for the voluntary disclosure of forecasts in Commission filings without imposing a reporting system so complex as to discourage firms from making any such disclosures. The Commission summarized its position as follows:

> It should be noted . . . that the Commission is neither encouraging or discouraging the making and filing of projections because of the diversity of views on the importance and reliability of projections. This issue, along with the question of the need for a safe-harbor rule for projections, may be among those appropriately considered by the Advisory Committee on Corporate Disclosure. In the interim, however, the Commission believes that it should not stand in the way of companies choosing to project in filings, subject to the general disclosure guidelines contained in the . . . [proposed] guide[s]. . .[2]

Summary and Overview

This chapter has presented the theoretical foundation for incorporating management forecast information into the formal financial reporting framework, other arguments for and against the disclosure of such forecasts, and the evolution of the positions of the accounting profession and the SEC on forecasting. Regarding the latter, it was observed that while both the AICPA and the SEC have been actively involved in the development of standards and guidelines for forecast preparation and disclosure, in both cases the actions taken to date have been primarily in recognition of the fact that forecasts have been and are being prepared and disseminated. Both bodies neither encourage

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[1]Ibid., p. 473.

[2]Ibid.

nor discourage the dissemination of forecasts. This situation can be attributed in part at least to failure to obtain sufficient evidence as a basis upon which to formulate firmer convictions.

The current AICPA and SEC positions appear to represent a moderate approach toward establishing standards for forecast disclosure. But, compliance with the AICPA standards for the preparation and dissemination of forecasts is voluntary except for the involvement of Institute members. Thus, the impact that the Institute's efforts will have on actual disclosures is uncertain. Moreover, the SEC's guides, if adopted, while being enforceable with respect to forecasts disclosed in SEC filings, will have an unknown effect on the frequency and nature of disclosures outside SEC filings.

Unfortunately, at present it is difficult to evaluate the wisdom of the current approaches of the AICPA and the SEC. Too little is known of the quality of past and present forecast disclosure practices, and it is difficult to estimate the impact on future voluntary disclosures of the standards and guidelines being developed. Conceptually, the voluntary framework being developed should be evaluated based on a comparison of the quantity and quality of forecast disclosures under the new standards and guidelines with the quantity and quality of such disclosures in the past. Appropriate consideration must also be given to the differential costs involved.

Both the AICPA and the SEC have acknowledged a need for futher experience with and analysis of forecasts as a basis for further action. A study of forecasts issued during a trial period under the new guidelines is one approach to gaining such information. While such a study will be of value, it does have a number of limitations. First,

substantial delay will be entailed in obtaining sufficient experience to permit meaningful analysis. Second, depending on the degree of success in clarifying some of the ambiguities in the recent pronouncements, the number of firms disclosing forecasts may decrease substantially. Finally, this approach will provide no further information about past forecast disclosure practices, information that is needed if an appropriate appraisal of change-producing actions is to be made.

Information collected to date on past forecast disclosure practices is incomplete and, on some points, contradictory. Accordingly, this researcher feels that the accounting profession should inquire further into past experience with disclosure of forecasted information as a potentially valuable source of additional evidence bearing on some of the major issues surrounding forecasting.

For the purposes of this thesis, it was not practical to attempt to study all forms of past management forecast data. Therefore, the analysis was restricted to forecasts of earnings per share, a form of disclosure which has been both prevalent and relevant to user decision models. Nor was it practical to attempt to study all the major issues surrounding forecasts. Therefore, emphasis was placed on obtaining additional data on three aspects of past forecast disclosures.

First, data on the frequency of past public forecast disclosures in point, open-range, and closed-range formats was obtained. The data collection procedures used and a profile of the data base obtained are presented in Chapter 3.

Second, in view of the continued diversity of views about the reliability of forecasts, measurements of the reliability of forecasts issued in each of the three formats were made. Specifics of the

methodology for measuring reliability and the research findings on reliability are presented in the first part of Chapter 4.

The final aspect of forecast disclosures examined in this research was the analysis of factors associated with the decision to disclose or not disclose a forecast, and the format and timing of forecasts issued. Specifics of the methodology for this analysis of disclosure practices, and the research findings, are presented in the second part of Chapter 4.

Chapter 2 of this study presents a review of the literature concerning prior empirical research on management earnings forecasts. As indicated above, Chapter 3 contains a description of the data collection procedures and a profile of the data base used in the study, and Chapter 4 contains the research methodology and findings. Finally, Chapter 5 contains a summary of the results of the study and the conclusions and recommendations based thereon.

CHAPTER II

REVIEW OF PRIOR EMPIRICAL RESEARCH ON MANAGEMENT FORECASTS

It was asserted in Chapter 1 that the accounting profession and the SEC lack sufficient evidence upon which to formulate and evaluate policy decisions on incorporating management forecasts into the formal financial reporting framework. Nonetheless a considerable amount of related empirical research has been published. Among the forecasting issues investigated in prior empirical research are the frequency of internal and publicly disclosed forecasts, forecast accuracy, factors associated with accuracy, beliefs by outsiders about management earnings forecast disclosure practices, stock market reaction to earnings forecasts, and management behavioral implications of forecast disclosure. This chapter provides a review of the most significant aspects of this body of literature. Emphasis is placed on review of the prior research on issues further investigated in this thesis.

The chapter is organized as follows. First, the major studies are reviewed individually. Following the individual reviews, comparative summaries of prior findings on frequency of forecast disclosures, accuracy, and selected disclosure practices are presented. Shortcomings of the prior research are identified as a basis for formulating the specific research questions investigated in this study.

Major Empirical Research Studies on Management Forecasts

Green and Segall studies.[1] In 1966 and 1967, the results of a pair of studies by these researchers dealing primarily with the predictive power of first-quarter earnings reports were published. The objective of these studies was to determine the forecasting value of interim reports. The methodology involved the development and testing of a number of "naive models" which were used to extrapolate forecasts from historical data (e.g., multiplying the first-quarter's earnings per share (EPS) by four to arrive at a forecast of annual EPS). In addition to comparing the relative predictive accuracy of annual-based versus interim-based time-series models, the researchers located and studied a limited number of actual earnings forecasts publicly disclosed by executives of the companies in their original sample. The management forecasts were investigated to provide a benchmark for the evaluation of the various time-series models.

The original study involved the analysis of naive forecasts of annual earnings for 1964 for 46 companies listed on the New York Stock Exchange (NYSE) and 12 actual (management) forecasts for those companies found in the Wall Street Journal Index for 1963 and 1964. The replication involved the analysis of naive forecasts of annual earnings for 1965 for 43 of the companies in the original sample plus a new sample of 44 additional NYSE firms, and 15 1965 management earnings forecasts found in the Wall Street Journal Index for 1964 and 1965 for companies

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[1]David Green, Jr., and Joel Segall, "The Predictive Power of First-Quarter Earnings Reports," Journal of Business 40 (January 1967): 44-55; and "The Predictive Power of First-Quarter Earnings Reports: A Replication," Journal of Accounting Research 4 (Suppl. 1966):21-36.

in the new sample.

Interestingly, on the basis of both the original study and the replication, the researchers concluded that first-quarter reports, as then prepared, were of little help in forecasting annual EPS. Further, the researchers were "not impressed" with the management forecasts, and concluded that the naive forecasts were "not inferior" to the presumably more sophisticated management forecasts.

Because the Green and Segall total sample of 27 published forecasts located in the Wall Street Journal Index was comprised of all forms of verbal and quantitative forecasts, only 11 of which were specific, the researchers could not compute an overall measure of accuracy. About the most that can be said beyond the previously stated conclusion about the relative accuracy of the naive forecasts versus the management forecasts is that in 18 out of the 27 cases the management forecasts indicated the correct direction of change in net income from the prior year.

Copeland and Marioni study.[1] A number of readers found Green and Segall's conclusions incredible. Copeland and Marioni decided to replicate the part of Green and Segall's study involving the comparison of management forecasts with those produced with naive models using later data. The researchers studied 50 management earnings forecasts published in the Wall Street Journal in 1968 and 25 published in each of the years 1964 and 1965. The sample was obtained by scanning issues of the Wall Street Journal until the desired numbers of forecasts were

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[1] R. M. Copeland and R. J. Marioni, "Executives' Forecasts of Earnings per Share versus Forecasts of Naive Models," Journal of Business 45 (October 1972):497-512.

located which were in specific, numerical point or range format and for which the required quarterly EPS data were available. In cases where the forecasts stated that EPS would "approximate," "exceed," or be "at least" a specific figure, the amount declared was used as the forecast. An arithmetic mean was computed and used as the forecast for cases where a closed-range estimate had been published. The accuracy of the forecasts was then calculated in terms of both absolute dollar and relative (percentage) errors, the latter computed using the formula

$$\frac{\text{Forecast - Actual}}{\text{Actual}}$$

Of the fifty 1968 management forecasts which had an average horizon of 7.5 months, the researchers found that forecasts which turned out to be overestimates outnumbered the underestimates by only two forecasts, with two forecasts being precise. The average relative error, including sign, was found to be +15.8 percent and ignoring the sign, +20.1 percent. On this basis the researchers concluded that firms which overestimated earnings did so with a much higher degree of inaccuracy than those that underestimated earnings. It should be noted, however, that the "average" statistics are heavily biased by the inclusion of just three extreme values, all of which were in excess of +100 percent. Excluding the three extreme values, the average including sign would have been +5.58 percent, and ignoring sign, +10.13 percent.

For the samples of 25 published forecasts found in each of the years 1964 and 1965, only the absolute errors were calculated in order to rank the accuracy of the management forecasts with those produced from naive models. The size of the errors was not reported. Contrary

to Green and Segall's conclusion, Copeland and Marioni concluded that the management forecasts were "substantially better" than those produced from the naive models in each of the three years studied.

Daily study.[1] Daily conducted a limited empirical investigation of forecasting accuracy by obtaining earnings and sales forecasts directly from cooperating companies. While more than 50 firms were requested to participate, only 12 firms cooperated, providing 66 earnings (net income) and 65 sales forecasts constituting from three to seven years of data for individual firms. An assumption made by Daily was that these management-oriented (internal) forecasts would represent a reasonable surrogate for the type of forecast that might be publicly reported. Daily defined accuracy as follows:

$$\text{Accuracy} = \frac{\text{Actual Results}}{\text{Forecasted Amount}} \times 100$$

Based on this measure, he determined that of the 65 revenue and 66 net income forecasts made by the 12 firms providing data, 90 percent of the revenue forecasts and 47 percent of the net income forecasts fell within plus or minus 10 percent of actual results. Differences exceeding 15 percent between forecasted and actual net income were present in one-third of the observations. Based on the analysis of the net income data, he concluded "a reasonable doubt should exist regarding the ability of firms to forecast operating results with the degree of accuracy . . . necessary to satisfy the requirements of investors;" and based on the analysis of the revenue data he concluded that "if forecasts would be

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[1] R. Austin Daily, "The Feasibility of Reporting Forecasted Information," Accounting Review 46 (October 1971):686-92.

deemed relevant information to investors, it may be possible at the present time to report such information."[1]

Daily also attempted to identify factors associated with forecast accuracy. Independent variables examined were size of firm as represented by (1) annual net income and (2) annual revenues, and accuracy of a firm's forecast of revenue. The three variables together resulted in a coefficient of determination of only .194, indicating there was no strong association between the variables examined and the accuracy of earnings forecasts. Accuracy was found to vary across industry classification with banks forecasting all categories of operations more accurately than any other group of firms represented in the data.

McDonald study.[2] Like Daily, McDonald investigated the accuracy of management forecasts and the association between several variables and the occurrence of forecast errors. However, McDonald studied published forecasts of net earnings per share in point format found in the January through April issues of the Wall Street Journal for the five year period 1966 through 1970. Only forecasts issued within the first 120 days of the fiscal year forecasted were included in his sample. The sample contained 201 EPS forecasts representing 152 firms for which one forecast was located, 23 firms for which two forecasts were located, and one firm for which three forecasts were located.

McDonald measured the accuracy of published management forecasts of net earnings per share using the following calculation:

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[1]Ibid., p. 692.

[2]Charles LeRoy McDonald, "An Empirical Examination of Published Predictions of Future Earnings" (Ph.D. dissertation, Michigan State University, 1972).

$$\text{Relative Prediction Errors} = \frac{\text{Actual Earnings - Predicted Earnings}}{\text{Predicted Earnings}}$$

His analysis of 201 forecasts published in point format and with minimum horizons of 245 days revealed a tendency toward overprediction, 63.7 percent of the observations being overpredictions, 33.8 percent underpredictions, and 2.5 percent exact predictions. The relative prediction errors ranged from -395.6 percent to +108.5 percent with the mean relative error for the five-year period covered by the study being -13.6 percent. The removal of four extreme overpredictions, arbitrarily defined as observations lying outside two standard deviations from the mean, reduced the average relative prediction error to -10.2 percent. McDonald reported that 35.3 percent of the forecasts studied fell within five percent of actual earnings and 48.8 percent within ten percent of actual earnings, while 39.8 percent were more than 15 percent from actual earnings. On this basis he concluded: ". . . some of the predictions seem to be reliable enough to be useful,"[1] and ". . ., published annual financial statements should include predictions of earnings for the forthcoming year."[2]

McDonald found that of the general industry groupings in his data, utilities were the best predictors. Using correlation analysis he also investigated the association between prediction errors and the following variables: (1) change in aggregate corporate profits, (2) change in industry profits, (3) fluctuation in past operating earnings, (4) relative extraordinary gains and losses, and (5) size of firm.

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[1] Ibid., p. 110.

[2] Ibid., p. 113.

None of the variables proved to be significant at the .05 level.

McDonald also used multiple regression analysis to examine factors associated with prediction errors. After removing four extreme values from his sample, he found that four independent variables remaining in his regression model explained 63.34 percent of the variation of prediction errors. Those variables were fluctuation in past operating earnings, relative extraordinary gains and losses, size of firm, and change in operating earnings. Most of the explained variation was attributed to the variable representing extraordinary items. Two endogenous variables, change in industry profits and change in aggregate corporate profits, were not significant at the .05 level and were deleted from the model.

Financial Analysts' Federation research project on corporate forecasts.[1] During 1972, the Financial Analysts Federation sponsored a research project to examine the desirability and possible content of a formal system of forecast disclosure. In addition to a comprehensive search of the published literature relating to corporate forecasting, the project included a selective survey of corporate forecasts published in the Wall Street Journal between October 1971 and September 1972. Based on the examination of eighty-nine forecasts classified by firm size and industry grouping, it was concluded that forecasting is "pervasive" and that there is "no firm size or industry group for which forecasting is impossible."[2] The nature of the forecasts examined was

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[1]For a summary of the findings of the project, see Samuel S. Stewart, "Research Report on Corporate Forecasts," Financial Analysts Journal 29 (January-February 1973):77-85.

[2]Ibid., p. 79.

not further described.

The accuracy of the management forecasts apparently was not examined. Instead, the project included a study of the accuracy of financial analysts' forecasts on the basis that "it might be assumed that the accuracy of analysts' forecasts is closely related to the accuracy of management forecasts."[1] Based on a limited examination of the forecasting records of only a few large institutional investors, the following "tentative" conclusions were stated: (a) there seemed to be a slightly optimistic bias to most forecasts; (b) the relative accuracy of analysts' forecasts is often not much better than the accuracy of forecasts based on simple, extrapolative models; however, analysts are consistently superior to models at turning points and in difficult-to-forecast industries; (c) the shorter the forecasting horizon, the more accurate the forecast; and (d) the accuracy of forecasting is strongly influenced by the nature of the industry.

Finally, the FAF research project included a survey to obtain data about FAF members' (professional analysts' and portfolio managers') experiences with forecasting, including their impressions as to the current extent and accuracy of forecasting. Regarding extent, more than 40 percent of the respondents indicated that they receive some type of forecast from more than half of the companies they follow. Data on the respondents' impressions about accuracy are shown in Table 1. Interestingly, portfolio managers rated management forecasts slightly more accurate than did the analysts, and the portfolio managers considered management forecasts to be slightly more accurate than analysts' forecasts.

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[1]Ibid.

TABLE 1

ANALYSTS' AND PORTFOLIO MANAGERS' EVALUATIONS OF ACCURACY OF FORECASTS

Accuracy	Rating by All Analysts	Rating by Portfolio Managers
One Year Management Forecasts		
Perfect	0%	0%
±10%	38%	50%
±20%	53%	42%
Worse	9%	8%
One Year Analysts' Forecasts		
Perfect	-	0%
±10%	-	41%
±20%	-	52%
Worse	-	7%

SOURCE: Samuel S. Stewart, "Research Report on Corporate Forecasts," Financial Analysts Journal 29 (January-February 1973):82.

Among other responses, the survey revealed that most respondents felt that there was a wide gap in the availability of forecasts to professional versus other investors. FAF members also viewed management forecasts as significant information that plays an important role in investment decision making.[1]

Financial Executives Research Foundation study.[2] This was a two-part study to examine (1) the many questions relating to management's use of internal forecasts and (2) to determine management's attitude toward public disclosure of business forecasts. Questionnaire

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[1] Ibid., p. 83.

[2] See, "How Accurate Are Forecasts?" Financial Executive 41 (March 1973):26-32.

responses were received from 338 companies. Questions dealt with the extent to which managements prepared forecasts for internal use, the accuracy of those forecasts, factors associated with accuracy, managements' opinions about the job the financial community is doing in forecasting corporate earnings per share, and communications between management and financial analysts.

Regarding the extent to which corporate managements prepare forecasts, 95 percent of the 338 companies responding to the questionnaire reportedly prepared internal forecasts of corporate sales, expenses, and earnings. The findings of the study regarding the accuracy of both quarterly and annual internal forecasts of various financial variables are summarized in Table 2. It is not clear from the report whether forecasted or actual results were used in the denominator of the percent variance calculations.

The results of the quarterly variance analysis were summarized as follows:

> Corporate expense is the most reliable forecast, with 97 percent of the responding companies having a variance less than plus-or-minus 10 percent. Corporate sales are easily predicted, as 94 percent of the companies had a variance of plus-or-minus 10 percent. Expenses by division and by corporate chart of accounts were also highly reliable with 93 percent and 92 percent of the companies having a variance of less than 10 percent. Earnings by division experienced the greatest variance from the expected results: almost one quarter of the companies responding indicated that their results typically differ from the forecasts by more than 10 percent.[1]

Regarding the analysis of the yearly variances it was stated:

> The fact that the corporate and division earnings forecast ranked eighth and ninth in terms of accuracy are (sic)

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[1]"How Accurate Are Forecasts?", p. 27.

TABLE 2

ACCURACY OF INTERNAL QUARTERLY AND YEARLY FORECASTS

Rank[1]	Type of Forecast	Cumulative Percent Variance[2] 5%	10%	15%	20%	21+%
	QUARTERLY VARIANCE					
1	Corporate expenses	80%	97%	99%	100%	0%
2	Corporate sales	72%	94%	96%	98%	2%
3	Expenses by division	74%	93%	97%	99%	1%
4	Expenses by corporate chart of accounts	72%	92%	95%	99%	1%
5	Changes in capital structure	71%	90%	91%	96%	4%
6	Changes in productivity	69%	87%	92%	98%	2%
7	Sales by division	55%	87%	95%	98%	2%
8	Corporate earnings	58%	85%	90%	93%	7%
9	Earnings by division	43%	76%	87%	92%	8%
	YEARLY VARIANCE					
1	Corporate expense	65%	90%	97%	98%	2%
2	Expenses by corporate chart of accounts	55%	84%	92%	98%	2%
3	Corporate sales	53%	84%	93%	95%	5%
4	Changes in capital structure	53%	84%	92%	95%	5%
5	Expenses by division	53%	82%	95%	97%	2%
6	Changes in productivity	47%	77%	92%	97%	3%
7	Sales by division	36%	74%	88%	94%	6%
8	Corporate earnings	37%	70%	80%	87%	13%
9	Earnings by division	22%	58%	73%	82%	18%

[1]Based upon cumulative variance at 10%.

[2]Percent variances respresent plus or minus differences.

SOURCE: "How Accurate Are Forecasts?" Financial Executive 41 (March 1973):27.

> indicative of the difficulty in forecasting. For corporate earnings, 13 percent of the companies responding do not come within plus-or-minus 20 percent of their expectations over the period of a year. Eighteen percent do not come within plus-or-minus 20 percent of their projected division earnings. This experience clearly shows that internal forecasts are not precise estimates of a company's earnings. In fact, Table [2] shows that for a great many companies they are not even reasonable estimates of earnings.[1]

The report concludes:

> The public disclosure of internal forecasts would seem to have limited usefulness to the investor because of the inaccuracy of the forecasts.[2]

In contrast to the Daily and McDonald findings, the Financial Executives Research Foundation study reported no association between forecast accuracy and the industry classification of the respondent. Also, in contrast to Daily's results, it was reported that smaller companies experienced a greater variance in their yearly sales forecasts than did larger companies. The study also reported no significant association between accuracy and the existence or length of written assumptions.

As for the job the financial community is doing in forecasting company earnings, over sixty-five percent of the responding companies indicated a belief that a good job was being done. However, it was reported that some companies considered a ten percent variance from internal forecasts to be a good estimate while others were willing to accept a variance of as much as seventy percent. Regarding communications with financial analysts, when a company's internal forecast differs "substantially" from one published by the financial community,

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[1] Ibid., pp. 27-28.

[2] Ibid., p. 32.

half the respondents reported that they inform the analyst of the difference in expectations. Most respondents stated they inform an analyst if he is beyond the range of "reasonableness."

AICPA research project on accountants' reports on forecasts. Two articles have been published reporting the results of parts of a larger AICPA research project on accountants' reports on forecasts.[1]

The research reported in the first of these articles represented an attempt to capitalize on past experience with forecasting in the United Kingdom. There, forecasts are sometimes included in prospectuses issued in takeovers or mergers and are required to be included in prospectuses for companies quoted or seeking quotation on the London Stock Exchange. The study dealt in part with the accuracy of these forecasts but primarily with the independent accountants' involvement with such forecasts.

The latter topic is outside the purview of this thesis. However, two observations made by the English accountants based on their experience with forecasting are of interest. First, the English accountants indicated they are not in favor of presenting range forecasts on the grounds that this format is not an adequate means of communicating the probabilistic nature of forecasts. Second, the English accountants expressed a great reluctance to be associated with forecasts with horizons exceeding 18 months.

Because of differences in the British and American economies and legal environments, it is hazardous to draw inferences relative to

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[1]See, D. R. Carmichael, "Reporting on Forecasts: A U. K. Perspective," Journal of Accountancy 135 (January 1973):36-47, and Richard J. Asebrook and D. R. Carmichael, "Reporting on Forecasts: A Survey of Attitudes," Journal of Accountancy 136 (August 1973):38-48.

forecast disclosure in this country based on the accuracy of British forecasts or the experiences of the British accountants with forecasts. Accordingly, for purposes of this literature review, the review of the United Kingdom study is limited to the foregoing comments.

The second article concerning the AICPA research project on forecasts reported the results of a survey of attitudes existing in the United States concerning proposals to expand the disclosure of forecasts. A questionnaire was mailed to large samples of CPAs, chartered financial analysts (CFAs), and financial executives. The questionnaire covered numerous forecasting issues including equity in the dissemination of forecasts, auditors' reports on forecasts, and behavioral aspects of forecasting. Regarding the latter, interestingly approximately 40 percent of both the CPA and CFA respondents expressed beliefs that corporations would generally tend to understate forecasts. A majority of both groups felt that fear of losing public confidence would deter corporations from purposely overstating forecasts.

In general, the survey results indicated considerable support for broader disclosure of forecasts on a voluntary basis, but no support for a mandatory disclosure requirement. Also, a consensus against CPAs reporting on forecasts was revealed.

Foster study.[1] This study attempted to assess users' reactions to earnings forecasts by measuring the trading volume and price reaction of the stock market to the release of estimated earnings per share. Using the Wall Street Journal Annual Index, Foster selected a sample

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[1]George Foster, "Stock Market Reaction to Estimates of Earnings per Share by Company Officials," Journal of Accounting Research 11 (Spring 1973): 25-37.

of 68 estimates of EPS. These estimates were published before the release of a preliminary earnings report or audited financial statements, but after the end of the fiscal period forecasted. The mean time-lapse between the release of the EPS estimate and the preliminary earnings report was just 18 trading days. On the basis of both the volume and price studies, Foster concluded that both individual investors and the aggregate market perceive the estimates of EPS to have informational content and do react to that source of annual earnings rather than waiting for the release of preliminary earnings reports on complete audited annual report data.

Ferris study.[2] This study also pertains to forecasting experience in the United Kingdom. But the study is of interest in terms of its potential implications for similar phenomena in the United States.

Through The Financial Times, 70 firms were identified which had issued prospectuses containing forecasts during the period December 1972 through December 1973. Of those, useable responses to a questionnaire were received from individuals extensively involved in the forecasting process in 31 firms. The questionnaire was developed towards two basic objectives: (1) to ascertain whether management did or did not intentionally overestimate the profit forecast, and (2) to determine whether management intentionally utilized internal behavioral responses in an effort to reduce forecast deviations to an acceptable level.

Regarding the first objective, the researcher found that 21 of the 31 firms studied, or approximately 68 percent, did intentionally

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[1]Kenneth R. Ferris, "Profit Forecast Disclosure: The Effect on Managerial Behavior," Accounting and Business Research 5 (Spring 1975): 133-39.

manipulate (underestimate) the forecast that was published in the prospectus. Ferris further concluded that the intentional underestimation was primarily a function of two factors: (1) a learned attitude of conservatism, and (2) a concern for the reaction of the business community to forecast failure.

Regarding the second objective, respondents for 13 of the 31 firms (42 percent) admitted to utilizing accounting adjustments, defined as the use of alternative accounting methods or the adjustment of accounting records, for the purpose of reducing expected deviations between actual and forecasted results. Moreover, 26 (71 percent) indicated that their operating decisions had been consciously influenced by their concern for achieving the published forecasts.

Basi, Carey, and Twark study.[1] This study focused on the relative forecasting ability of managements and financial analysts by comparing the accuracy of forecasts issued by both groups for the same firms and the same time periods. Management forecasts for 88 firms which were referenced in the Wall Street Journal Annual Index for 1970 and 1971 were examined together with analysts' forecasts for the firms obtained from Standard and Poor's Earnings Forecaster. The sample included point and closed-range forecasts of EPS expressed in dollars or as a percentage increase or decrease from the previous year's EPS. Closed-range forecasts were converted to point forecasts by using the midpoint of the range. Open-range ("at least" type) forecasts were excluded.

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[1]Bart A. Basi, Kenneth J. Carey, and Richard D. Twark, "A Comparison of the Accuracy of Corporate and Security Analysts' Forecasts of Earnings," Accounting Review 51 (April 1976):244-54.

For the samples of forecasts examined, on average the analysts forecasts overestimated EPS by nearly nine percent while the management forecasts averaged a six percent overestimate. The corresponding mean absolute percentage estimates were 14 and 10 percent, respectively. While acknowledging the occurrence of several large errors in excess of 100 percent, the researchers did not report the effect of such extreme values on the mean error statistics. More than 70 percent of the forecasts by both the analysts and the executives were within ±10 percent of actual EPS.

Based on the entire sample, the cumulative absolute percentage error distribution for the management forecasts dominated the corresponding distribution for the analysts' forecasts. That is, the proportion of management forecasts which fell at or below a given absolute percentage error level was always greater than the corresponding proportion of analysts forecasts. However, the first degree stochastic dominance of the management forecasts was not statistically significant.

On other matters studied, the researchers found both management and analysts' forecasts to be more accurate for utilities than non-utilities. Forecasts for firms on the New York Stock Exchange were generally more accurate than those for firms on the American Stock Exchange.

Lorek, McDonald, and Patz study.[1] This study represents an extension of the prior research done by Green and Segall and Copeland and Marioni on the relative accuracy of management forecasts versus

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[1]Kenneth S. Lorek, Charles L. McDonald, and Dennis H. Patz, "A Comparative Examination of Management Forecasts and Box-Jenkins Forecasts of Earnings," Accounting Review 51 (April 1976):321-30.

forecasts produced by extrapolative models relying solely upon past earnings data. But rather than using simple (naive) models, Lorek, et.al., thought it would be more appropriate to use more sophisticated time-series models to test the hypothesis of the superiority of forecasts issued by informed management.

Rather than imposing a single model or set of models to be used to extrapolate future earnings for all firms in their sample, the researchers used a procedure known as the Box-Jenkins methodology to determine the most appropriate time-series model for each firm. Forecasts were then generated with these firm specific models utilizing from 32 to 52 observations of past quarterly earnings data depending on their availability for specific firms.

The sample consisted of 40 firms randomly selected from among those represented in the sample of management forecasts used in the McDonald study reviewed earlier in this chapter. It may be recalled that the sample for that study consisted of point forecasts disclosed in the Wall Street Journal during the period 1966 through 1970. Only forecasts issued within the first 120 days of the fiscal year forecasted were included. Based on the comparison of the accuracy of the management forecasts with the time-series forecasts for the 40 firms, the researchers rejected the null hypothesis of no difference between the accuracy of the two sources of forecasts. They accepted the alternate hypothesis that the time-series forecasts were more accurate than the management forecasts.

This concludes the identification and review of prior empirical studies on management forecasts. The next three sections of this chapter present comparative summaries of the findings of prior research on

aspects of forecasting further investigated in this thesis - specifically, the frequency of forecast disclosures, forecast accuracy, and selected management forecast disclosure practices.

Summary of Findings on Frequency of Forecast Disclosures

Data on the frequency with which firms both prepare and voluntarily disclose forecasts is relevant to evaluating alternative policies on future forecast disclosure. The Financial Executives Research Foundation study reviewed above showed that the preparation of internal forecasts by firms is widespread, 95 percent of the 338 companies responding to a survey indicating they prepare forecasts of sales, expenses, and earnings.

The extent of voluntary disclosure of such forecasts is not known. Prior studies have provided some data on frequency of disclosure but varying sampling objectives and sample selection criteria make it difficult to generalize from the findings. For example, Copeland and Marioni scanned the Wall Street Journal for forecasts quantified in point or range format but stopped after locating arbitrary predetermined sample sizes. McDonald scanned the January through April issues of the Wall Street Journal for the five year period 1966 through 1970 but limited his sample to point forecasts with minimum horizons of 245 days.

A further indication of the state of knowledge about the frequency of management forecast disclosures is provided by the following statement from a Wall Street Journal article:

> The SEC doesn't know how many companies make projections in an average year, but estimates run into the thousands. Several years ago the agency said that in November 1972 alone, The Wall Street Journal carried 153 reports of forecasts by corporate managers.[1]

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[1]"SEC Proposes Firms Report to Agency Profit Forecasts Given to Analysts, Press," Wall Street Journal, April 29, 1975, p. 2.

The article did not say how the term "forecasts" was defined. Alternative definitions and the numerous types of media through which forecasts may be disclosed add to the difficulty of determining the frequency of forecast disclosures.

This study adds to the data available on frequency of disclosures by determining the proportion of firms from a defined universe of firms which have disclosed forecasts through one medium (the Wall Street Journal). To obtain a more complete picture of forecast disclosures, liberal limits on horizon were used. Also, since the studies reviewed above have provided little data on the frequency with which forecasts have been disclosed in alternative formats, an objective of this study was to provide data on the frequency of use of point, open-range, and closed-range formats. Details of the data collection procedures are presented in Chapter 3.

Summary of Findings on Accuracy of Management Forecasts

In Chapter 1, it was noted that the SEC cited continuing diversity of views on the reliability of forecasts as one reason for its decision expressed in the April 1976 release to neither encourage nor discourage the disclosure of forecasts. While this diversity of views may relate in part to lack of data on how reliable forecasts must be to be useful, it may also relate in part to the diversity of findings in prior studies on the accuracy of forecasts.

The results of eight of the studies dealing with the accuracy of management forecasts reviewed previously in this chapter are summarized in Table 3. In addition to the results, Table 3 provides a brief description of the samples studied based on the specificity of details

TABLE 3

SUMMARY OF PRIOR EMPIRICAL STUDIES ON ACCURACY OF MANAGEMENT EARNINGS FORECASTS

Study and Sample Description	Forecast Error Measure	Results
Green and Segall - 27 forecasts in various formats including verbal and quantitative, referenced in WSJ Annual Index for years 1963-1965.	No uniform measure	18 of 27 forecasts indicated correct direction of change in earnings. Forecasts of naive models judged not inferior to management forecasts.
Copeland and Marioni - 50 EPS forecasts in point, open, and closed-range formats, located in 1968 issues of the WSJ, average horizon of 7.5 months.	$\frac{\text{Forecast-Actual}}{\text{Actual}}$	Mean signed relative error: +15.8% Mean absolute relative error: +20.1% Management forecasts judged superior to forecasts of naive models.
Daily - 66 forecasts of net income obtained directly from management.	$\frac{\text{Actual}}{\text{Forecast}} \times 100$	47% of forecasts came within ±10% of actual.
McDonald - 201 EPS point forecasts, located in 1966-1970 issues of the WSJ (January through April issues), minimum horizons of 245 days.	$\frac{\text{Actual-Forecast}}{\text{Forecast}}$	Mean signed relative error: -13.6% 49% of forecasts came within ±10% of actual.
Financial Analysts Federation - survey of portfolio managers' evaluations of earnings forecasts supplied to them by managements.	Not specified.	50% of forecasts came within ±10% of actual.
Financial Executive Research Foundation - responses from survey of 338 companies regarding accuracy of internal earnings forecasts.	Not specified.	70% of forecasts came within ±10% of actual.
Basi, Carey, and Twark - 88 EPS forecasts in point and closed-range formats, referenced in WSJ Annual Index for years 1970 and 1971.	$\frac{\text{Forecast-Actual}}{\text{Actual}}$	Mean signed relative error: +6% Mean absolute relative error: +10.1% 78% of forecasts came within ±10% of actual.
Lorek, McDonald, and Patz - 40 EPS point forecasts randomly selected from McDonald sample (see above).	$\frac{\text{Actual-Forecast}}{\text{Forecast}}$	Forecasts of sophisticated time-series models judged superior to management forecasts.

provided in the original articles, and the measure of forecast error used in each study. The results were not always reported in the same mode in the original articles which makes it difficult to aggregate the results. In comparing the results, differences in the source and other characteristics of the samples should be kept in mind as well as differences in the error measures employed.

From the data in Table 3, it may be noted that the mean signed relative forecast errors reported for the various samples ranged from +6% to +15.8%. The mean absolute relative errors ranged from 10.1% to 20.1%. These findings suggest a general tendency for forecasts to be optimistically biased. This finding is interesting in view of the results of other studies (the FAF and AICPA surveys) showing that many users of forecasts believe that management would generally tend to understate publicly disclosed forecasts. Diverse findings were also reported on the proportion of forecasts falling within ±10 percent of actual, the proportions ranging from 47 percent in the Daily study to 78 percent in the Basi, Carey, and Twark study. Finally, contradictory findings regarding the relative accuracy of management forecasts versus forecasts produced by time-series models were reported in the Green and Segall, Copeland and Marioni, and Lorek, et. al., studies.

In view of the diverse findings of past studies on the magnitude of forecast errors and the direction of any bias, a second objective of this research was to provide additional data on the reliability of past management forecast disclosures. A further contribution was made in this study by conducting separate analyses of the reliability of forecasts issued in point, open-range, and closed-range formats. This was not done in any of the previous studies. The data from this analysis

should be useful in evaluating alternative policies and guidelines on forecast disclosure. Specifics of the methodology for the analysis of reliability are presented together with the research findings in Chapter 4.

Summary of Findings on Selected Management Forecast Disclosure Practices

The studies reviewed above reveal few findings on management forecast disclosure practices beyond the limited inferences drawn about the frequency and format of disclosures. As noted previously, the FAF and AICPA research projects provide some data about beliefs held by CPAs, financial analysts, and financial executives with respect to possible intentional bias in forecasts. The Ferris study also provided some data on British managements' use of internal behavioral responses in an effort to reduce forecast errors.

None of the prior studies investigated factors associated with a management's decision to issue or not issue a forecast, the timing (horizon) of forecasts, or the format of forecasts. No data have been collected on managements' issuance of revisions of forecasts. And no data have been collected on whether managements afford comparable treatment to the disclosure of favorable or unfavorable expectations.

Data on all of these aspects of forecast disclosure practices are relevant to evaluating alternative policies on forecast disclosure. Accordingly, a third objective of this study was to collect data based on exploratory research on these important aspects of forecast disclosure. Specifics of the methodology employed for this research are presented in Chapter 4.

The next chapter identifies the specific research questions addressed in this thesis, the data collection procedures employed, and a profile of the management earnings forecast data used in this study.

CHAPTER III

RESEARCH QUESTIONS, DATA COLLECTION PROCEDURES, AND PROFILE OF PUBLISHED MANAGEMENT EARNINGS FORECAST DATA USED IN THE STUDY

Research Questions

The AICPA Study Group on the Objectives of Financial Statements noted that the answer to the question of whether management forecasts ought to be published may well depend on their relevance and reliability.[1] Evidence in the literature of accounting, economics, and finance supporting the relevance of forecasts to economic decision making was documented in Chapter 1 of this thesis. Chapter 2 included a review of the results of prior research into the reliability of management forecasts noting that such research has produced diverse findings. Moreover, it was found that prior studies were based primarily on point forecasts and that where range forecasts were included, separate analyses of the reliability of forecasts published in different formats were not made. In view of the continuing concern of various accounting policy making bodies such as the AICPA, FASB, and SEC about both the format and reliability of forecast disclosures, the following research questions were formulated as the basis for the research reported in this thesis:

1. With what frequency are corporate managements making earnings forecast disclosures in point, open-range, and closed-range formats?

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[1] Objectives of Financial Statements, p. 46.

2. How reliable are the earnings forecast disclosures made in each of these formats?

3. What variables are associated with management forecast disclosure practices, including the decision to disclose or not disclose a forecast and the format and timing of disclosures made?

The nature and data requirements of the research undertaken to answer each of these questions is presented in the next three sections.

Frequency of management earnings forecast disclosures in point, open-, and closed-range formats. The investigation of this question required a source of management earnings forecast disclosures and the coding of those disclosures by format. Prior research studies were reviewed and a pilot study of forecasts published in the Wall Street Journal was undertaken to determine the types of disclosure formats being used. The source of earnings forecasts and other data selection criteria adopted, including the basis for deciding which disclosure formats to include in the study, are presented in a later section in this chapter.

Reliability of forecasts published in different formats. In addition to the forecasted earnings data used in addressing the first research question, the examination of forecast reliability in this study required the use of actual earnings data, the source of which is discussed under the heading "Data Collection Procedures."

Both nominal and ratio scaled measurements of the reliability of forecasts disclosed in different formats were developed based on comparisons of the forecasted and actual earnings data. In addition to separate analyses of the reliability of forecasts in each format, a comparative analysis of the reliability measurements obtained for each format was made to determine whether there are significant

differences in the information conveyed through the different formats. For example, corollary to the research question presented above on reliability are the following questions:

1. Are the probability distributions of future earnings underlying forecasts expressed as minimum estimates different from the probability distributions of future earnings underlying forecasts expressed as point estimates?

2. Are the probability distributions of future earnings about the mid-points of closed-range forecasts different from the probability distributions of future earnings underlying forecasts expressed as point estimates?

Specifics of the methodology used in examining reliability are presented in Chapter 4 together with the research findings.

Variables associated with management forecast disclosure practices. The decision to disclose or not disclose a forecast and the format and timing of forecasts issued were identified as three disclosure practice variables in this study. One corollary to the general question about variables related to forecast disclosure practices was addressed in the preceding section on reliability; namely whether the disclosure format used is related to differences in the probability distributions underlying individual forecasts. Other corollary questions include:

1. Are the forecast disclosure practices of a firm in a given year related to the accuracy of its prior year's forecast?

2. Is the disclosure format used related to the horizon of a forecast?

3. Are the forecast disclosure practices of a firm related to the favorable or unfavorable nature of its earnings expectations viewed in terms of its earnings trend?

In addition to the data used for the analysis of reliability discussed in the preceding section, the investigation of these

research questions required the coding or calculation of variables representing the horizon of a current forecast, the accuracy of the prior year's forecast, and prior years' actual earnings. Again, specifics of the methodology used are presented in Chapter 4 with the research findings.

The remainder of this chapter presents a description of the data collection procedures employed and a profile of the management earnings forecast data used in the study.

Data Collection Procedures

The preceding sections identified various forecast disclosure and actual earnings variables required for the analyses designed to answer the research questions posed. The source and nature of each of the variables comprising the data base are discussed below.

Management forecast disclosure variables. Prior studies have utilized two major sources of management forecasts: (1) internal forecasts obtained directly from management, and (2) external or published management forecasts located in such sources as the Wall Street Journal.

In discussing the poor response to requests for participation in his study, Daily acknowledged that managements might be reluctant to reveal to someone outside the firm that past internal forecasts had been highly inaccurate.[1] This suggests that the use of internal forecasts revealed by management on an ex post basis might result in obtaining a sample biased by the inclusion of a disproportionate number of firms with superior forecasting experience.

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[1]Daily, "Feasibility of Reporting Forecasted Information," p. 292.

Also, as implied by Daily, the study of internal forecasts for purposes of evaluating the public disclosure of forecasts requires the assumption that the internal forecasts represent a reasonable surrogate for the type of forecasted information that might be externally reported. Daily concluded the reasonableness of the assumption was "evident." Yet, executives of three firms (twenty-five percent of his sample) stated that material changes in forecasting procedures would probably be necessary before such information could be reported.[1] Moreover, as noted in Chapter 1, there has been no consensus as to the definitions of such terms as forecast and budget. In the absence of such a consensus, there has been, and continues to be, potential for failure on the part of management data sources to appropriately distinguish the two types of data. An implication that a terminology problem has existed, and the significance of the distinction between the terms, is apparent in the following comment made by the AICPA's spokesman at the SEC hearings on forecasts:

> Our comments are not directed to the type of forecasts which are intended purely for management purposes and may be deliberately overstated as goals for corporate personnel. Such forecasts are commonly referred to as budgets. . . .
> For purposes of our discussion, we intend to use the term "forecasts" to mean financial summaries of the best possible estimates of future expectations.[2]

To avoid some of the problems associated with gathering and interpreting internal forecasts which were outlined above, external or published management forecasts were used in the present research. In

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[1]Ibid., p. 288.

[2]"Trial Period Suggested for Publication of Forecasts (News Report)," Journal of Accountancy 135 (January 1973):10.

particular, it was decided to examine forecasts published in the Wall Street Journal. This source was chosen since prior studies and a pilot study by this researcher indicated that numerous companies disclose forecasts through this medium. Further, the availability of large numbers of forecasts together with the relative ease in collecting the data made it possible to examine a larger sample than would otherwise have been feasible. In fact, the pilot study of the availability of forecasts in the WSJ revealed that the extent of all forms of management forecast disclosures was even more widespread than anticipated with large numbers of forecasts finding their way into the WSJ through various channels, in various formats, and with varying degrees of specificity.

Thus, it became necessary to establish certain screening criteria for selecting forecasts to be included in the study. The criteria were established based on the following considerations:

1. The desire to obtain a sufficiently large sample to permit meaningful analysis.

2. The desire to include forecasts quantified in point, open-range, and closed-range format in order to investigate the reliability of forecasts in each format.

3. The avoidance, to the extent possible, of potential contamination of the data resulting from the necessity to make questionable assumptions in coding and analyzing the data.

4. The practicality of processing and analyzing numerous groups of forecasts issued in differing formats.

Accordingly, screening criteria dealing with the universe of forecasting firms, nature of disclosure in the WSJ, forecast format, period, and horizon, and other factors, and the reasoning underlying each, were established as follows:

1. Universe of forecasting firms. In order to obtain a reasonably, but not overwhelmingly, large sample of

management earnings forecasts disclosed by an identifiable universe of firms for which actual earnings data would be readily available, it was decided to examine only forecasts of firms included on the Primary Industrial File of the Compustat annual data tapes. The implications of this restriction are discussed later in this chapter.

2. Nature of disclosure in the WSJ. The entire issue of each WSJ published during the study period, 1 January 1969 through 31 December 1972, was scanned to locate forecasts. The majority of disclosures occurred in one of the following forms: (a) management press releases providing forecasted information only, (b) press releases providing historical earnings announcements accompanied by forecasts of future earnings, (c) news stories dealing with such topics as new products or industry conditions, (d) the "Stockholder Meeting Briefs" section, and (e) the "Heard on the Street" column. All forecast disclosures located in the WSJ in any of these forms were eligible for selection provided it was specifically indicated that the forecasts originated with management.

3. Forecast format. A number of format variables may be identified including the following: (a) type of earnings forecasted--operating (after taxes but before extraordinary items) or net (after taxes and extraordinary items), primary or fully diluted, (b) degree of specificity--non-quantified verbal (e.g., earnings will "increase," "set a record," or "decrease substantially") or quantified in point, open-range, or closed-range format, and (c) mode of quantification--total or per share earnings or percent change in total or per share earnings. Any attempt at collecting past published forecast data will quickly reveal that a major shortcoming has been the degree of ambiguity in such disclosures. For example, "earnings" forecasts have often been published without any indication as to whether reference was to "operating" or "net" or "primary" or "fully diluted" earnings. And in the majority of cases, where the mode of quantification has been "percent change," it has not been made clear which type of earnings figure was the base. Accordingly, the following format criteria were established:

   a) Forecasts of operating or net earnings, primary or fully diluted, were all accepted and appropriately coded to permit matching with the appropriate actual earnings figures. Where the type of earnings was not specified, the forecasts were coded as "net primary."
   b) A forecast must have been expressed in quantitative

terms in either point, open-range, or closed-range format. Quantitative expression was necessary to permit application of the desired quantitative methodology to the analyses of reliability and disclosure practices. Due to the limited number of published open-range forecasts of the type specifying maximum earnings per share, only forecasts specifying minimum earnings per share were included in the open-range category in this study.

c) The mode of quantification must have been dollars of earnings per share. This was the predominant mode found. Forecasts of total earnings were eliminated due to the lesser frequency with which they occurred and due to the desire to keep the number of categories of forecasts to be studied and the required methodology reasonable. Forecasts expressed in terms of "percent change" from the prior year were excluded due to the need, for the majority of such forecasts, to make an assumption as to the base to which the percent change applied.

Henceforth, use of the term "forecast format" in this thesis refers to the alternative presentation of point, open-range, or closed-range forecasts of per share earnings without regard to the type of earnings (operating or net, primary or fully diluted) forecasted.

4. Forecast period. Forecasts have been published for quarterly, semi-annual, and annual results. Only forecasts of annual results for fiscal years ending during the period 1 January 1969 to 31 December 1972 were eligible for inclusion in this study. It was also found that forecasts of earnings for a final interim period of a year often accompany earnings announcements pertaining to the results of a preceding interim period or periods. No attempt was made to "construct" annual forecasts in these situations by adding the forecasted results of the final interim period to the actual results of the preceding interim period(s) since the lack of interim reporting standards during the period covered in this study might have resulted in interim forecasts which were not homogeneous in a number of respects with annual forecasts.

5. Forecast horizon. Estimates of annual earnings have been published as early as five or more years prior to the end of the forecasted period to as late as several weeks or months following the end of the forecasted period but prior to the release of a preliminary earnings report. Forecasts were included in this study only if they were published prior to the fiscal year-end of the forecasted period but with a maximum horizon

of eighteen months. This time frame includes the vast majority of management forecasts published in the past.

6. Other factors. While numerous instances where managements commented to the effect that analysts' forecasts were "in the ball-park" or "reasonable" were noted in the WSJ, these so called "confirmed" or "imputed" management forecasts were not included in this study. Furthermore, forecasts which originated with management but which were qualified in any way were excluded. Most such qualifications were expressed in such phrases as "subject to market reaction to our new product" or "subject to the pending acquisition (or disposal or merger)." These forecasts were excluded as it was deemed impracticable to attempt to follow up on all such qualifications, the information to accomplish which would not be publicly available in some cases. Finally, in order to attempt to preserve the distinction between most probable estimates and internal estimates which might include built in slack or motivational elements, published future earnings disclosures expressed in terms of "goals" or "budgeted" or "targeted" amounts were excluded from the study.

To summarize, to have been selected for inclusion in this study, a management forecast must have been:

1. Issued by a firm included on the 1974 edition of the Primary Industrial File of the Compustat annual data tapes.

2. Disclosed in the Wall Street Journal between 1 January 1969 and 31 December 1972.

3. Expressed in terms of dollar earnings per share in one of the following formats: point, open-range (minimum EPS forecasted), or closed-range (minimum and maximum EPS forecasted).

4. A forecast of annual earnings for a fiscal year ending between 1 January 1969 and 31 December 1972.

5. Issued prior to, but not more than eighteen months prior to, the end of the forecasted period.

6. Originated by management, not merely confirmed by or imputed to management.

7. Unqualified.

8. Not expressed in terms of a "goal," "target," or "budget."

Certain implications of these data selection criteria are enumerated in a later section of this chapter.

For each forecast included in the data base, the following variables were coded:

1. Earnings type- operating or net, primary or fully-diluted.
2. Amount- expressed in dollars per share.
3. Format- point, open-range, or closed-range.
4. Date published in the Wall Street Journal.
5. Fiscal year forecasted.

Actual earnings data. As noted above, forecasts of operating or net income per share, primary or fully diluted, were eligible for inclusion in the study provided all other criteria were satisfied. Based on an identifying "earnings type" code assigned to each forecast, appropriate data items were abstracted from the Primary Industrial File of the Compustat annual data tapes to supply the actual per share earnings data necessary for the analyses of reliability and forecast disclosure practices. Data from the Compustat tape and from the Moody's Investor Service, Inc. manuals were used to make adjustments, where necessary, in the per share data for stock dividends and splits occurring after publication of a forecast but before the end of the forecast period.

Implications of the Data Collection Procedures

The data collection procedures enumerated above should be scrutinized for any inherent implications, the most significant of which, in this researcher's view, are emphasized below.

Implications of using published management forecast data. It was noted above that the study of forecasts published ex ante avoids the

potential bias resulting from selective management disclosure of forecasts after forecast accuracy has been determined. Yet, relative to extending inferences from the analysis of forecasts of firms included in the data base for this study to a larger population of firms which might voluntarily or by mandate publish forecasts, it should be cautioned that the possibility that the data base includes a disproportionate number of firms with superior forecasting experience remains due to what McDonald referred to as the "self-selecting" nature of published forecasts.[1] That is since the public disclosure of forecasts has been voluntary, perhaps only those firms with an above average ability to forecast, or firms having an above average degree of confidence in the forecasts, have made such ex ante disclosures.

Implications of restricting sample to forecasts issued by firms on Compustat's Primary Industrial File. The Compustat service is widely recognized as maintaining a highly reliable and efficient system of data collection. The Primary Industrial File, in particular, includes data on nine-hundred companies including all companies in Standard and Poor's index of 425 industrials, plus other companies of greatest investor interest listed on the New York or American stock exchanges or traded in the over-the-counter market. In view of the infeasibility of examining forecasts published by all firms, this particular group was felt to constitute a highly relevant population.

It should be noted that in order to constitute a file of firms of greatest investor interest, the individual firms comprising the

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[1]McDonald, "Empirical Examination of Published Predictions of of Future Earnings," p. 53.

Primary Industrial File change from year to year. New additions are determined by companies commanding current investor interest and new listing on the New York and American stock exchanges. Deletions result from mergers, suspensions from trading, and bankruptcy filings. Therefore, as in the case of all studies using Compustat data, it should be observed that the tape contains only survivors which might possess characteristics different from firms once on the file but deleted before the preparation of the data tape used. (A 1974 edition of the Primary Industrial File was used in this study.)

Implications of the study period. As an indication of the representativeness of economic conditions during the study period, it may be observed that aggregate corporate profits rose by three percent in 1969, fell eight percent in 1970, rose thirteen percent in 1971, and rose seventeen percent in 1972.[1] In the researcher's opinion, the inclusion of several years in the study period characterized by varying economic conditions contributes to the external validity of the study.

On the other hand, it may be recalled that economic controls were imposed on the economy during the latter part of the study period. The so-called Phase I controls which took the form of a wage-price freeze were effective during the period 15 August 1971 through 12 November 1971, followed by 5.5 and 2.5 percent ceilings, respectively, on wage and price increases under the Phase II controls which were effective during the period 13 November 1971 through 11 January 1973. The impact of the economic controls on the forecast disclosure decisions of firms, and

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[1]First National City Bank of New York, Monthly Economic Letter (New York: First National City Bank of New York), April, 1969-1972.

on the accuracy of forecasts of firms which did make disclosures for periods affected by the controls, cannot be measured.

Statistical implications. Since all management forecasts located in the Wall Street Journal during the study period which met all the selection criteria were included in the study, the data base may be viewed as a population rather than a sample. The compilation and presentation of purely descriptive statistics on this population of forecasts and forecasting firms constitutes a contribution to our knowledge of past forecast disclosure experience.

But the study of a finite number of forecasts issued in the past by a finite number of firms would have little utility if its conclusions could not be extended to "like observations" for the same or other firms in the future. Toward this end, it is desirable to think of the data base as a sample of the experience of some larger population of firms which could potentially forecast earnings, either voluntarily or under some future disclosure requirement. Authoritative support for the extension of conclusions from a non-random sample of this type to "like observations" may be found in the literature of applied statistics.[1] On this authority, in addition to the compilation of descriptive statistics, the methodology used in this research included certain statistical tests of inferences about the reliability of forecasts published in different formats and about the association between disclosure practice variables such as existence, format, and timing, and independent variables such as prior forecast accuracy and the

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[1]For example, see Jerome Cornfield and John W. Tukey, "Average Values of Mean Squares in Factorials," Annals of Mathematical Statistics 27 (December 1956):912-13.

favorable or unfavorable nature of a firm's earnings expectations.

Specification of the population of like observations to which inferences from this study can be extended is left to the reader. The sections above on data collection procedures and their implications should be scrutinized to enhance the validity of the process. As a further aid to the reader, a profile of the data base has been prepared and is reported in the next section.

Profile of Published Management Earnings Forecast Data Used in the Study

A profile of the forecast data used in the study was constructed for the following purposes:

1. To provide evidence on the first research objective of obtaining information on the frequency of forecasts published in selected formats.
2. To provide an indication of the adequacy of the data for carrying out the analyses described in the following chapter for accomplishing the second and third research objectives.
3. To aid the reader in determining the population of like observations to which the results of the research may be generalized.

The profile is provided through the presentation of frequency distributions and crosstabulations of forecasts classified by firm, fiscal year forecasted and/or calendar year of publication, format, horizon, and industry grouping.

Frequency of forecasts by firm. The data collection procedures described in the preceding sections resulted in a sample of 415 published management forecasts which met all of the data selection criteria. It was subsequently discovered that 32 of those forecasts were reissuances of prior forecasts. Since the inclusion of these forecasts would

constitute redundancy and result in violation of the assumption of independence among observations required by certain statistical tests used, the 32 reissued forecasts were deleted from the data base leaving a total of 383.

The data base does include multiple forecasts for the same firm in the following situations: (1) firms which disclosed one or more revisions, as opposed to reissuances, of an original forecast for a given fiscal year, and (2) firms which disclosed forecasts in two or more of the study period years. Tables 4 and 5 indicate the frequencies with which these phenomena occurred. From Table 4 it can be determined that of the 383 forecasts comprising the data base, 327 were original forecasts, the difference of 56 being comprised of 46 first revisions, 8 second revisions, and 2 third revisions. Table 5 shows that the data base includes the forecast disclosures of 233 different firms. It can also be seen that while forecasts for two fiscal years are included for 52 of the firms, there were few firms with forecasts in more than two years.

Including revisions and multiple forecasts for the same firm issued in different years poses no problems from the standpoint of presenting descriptive statistics compiled from the data base. The effect on certain inference testing procedures vis-a-vis the independence assumption is dealt with in Chapter 4.

Frequency of forecasts by format and year. A crosstabulation of the 383 forecasts by format and fiscal year forecasted and calendar year of publication is presented in Table 6. From this table it may be observed that the point format was the most popular disclosure format for every period except fiscal 1970 and calendar 1969. But at the same

TABLE 4

FREQUENCY OF FIRMS FOR WHICH ONE, TWO, THREE, OR FOUR FORECASTS ARE INCLUDED IN GIVEN FISCAL YEARS

Number of forecasts per firm	Number of firms for which forecasts are included for fiscal				
	1969	1970	1971	1972	Total
One	60	56	78	87	281
Two	9	13	7	9	38
Three		2	2	2	6
Four	—	1	—	1	2
Firms for which at least one forecast is included for given fiscal year	69	72	87	99	327
Total forecasts in given fiscal year	78	92	98	115	383

TABLE 5

FREQUENCY OF FIRMS FOR WHICH AT LEAST ONE FORECAST IS INCLUDED IN ONE, TWO, THREE, OR FOUR FISCAL YEARS

Fiscal Years	Firms
One	161
Two	52
Three	18
Four	2
Total	233

TABLE 6

FREQUENCY OF FORECASTS BY FORMAT AND YEAR

Forecast Format	Fiscal Year Forecasted				Total Per Format	Calendar Year Published			
	1969	1970	1971	1972		1969	1970	1971	1972
Point	33	36	44	50	163	38	40	40	45
Open-range	13	16	22	19	70	19	16	18	17
Closed-range	32	40	32	46	150	42	39	30	39
Totals	78	92	98	115	383	99	95	88	101

time, the combined number of open- and closed-range forecasts exceeded the number of point forecasts in each of the yearly breakdowns. Moreover, in the aggregate, nearly as many closed-range forecasts were issued as were point forcasts. These data demonstrate the significance of all three disclosure formats during the study period examined. No trend in the mix of formats found in each period is observable.

In compiling the statistics on frequency of forecasts by format it was noted that firms with multiple forecasts frequently switched among formats. Of the 72 firms with forecasts in the data base for more than one year, only 24 consistently used the same format for the initial forecast for each year. Of the 56 revisions included in the data base, only 21 were in the same format as the corresponding initial forecast.

Regarding the frequency of forecasts by years, Table 6 shows that the number of forecasts meeting the selection criteria declined in calendar years 1970 and 1971, perhaps reflecting the decline in

aggregate corporate profits experienced in 1970. On the other hand, the number of forecasts increased in each succeeding fiscal year. This phenomenon is reconcilable with the calendar year pattern when the overlapping of fiscal years with calendar years is considered. For example, while the numbers of forecasts published in calendar years 1970 and 1971 declined by 4 and 11, respectively, from the calendar 1969 level, twenty-two of the forecasts published in 1969 pertained to fiscal periods ending in 1970 or 1971. Also, in examining the data for trends, it must be considered that the levels of forecasting activity reflected in the fiscal 1969 and calendar 1972 columns understate the actual levels of activity due to the exclusion of forecasts for fiscal 1969 issued prior to January 1, 1969, and the exclusion of forecasts issued in calendar 1972 for fiscal periods ending after December 31, 1972. But while the data are too limited to be conclusive, there is some indication that the level of forecast disclosure activity was sensitive to general economic conditions, and that the level of activity was higher in the latest year studied than in the earliest year studied.

Frequency of forecasts by horizon and year. Table 7 provides a cross-tabulation of the forecasts by horizon intervals and fiscal and calendar years. From this table it can be determined that 248 or 65 percent of all the forecasts had horizons of six months or less, 120 or 31 percent had horizons greater than six but not exceeding twelve months, and only 15 or 4 percent had horizons greater than twelve but not exceeding eighteen months. From the limited data there is no observable trend in the length of the forecast horizons.

TABLE 7

FREQUENCY OF FORECASTS BY HORIZON AND YEAR

Horizon in Months	Fiscal Year Forecasted				Total Per Interval	Calendar Year Published			
	1969	1970	1971	1972		1969	1970	1971	1972
16 - 18		3			3	3			
13 - 15		1	6	5	12	3	4	5	
10 - 12	11	9	11	6	37	17	6	12	2
7 - 9	13	23	27	20	83	18	30	18	17
4 - 6	22	20	13	29	84	24	18	14	28
0 - 3	32	36	41	55	164	34	37	39	54
Totals	78	92	98	115	383	99	95	88	101

Mean horizons of forecasts classified by format and year. Table 8 provides a crosstabulation of mean horizons for the forecasts classified by format and fiscal and calendar years. No trends across years in the mean horizons are observable from this table, although a sharp decline in the mean horizon in days is indicated for both the fiscal and calendar 1972 years. Also, a general tendency for the two categories of range forecasts to be characterized by slightly longer mean horizons than the point forecasts is apparent. Chapter 4 includes an analysis of the significance of the differences in mean horizons for the different formats.

TABLE 8

MEAN HORIZON IN DAYS BY FORMAT AND YEAR

Forecast Format	Fiscal Year Forecasted				Grand Mean	Calendar Year Published			
	1969	1970	1971	1972		1969	1970	1971	1972
Point	117	147	152	128	136	143	141	162	102
Open-range	184	182	156	101	152	239	161	114	87
Closed-range	165	153	183	137	152	165	163	173	108
Grand mean	138	154	163	127	145	171	154	156	102

Frequency of forecasts by industry grouping and year. The criteria mentioned earlier for inclusion of a firm on the Compustat Primary Industrial tape are helpful in evaluating the character of the firms represented by the forecasts in the data base. A further indication of the representativeness of the data base may be obtained by studying Table 9 which provides a crosstabulation of the forecasts included by industry grouping and year.

Summary

The profile of the data base provided above indicates that the three forecast disclosure formats selected for inclusion in this study do represent significant forms of public disclosure in terms of frequency of use. Further, it is the researcher's opinion that the profile presented supports the adequacy of the data base for the analyses of reliability and disclosure practices reported in the next chapter.

TABLE 9

FREQUENCY OF FORECASTS BY INDUSTRY GROUPING AND YEAR

2-Digit SIC Code	Industry Grouping	Fiscal Year Forecasted				Total Per Group	Calendar Year Published			
		1969	1970	1971	1972		1969	1970	1971	1972
19 - 39	Manufacturing	64	62	64	81	271	80	61	55	75
40 - 49	Transportation, communication, electric, gas, and sanitary services	5	6	12	10	33	5	7	12	9
50 - 59	Wholesale and retail trade	2	9	11	7	29	6	12	8	3
60 - 67	Finance and real estate		3	3	7	13		3	3	7
70 - 79	Lodging, automotive, entertainment, medical, and miscellaneous services	2	6	1	2	11	2	6	1	2
10, 12, 13, 16 & 99	Other	5	6	7	8	26	6	6	9	5
Totals		78	92	98	115	383	99	95	88	101

CHAPTER IV

DATA ANALYSIS AND RESEARCH FINDINGS

The first part of this chapter presents the methodology employed to study the reliability of forecasts published in point, open-range and closed-range formats and the results of the analyses thereof. The second part of the chapter presents the methodology employed to study variables associated with designated management forecast disclosure practices and the results of those analyses.

ANALYSIS OF RELIABILITY

The concept of reliability employed in this study is based on one proposed by Ijiri and Jaedicke who stated: "In general, a system is said to be reliable if it works in the way it is supposed to work."[1] They added that in some cases reliability may be measured as the proportion of total measurements which are right versus wrong, while in other cases reliability should be measured in terms of "the degree of closeness to being right."[2] The application of both types of reliability measurements to the analysis of the forecast data in this study is discussed below.

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[1]Yuji Ijiri and Robert K. Jaedicke, "Reliability and Objectivity of Accounting Measurements," Accounting Review 41 (July 1966): 478.

[2]Ibid., p. 479.

Reliability Measured as Proportion of Forecasts Which Are Right Versus Wrong

Examples of proportions relevant to measurement of the reliability of published earnings forecasts include the following:

1. The proportion of point forecasts for which actual EPS equal forecasted EPS.

2. The proportion of open-range forecasts for which actual EPS equal or exceed the forecasted minimum EPS.

3. The proportion of closed-range forecasts for which actual EPS fall within the forecasted minimum and maximum EPS estimates.

In addition to the above proportions representing the proportions of forecasts in each format which turned out to be literally "right," other proportions can be computed to examine the direction of any systematic bias in the forecasts issued in a given format. For example, the proportions of point and closed-range forecasts for which actual earnings turned out to be less than the point forecasts or midpoints of the closed-range forecasts, respectively, can be compared with the corresponding proportions for cases where actual earnings exceeded the point and midpoint estimates.

Finally, proportions may be used to analyze whether there are differences in the information conveyed by forecasts issued in different formats. For example the proportion of forecasts for which actual earnings fall below point estimates can be compared to the proportion of forecasts that fall below minimum estimates to see if the latter are more conservative than point estimates as one would expect. The calculation of these and other proportions for the forecast data in this study is discussed further below in separate sections for forecasts issued in each format and in a section presenting a comparative

analysis of forecasts issued in different formats.

Besides providing a means of focusing on specific attributes of interest of past forecasting experience, as reliability measurements, proportions have the advantage of being free from the bias inherent in summary reliability measures based on a ratio scale when the population includes extreme values. But the usefulness of such proportions alone as reliability measures may be questioned since few would disagree that point forecasts, for example, need not be "right" but merely "close" for them to be reliable. Further, it can be argued that managements can achieve high reliability ratings on range forecasts based on the right versus wrong measure simply by publishing conservative minimum and optimistic maximum estimates.[1] Accordingly, the second type of reliability measurement proposed by Ijiri and Jaedicke was also adopted in this study and is described in the next section.

Reliability Measured in Terms of Degree of Closeness to Being Right

Ijiri and Jaedicke suggest that this type of reliability measurement may be thought of as consisting of two components - the degree of objectivity or dispersion in a set of measurements, and a bias factor equal to the difference between the mean of a set of measurements and some alleged value.[2]

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[1]It has been counter argued that any tendency toward excessive conservatism or optimism would be tempered by managements' desire to encourage investment, and the realization that comparison of forecasted and actual results would be forthcoming. For further discussion of these arguments, see James R. Wilkinson and Lloyd D. Doney, "Extending Audit and Reporting Boundaries," Accounting Review 40 (October 1965): 754.

[2]Ijiri and Jaedicke, "Reliability," p. 481.

In the context of forecast data, we can use as the set of measurements relative forecast errors or differences computed as follows:

$$\text{Relative forecast error or difference} = \frac{\text{Actual EPS - Forecasted EPS}}{\text{Actual EPS}}$$

Application of this formula to point forecasts is straight-forward and the percentage differences are appropriately referred to as forecast errors. Note that negative relative errors denote overpredictions. The formula was applied in this study to the forecasts issued in other formats as follows: For open-range forecasts the minimum EPS estimates were substituted for forecasted EPS. For closed-range forecasts the formula was applied in two ways. First, the range midpoints were substituted for forecasted EPS. Then in a separate analysis the minimum estimates of the closed-range forecasts were substituted for forecasted EPS. The propriety of these substitutions and the interpretation of the relative differences computed thereby are discussed further in the sections on the reliability of forecasts issued in these formats.

A measure of the objectivity of the set of measurements (relative differences) for forecasts issued in a given format can then be obtained by calculating the variance of the distribution of relative differences. The bias component can be obtained simply by calculating the mean of the relative differences since the alleged value in this measurement scheme is zero percent assuming the management forecasts are accepted as best or most probable estimates of EPS (i.e., the expected relative difference is zero).

The objectivity and bias components of reliability are illustrated graphically in Figure 1 where distributions A, B, and C represent three hypothetical distributions of relative forecast errors which

could be associated with point forecasts. Examples of how such distributions would be interpreted follow.

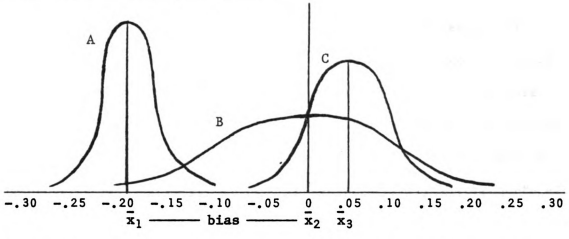

Figure 1. Objectivity and Bias Components of Reliability Measured in Terms of Degree of Closeness to Being Right.

Distribution A which is characterized by narrow dispersion (high objectivity) and a large negative bias would be indicative of a tendency toward consistency among forecasts in degree of closeness to being right and consistent over optimism or overprediction. Distribution B which is characterized by wide dispersion (low objectivity) but zero bias would be indicative of lack of consistency among firms both in terms of degree of closeness to being right and direction of error. Distribution C which is characterized by greater objectivity than distribution B but less than distribution A and a small positive bias would be indicative of a slight tendency toward conservatism or underprediction.

Ijiri and Jaedicke go on to functionally relate the components of reliability as follows:

Reliability = Objectivity + Bias

or, symbolically:

$$R = \frac{1}{n} \sum_{i=1}^{n} (x_i - \bar{x})^2 + (\bar{x} - x^*)^2.$$ [1]

In the context of this study, the x_i are the relative forecast errors or differences computed by the formula on page 71 for forecasts issued in a given format. The $\bar{x}$ term is the mean of the x_i values for forecasts issued in a given format. And the x^* term represents the alleged value, which as noted above, is zero percent in this context. But in this study, attention is focused on the variance and bias components of reliability individually rather than upon R itself. The reason for this is that users might not be indifferent to two groups of forecasts with equal R values but different variance and bias components.

It should be noted that this analysis of reliability pertains to the measurement system represented by the forecasts disclosed in a given format, not the reliability of individual forecasts nor of all forecasts issued by an individual firm. From an individual user's point of view, a measure of the reliability of a given firm's forecasts over time might be most useful in assessing the reliability of the firm's current forecast. A useful measure of the reliability of all forecasts could then be based on an aggregate of the individual firm's temporal measures. But as indicated in the literature review in Chapter 2 and

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[1] Ijiri and Jaedicke observe that this equation may be reduced to the form

$$R = \frac{1}{n} \sum_{i=1}^{n} (x_i - x^*)^2$$

which is exactly the same as the formula for the mean-square error, a measure commonly used in statistics. They also observe that R actually indicates the degree of unreliability and the variance component the degree of subjectivity. That is, the degree of objectivity of the measurement system increases as the variance component gets smaller and the degree of reliability increases as R approaches zero with the system being perfectly reliable when R = 0. (Ijiri and Jaedicke, "Reliability," p. 481.)

in the data profile in Chapter 3, there are few firms for which published forecast data are available for more than two years. Temporal measures of reliability for individual firms probably should be based on longer time series than two years.

In the absence of better measures, users desiring to evaluate the reliability of a firm's first forecast or subsequent revisions might desire information about the reliability of past forecasts across firms. Moreover, information on the reliability of past forecasts by all firms should be helpful to accounting policy making bodies in deciding what course to follow with respect to future disclosures. For example, learning that past voluntary disclosures were highly objective and unbiased would support the position that there is no need to change the status quo on forecast disclosure. On the other hand, learning that past disclosures lacked objectivity or were significantly biased would lend support to positions prohibiting or regulating forecast disclosures. Differences in the reliability of forecasts issued in different formats might lead to different policies with respect to the use of different disclosure formats.

Before proceding with the presentation of the analysis of reliability of forecasts published in each format using both the proportion of right versus wrong and degree of closeness to being right measures, several additional general comments on methodology are in order. The comments in the next three sections pertain to the measurement of relative forecast errors or differences, materiality, and the elimination of non-independent observations for purposes of conducting statistical tests.

Measurement of Relative Forecast Errors or Differences

The limitations of various measures of forecast error, including dollar error, relative (percentage) error, and price-normalized error measures, have been discussed at length in the literature.[1] Consistent with the determinations of nearly all prior researchers who measured forecast accuracy, relative error or difference was chosen in this study as the measure most appropriate for the analysis of reliability measured as the degree of closeness to being right.

Actual rather than forecasted EPS was chosen as the denominator for the relative error or difference formula since it results in equal weighting of equal over and underpredictions measured as a percent of actual. This choice is also consistent with the tendency in the past literature to report findings on accuracy in terms of the frequency with which forecasts fell within stated percentage intervals above and below actual earnings.

Yet relative forecast errors or differences computed as a percentage of actual have the disadvantage of heavily weighting small dollar differences when earnings per share are close to zero. This phenomenon is reflected in this study by the occurrence of several differences having extreme values of several hundred percent.

Since the measures of objectivity and bias described above are sensitive to extreme values, it was felt advisable to devise a scheme to dampen the distortion caused by the occurrence of the extreme values. This was accomplished in this study by recoding all relative differences

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[1]For example, see David Green, Jr. and Joel Segall, "The Predictive Power of First-quarter Earnings Reports: A Replication," Journal of Accounting Research 4 (Suppl. 1966):22-23.

with absolute values greater than 100 percent as differences of 100 percent, retaining the sign of the original value. This procedure can be supported on the grounds that distinguishing among differences greater than 100 percent is of little significance in evaluating forecast accuracy.[1] Additional analyses were performed based on the elimination of extreme values altogether. The frequency with which such extreme values occurred in each forecast format is reported in the analysis sections which follow.

Another problem with the relative difference measure occurs when a positive EPS forecast is associated with negative actual EPS. In such cases, the calculation of a percentage difference is not meaningful. This phenomenon pertained to six of the forecasts included in the study. Rather than eliminate such observations from the data base, the relative difference was arbitrarily coded for such cases as -100 percent. It was felt that this procedure provided an appropriate method for weighting such occurrences for the subsequent analyses.

Materiality and the Evaluation of Reliability

The preceding sections suggest that designated proportions, variances, and means may be used in arriving at reliability measurements. But the current state of knowledge about users' decision models and materiality functions does not permit assertions to be made that any particular value for a proportion, variance, or mean indicates a group of forecasts is reliable or unreliable. But the fact that the

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[1] Precedence for this procedure can be found in Philip Brown and Victor Niederhoffer, "The Predictive Content of Quarterly Earnings," Journal of Business 41 (October 1968):488-97.

measurements are based on a ratio scale, does permit limited statements to be made about the reliability of specified types of forecasts relative to other types of forecasts. Moreover, the measurements can be compared to arbitrary or minimal criteria. Such criteria are defined and such comparisons made in the subsequent analyses sections of this chapter as a basis for formulating specific research hypotheses and interpreting the results of the tests of those hypotheses.

Elimination of Non-independent Observations for Purposes of Statistical Tests

It was noted in Chapter 3 that the methodology for this study included tests of significance of key statistics based on viewing the data base as a sample of forecasts from a hypothetical population of like forecasts. This hypothetical population might be defined as forecasts issued by the same firms in future periods. Or it might be defined as forecasts issued by like firms in the same or future periods. It was also noted in Chapter 3 that the data base includes multiple observations for some firms representing forecasts issued in more than one year for some firms and more than one forecast in a given year (revisions) for some firms.

Certain of the significance tests employed in this study require independence among observations within groups and between or among groups. Rather than sacrifice all of the multiple observation data to meet the requirements of these tests, the following sections containing the analyses of forecasts issued in each format first present descriptive statistics, including relevant proportions, variances and means, based on all 383 observations in the data base. Additional relevant statistics are then presented on a reduced sample consisting of independent

observations. The sample reduction was accomplished by randomly selecting one observation per firm from the original sample. The effect of this procedure on sample size is shown in Table 10.

TABLE 10

SAMPLE SIZES FOR ORIGINAL AND REDUCED (INDEPENDENT) SAMPLES

Format	Original Sample Size	Reduced Sample Size
Point	163	97
Open-range	70	45
Closed-range	150	91
Total	383	233

The next four sections present the application of the "proportion" and "degree of closeness to being right" methodologies to separate analyses of the reliability of point, open-range, and closed-range forecasts included in this study, and to a comparative analysis of the forecasts in the three formats. The results of the analyses are presented concurrently. A summary of key statistics and results of hypothesis tests is presented at the end of each section.

Analysis of Point Forecasts

In the absence of qualifying disclosures, it seems reasonable to expect that forecasts issued in this format represent "best" or "most probable" estimates of EPS. Questions of interest concerning these forecasts concern the proportion of such forecasts which turn out to be right and how close the wrong ones come to being right.

Specifically, regarding degree of closeness to being right, of interest is the degree of dispersion in the measures and whether they tend to be biased toward over or underprediction.

In seeking answers to these questions the relative forecast error was computed for each point forecast in the data base by substituting the point EPS estimate and the appropriate actual EPS amount in the relative forecast error or difference formula given previously and repeated here for convenient reference:

$$\text{Relative forecast error or difference} = \frac{\text{Actual EPS} - \text{Forecasted EPS}}{\text{Actual EPS}}$$

A frequency distribution of the relative forecast differences (errors in this case) was then compiled and is presented in Figure 2.

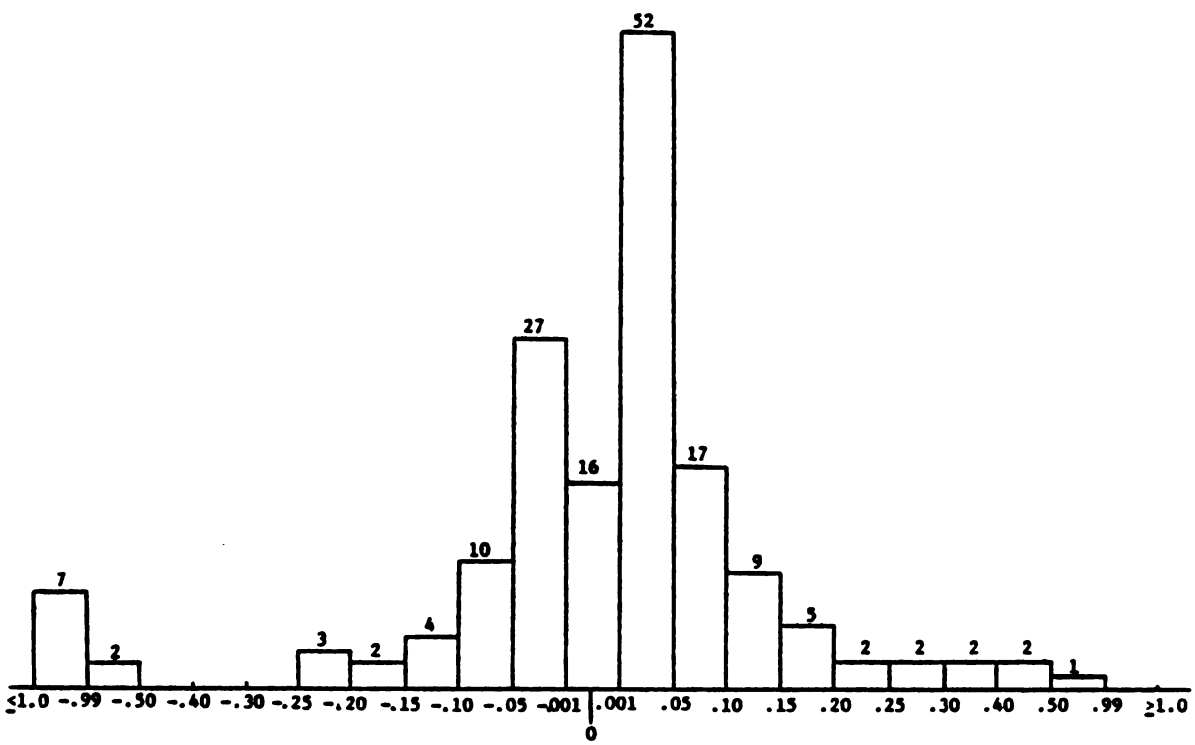

Figure 2. Frequency Distribution of Relative Errors in Point Forecasts.

Recalling that negative errors represent overpredictions, from Figure 2 it can be determined that of the total of 163 point forecasts in the original data base, 55 turned out to be overpredictions while 92 were underpredictions. One case of a positive forecast associated with negative actual EPS is included in the bar at the extreme left end of the distribution in Figure 2. In 16 cases EPS were forecasted without error resulting in a proportion of "right" forecasts of approximately 10 percent.

An indication of whether the forecasts tended to be biased toward over or underprediction can be obtained by comparing the proportions of over and underpredictions found. Of the point forecasts studied, 34 percent were found to be overpredictions while 56 percent were found to be underpredictions. Viewing the forecasts studied as a sample from a hypothetical population of forecasts, a significance test of the proportions may be made to provide evidence on the question of bias in point forecast disclosures. To this end, the following null hypothesis was tested:

Ho_1: The proportions of inexact point forecasts which fall above and below actual EPS, respectively, are .5 each.

The test of this hypothesis was based on the reduced sample of 97 independent observations, sample reduction being accomplished in the manner and for the purposes described in the preceding section. In addition, 10 right or exact forecasts were eliminated from the independent sample so that the proportions of inexact forecasts (overpredictions and underpredictions) would sum to 1. This resulted in observed frequencies of 36 overpredictions and 51 underpredictions. The proportion of inexact forecasts which were overpredictions was 41 percent

while the proportion of underpredictions was 59 percent. The chi-square goodness of fit test was then employed using .5 as expected proportion for each category of inexact forecasts. The test statistic computed was:

$$X^2 = \sum_{j=1}^{J} \frac{(f_{oj} - f_{ej})^2}{f_{ej}}$$

where:

f_{oj} = observed frequency in the jth class, and

f_{ej} = expected frequency in the jth class.

The value of the computed chi-square was 2.5862 which is not significant even at the .10 level (critical value for X^2 with 1 degree of freedom at the 90th percentile = 2.706). Thus, the null hypothesis that the proportions of inexact point forecasts which fall above and below actual EPS are equal was not rejected. Thus, the larger proportion of underpredictions cannot be interpreted as indicating a statistically significant tendency toward conservatism in the point forecasts.

Next, to analyze the reliability of point forecasts in terms of the degree of closeness to being right, the variance and signed and absolute means of the frequency distribution of relative errors were computed.

The variance of the distribution of the relative differences for the original sample of 163 point forecasts was .062. This statistic by itself has little meaning. However, comparisons of the variance statistics for forecasts issued in different formats are made in a subsequent section of this chapter.

A better feel for the dispersion in the distribution can be had by inspecting Figure 2. From Figure 2, it may be determined that 95 or

58 percent of the forecasts came within ±5 percent of actual, 122 or 75 percent within ±10 percent of actual, and 135 or 83 percent within ±15 percent of actual.

The signed mean of the distribution was -.023. Upon first inspection this might be interpreted as indicating a bias toward overprediction. But it should be recalled that the analysis of proportions of over and underpredictions in both the original and reduced samples showed that underpredictions occurred with greater frequency than overpredictions. Thus, further inspection shows the negative bias component to be a reflection of the sensitivity of the mean to the greater number of extreme negative observations relative to the number of extreme positive observations. To obtain a further indication of the amount of bias in the majority of point forecasts, the mean was recomputed after eliminating extreme observations (outliers) with absolute values of greater than or equal to 100%. There were seven outliers in the original sample of 163 point forecasts including one case of a positive forecast associated with negative actual earnings. The recomputed mean was .021 compared to -.023 before removing outliers.

As a further test of bias in the distribution of relative errors, a one sample test of means was used to test the following null hypothesis:

Ho_2: The mean signed relative error for point forecasts (excluding outliers) is equal to zero.

The test statistic used was:

$$Z = \frac{\bar{x} - u_o}{s/\sqrt{n}}$$

where:

$\bar{x}$ = the sample mean,

u_o = the hypothesized value = 0,

s = the sample standard deviation used as an unbiased estimator of the population standard deviation, and

n = sample size.[1]

The test was conducted on the mean of the reduced sample of 97 independent forecasts less 4 outliers. The values of the mean and variance of the sample were .018 and .024, respectively, resulting in a Z value of 1.121 which is not significant at the .05 level for the two-tailed test (critical z = ±1.96). Thus, the mean indicated no statistically significant bias.

Finally, to provide an additional measure of the degree of closeness to being right but not of the direction of error, the means of the absolute relative errors for the various samples were computed. The mean absolute relative error was .115 for the entire sample of 163 point forecasts and .075 after removing the seven outliers with absolute

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[1]The one sample test of means is based on the assumption that the variable X has a normal distribution in the population sampled. Inspection of the frequency distribution shown in Figure 2 raises doubt as to the validity of this assumption with respect to the relative errors for point forecasts. Application of the Kolmogorov-Smirnoff test for normality to the distribution confirms that the relative errors are not likely normally distributed in the population sampled. Nonetheless, use of the z test statistic may be justified in this case by appeal to the central limit theorem which may be stated as follows: "If X is any random variable with a mean μ and variance σ^2, the sampling distribution of the mean $\bar{X}$ of a random sample of size n is approximately normal with a mean μ and variance σ^2/n if n is sufficiently large, irrespective of the distribution of X." (Lincoln L. Chou, Statistics: Methods of Analyses (New York: McGraw-Hill Book Company, 1969), p. 179.) Regarding the value of n that is considered sufficiently large, Chou states: ". . . in most applications a sample size of 30 or more is considered large enough to permit the use of the normal probability distribution for finding the probabilities associated with $\bar{X}$." (p. 180) Since n for the one sample test of means for point forecasts is considerably larger than 30, the "large sample theory" applies. (Similar reasoning applies to use of the one sample test of means in the analyses of open and closed-range forecasts reported in subsequent sections of this chapter.)

relative errors greater than or equal to 100 percent. The mean absolute error based on the independent sample of 97 forecasts was .119 and after removing four outliers it was .081.

This concludes the separate analysis of point forecasts. The descriptive statistics reported in this section and the results of the hypotheses tested in this section are summarized in Table 11.

TABLE 11

SUMMARY OF DESCRIPTIVE STATISTICS AND HYPOTHESIS TESTS FOR POINT FORECASTS

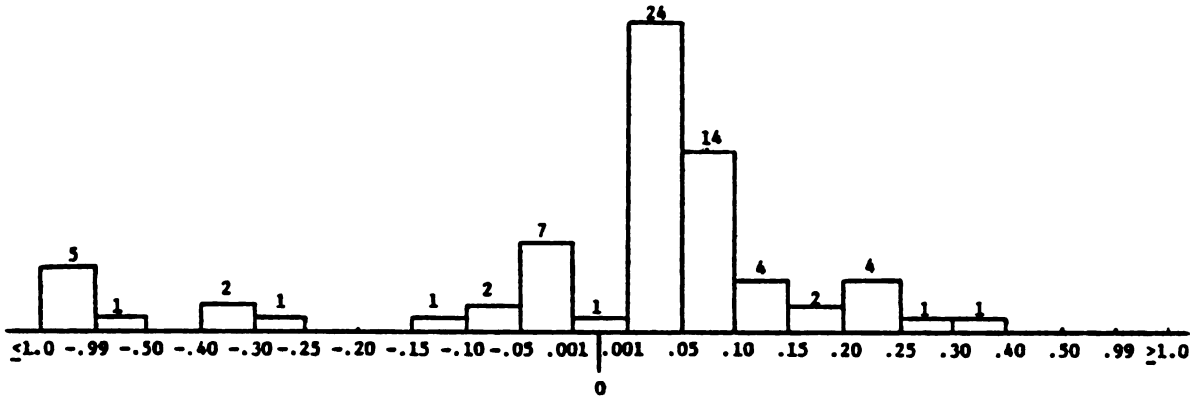
	Samples			
	Original		Independent	
	Entire Sample	Less Outliers	Entire Sample	Less Outliers
STATISTICS				
Sample Size	163	156	97	97
Proportions of forecasts for which point estimates:				
a) equalled actual (right forecasts)	.098	.103	.103	.108
b) exceeded actual	.337	.308	.371	.344
c) came within ±10 percent of actual	.748	.782	.742	.774
Variance of signed relative errors	.062	.020	.064	.024
Mean of signed relative errors	-.023	.021	-.024	.018
Mean of absolute relative errors	.115	.075	.119	.081
HYPOTHESIS TESTS				
Ho_1: The proportions of inexact point forecasts which fall above and below actual EPS, respectively, are .5 each.	N/A	N/A	Not Rejected	N/A
Ho_2: The mean signed relative error for point forecasts (excluding outliers) is equal to zero.	N/A	N/A	N/A	Not Rejected

Further analysis of the reliability of point forecasts relative to forecasts issued in other formats is reported in a subsequent section of this chapter.

Analysis of Open-range Forecasts

Recall that only forecasts of minimum EPS were included in the open-range category in this study. A relevant question pertaining to these forecasts concerns how reliable they are as indicators of minimum earnings. And, in view of the assertion made previously that due to market considerations management would likely avoid excessively conservative minimum estimates, another relevant question pertains to how close the minimum estimates come to actual EPS.

As noted previously, relative errors or differences were computed for these forecasts by substituting the minimum EPS estimate in the same formula used to compute relative errors for point forecasts. Since whenever actual EPS exceed the minimum EPS estimates the open-range forecasts are literally correct, only negative relative differences can be referred to as errors. But the examination of the overall frequency distribution of both negative and positive relative differences is informative in assessing the degree of conservatism in the minimum estimates. That frequency distribution is presented in Figure 3.



Figire 3. Frequency Distribution of Relative Differences in Open-range Forecasts Measured from Minimum Estimates.

From Figure 3 it can be determined that of the total of 70 open-range forecasts included in the data base, 51 or 73 percent of the forecasts were right (having zero or positive relative differences) while 19 or 27 percent of the minimum estimates exceeded actual EPS. Two cases of positive forecasts associated with negative actual EPS are included in the bar at the extreme left end of the distribution in Figure 3.

As a minimal criterion for assessing the reliability of these forecasts as indicators of minimum EPS, one could test to see whether the proportion of overpredictions was significantly less than .5. This proportion was chosen as a minimal criterion since it corresponds to the proportion of overpredictions which one would expect to find associated with unbiased point EPS forecasts. Accordingly, the following null hypothesis was tested using a one-sample test of proportions:

Ho_3: The proportion of open-range forecasts for which the minimum EPS estimates exceed actual EPS is greater than or equal to .5.

The test statistic computed was:

$$Z = \frac{\hat{p} - p_o}{\sqrt{p_o q_o / n}}$$

where:

$\hat{p}$ = the sample proportion,

p_o = the minimum alternative hypothesized proportion,

$q_o = 1 - p_o$, and

n = sample size.

The test of this hypothesis was based on the reduced sample of 45 independent observations, 11 or 24 percent of which were overpredictions. The value of the z statistic was -3.435 which is significant at the .05 level for the one-tailed test (.05 Z = -1.645). Thus, the null hypothesis was rejected in favor of the alternate hypothesis that the proportion of open-range forecasts for which the minimum estimates exceed actual EPS is significantly less than .5.

Referring again to the frequency distribution of relative differences for the original sample of 70 open-range forecasts in Figure 3, the variance of the distribution was found to be .089. The variance is subsequently compared with the variances of the distributions for forecasts issued in other formats. From Figure 3 it can be seen that a majority of the differences, 39 or 56 percent were clustered within the interval 0 to +10 percent. The interval ±10 percent encompassed 48 or 69 percent of the forecasts while the interval ±15 percent encompassed 53 or 76 percent of the forecasts.

The signed mean of the distribution of relative differences

for the 70 open-range forecasts was -.042. Since the forecasts purport to represent "minimum" estimates as opposed to "best" or "most probable" estimates, one would expect to find a positive mean or bias component. As noted above positive relative differences outnumbered negative relative differences 50 to 19 in this distribution. Thus, the negative mean is again a reflection of the sensitivity of the mean to the relatively larger number of extreme negative differences than extreme positive differences. Applying the same methodology used in analyzing point forecasts, a further analysis of bias was undertaken by recomputing the mean after removing outliers defined again as relative differences with absolute values greater than or equal to 100 percent. There were five outliers in the original sample of 70 open-range forecasts including two cases of positive forecasts associated with negative actual earnings. The recomputed mean was .031 compared to -.042 before removing outliers.

As a further test of bias in the distribution of relative differences for open-range forecasts, the one-sample test of means was again used to test the following null hypothesis:

Ho_4: The mean signed relative difference for open-range forecasts (excluding outliers) is less than or equal to zero.

The test was based on the mean of the reduced sample of 45 independent open-range forecasts less one outlier. The values of the mean and variance of the sample were .028 and .013, respectively, resulting in a z value for the one-sample test of means of 1.658 which is significant at the .05 level for the one-tailed test (.05 Z = 1.645). Thus, the mean test based on the independent sample of open-range forecasts excluding outliers shows a statistically significant bias in the expected direction.

To provide an additional measure of the degree of closeness to

being right but not of the direction of error, the means of the absolute relative differences for the various samples of open-range forecasts were computed. The mean absolute relative difference was .155 based on the entire sample of 70 open-range forecasts and .09 after removing five outliers. The mean absolute relative difference based on the independent sample of 45 forecasts was .093 and after removing one outlier it was .073.

This concludes the separate analysis of open-range forecasts. The descriptive statistics and results of hypotheses tested in this section are summarized in Table 12. Further analysis of the reliability of open-range forecasts relative to forecasts issued in other formats is presented in a later section of this chapter.

Analysis of Closed-range Forecasts

Forecasts published in this format focus attention on two points in the unspecified probability distribution of future EPS.. Thus one question of interest concerns the proportion of such forecasts which are right - that is for which actual EPS fall within the ranges. The answer to this question is helpful in assessing the reliability of the end points of the ranges as indicators of minimum and maximum EPS. Of further interest in assessing reliability are the widths of published closed-ranges and whether the ranges are conservatively or optimistically biased. Finally, since the widths of published ranges tend to vary, statistics such as the mean and variance of relative differences computed relative to a common base such as the range midpoints or end points are relevant to evaluating the reliability of these forecasts.

Because of the more complex nature of closed-range forecasts,

TABLE 12

SUMMARY OF DESCRIPTIVE STATISTICS AND HYPOTHESIS TESTS FOR OPEN-RANGE FORECASTS

	Samples			
	Original		Independent	
	Entire Sample	Less Outliers	Entire Sample	Less Outliers
STATISTICS				
Sample Size	70	65	45	44
Proportions of forecasts for which minimum estimates:				
a) were less than or equal to actual (right forecasts)	.729	.785	.756	.773
b) exceeded actual	.271	.215	.244	.227
c) came within ±10 percent of actual	.686	.738	.778	.795
Variance of signed relative differences	.089	.018	.036	.013
Mean of signed relative differences	-.042	.031	.005	.028
Mean of absolute relative differences	.155	.090	.093	.073
HYPOTHESIS TESTS				
Ho_3: The proportion of open-range forecasts for which the minimum EPS estimates exceed actual EPS is greater than or equal to .5.	N/A	N/A	Rejected	N/A
Ho_4: The mean signed relative difference for open-range forecasts (excluding outliers) is less than or equal to zero.	N/A	N/A	N/A	Rejected

the methodology for evaluating their reliability is somewhat more involved. Prior to the compilation of frequency distributions of relative differences like those used in the analyses of point and open-range forecasts, a different type of frequency distribution illustrated in Figure 4 was compiled as described in the next paragraph.

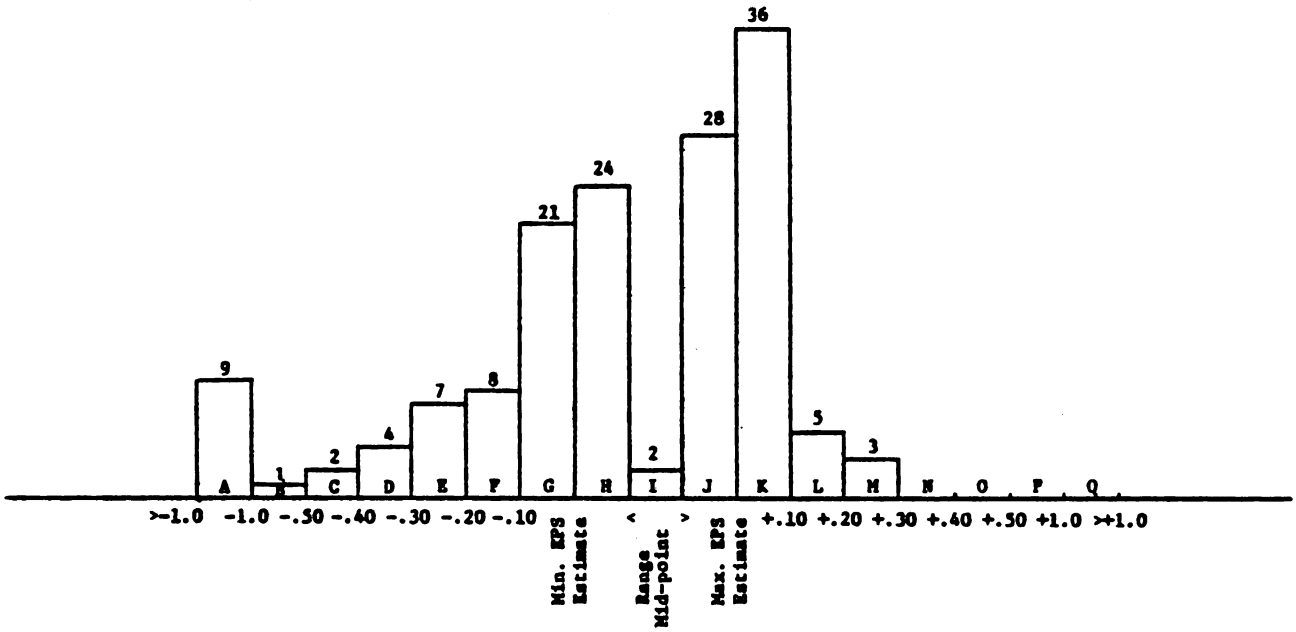


Figure 4. Frequency Distribution of Relative Differences Classified by Interval in Closed-range Forecasts

In Figure 4, intervals H, I, and J represent the forecasts for which actual EPS fell within the lower halves of the ranges, at the midpoints, and in the upper halves of the ranges, respectively, and which were thus "right." The 54 forecasts falling in these intervals represent considerably fewer than half, specifically 36 percent, of the 150 closed-range forecasts in the data base.

Intervals A through G represent forecasts for which actual EPS

fell below the minimum points of the ranges while intervals K through Q represent forecasts for which actual EPS exceeded the maximum points of the ranges. The axis percentages represent the difference between actual EPS and the closest end point expressed as a percentage of actual. For example, the minimum estimates in 21 of the ranges exceeded actual EPS by 10 percent or less (interval G). Analogously, the maximum estimates in 36 of the ranges fell below actual by 10 percent or less (interval K). Thus, 111 or 74 percent of the closed-ranges either encompassed or came within 10 percent of actual EPS (intervals G through K).

To assess the direction of any bias in the forecasts, the proportions of cases where actual earnings fell above or below the range midpoints was examined. From Figure 4, it can be determined that for 76 or 51 percent of the forecasts actual EPS fell below the range midpoints, while for 72 or 48 percent actual EPS fell above the range midpoints. Since such a small difference in proportions has little meaningful significance, no statistical test of proportions regarding bias was performed. However, it should be noted that the frequencies of forecasts with actual EPS falling below and above the end points are less similar. In 44 or 29 percent of the cases, actual EPS exceeded the maximum EPS estimates while in 52 or 35 percent of the cases, actual EPS fell below the minimum estimates. Thus, when viewed from the midpoints the forecasts appear to be unbiased. But viewed from the end points, it can be concluded that the minimum EPS estimates are more optimistically biased than the maximum estimates are conservatively biased.

The significance of parts of the preceding analysis is related to the widths of the published ranges. Obviously one would expect to

find much smaller proportions of range forecasts to encompass actual EPS if very narrow ranges are published than if very wide ranges are published. To evaluate this matter the widths of each of the 150 range forecasts were computed as the differences between the range midpoints and end points expressed as percentages of the midpoints. A tabulation of the widths is presented in Table 13.

TABLE 13

FREQUENCY DISTRIBUTION OF WIDTHS
OF CLOSED-RANGE FORECASTS

Distance from Midpoint to End Point Expressed as Percentage of Midpoint	Absolute Frequency	Cumulative Frequency (Percent)
1%	22	14.7
2%	45	44.7
3%	25	61.3
4%	29	80.7
5%	9	86.7
10%	17	98.0
15%	1	98.7
20%	1	99.3
>20%	1	100.0
Total Cases	150	

Table 13 shows that indeed very narrow ranges were often used with over half of the ranges encompassing less than ±3 percent around the midpoint. Ninety-eight percent of the ranges encompassed less than or equal to ±10 percent around the midpoints. Further study of the range widths indicated that they tended to be expressed in discreet intervals of $.05, $.10, and $.25 rather than some common percentage of the midpoints.

In view of the non-standardized and frequently narrow ranges characterized in the sample, further analysis of the reliability of range forecasts in terms of degree of closeness to being right seemed appropriate. For this analysis, first a frequency distribution of relative differences was compiled by substituting the range midpoints for forecasted EPS in the same relative error or difference formula used for the analyses of point and open-range forecasts. Since the identity of the end points of the ranges is lost in this analysis, reference can be made only to "relative differences" as opposed to "relative errors." The frequency distribution prepared in this manner is presented in Figure 5. The bar at the extreme left end of the distribution includes three cases of positive forecasts associated with negative actual EPS.

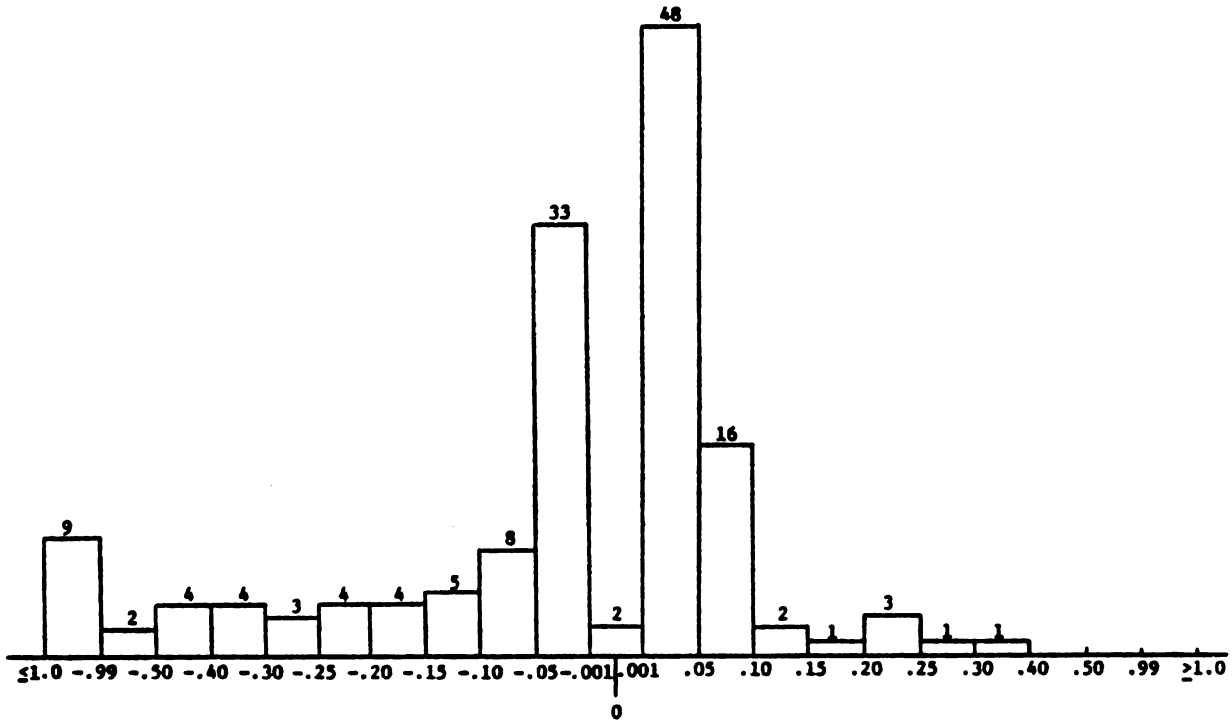


Figure 5. Frequency Distribution of Relative Differences in Closed-range Forecasts Measured from Midpoints.

The variance of this distribution is .075. Again the statistic is of little significance by itself but is examined further in the next section of this chapter on the comparative analysis of forecasts issued in different formats. An alternative feel for the dispersion in the relative differences can be obtained from further inspection of the distribution in Figure 5 which shows that 83 or 55 percent of the midpoints fell within ±5 percent of actual EPS, 107 or 71 percent fell within ±10 percent and 114 or 76 percent fell within ±15 percent of actual.

The signed mean of the distribution in Figure 5 is -.092. This indicates an optimistic bias and is consistent with the finding that there was a slightly higher frequency of forecasts with midpoints exceeding actual EPS than falling below actual EPS. But since the former exceeded the latter by only 4 cases, the negative bias component is more a reflection of the greater proportion of extreme negative observations relative to extreme positive observations than of any consistent tendency toward optimistically biased midpoints.

To obtain a better indication of the degree of bias in the majority of forecasts, the mean of the relative differences was recomputed after removing outliers defined again as relative differences with absolute values greater than or equal to 100 percent. There were 9 outliers in the original sample of 150 closed-range forecasts including three cases of positive forecasts associated with negative actual earnings. The mean after removing outliers was -.034 compared to -.092 before their removal.

As a further test of bias in the distribution of relative differences for closed-range forecasts, the mean was subjected to the

following hypothesis test:

> Ho_5: The mean signed relative difference based on midpoints of closed-range forecasts (excluding outliers) is equal to zero.

The test was based on the mean of the reduced sample of 91 independent closed-range forecasts less 8 outliers. The values of the mean and variance of the sample were -.039 and .026, respectively, resulting in a Z value for the one-sample test of means of -2.187 which is significant at the .05 level for the two-tailed test (.025 Z = ±1.96). Since the sign of the mean was negative, the results of this test indicate that there is a statistically significant optimistic bias relative to the midpoint of closed-range forecasts.

The means of the absolute relative differences based on the range midpoints were also computed for both the original and independent samples, both with and without outliers. The mean absolute relative difference was .144 based on the entire sample of 150 closed-range forecasts and .089 after removing nine outliers. The mean absolute relative difference based on the independent sample of 91 forecasts was .175, and after removing eight outliers it was .096. These and other descriptive statistics, and the results of the hypotheses tested, based on the midpoints of closed-range forecasts, are summarized in Table 14 on page 99.

To provide a further basis for comparing the closed-range forecasts with those issued in point and open-range formats an additional frequency distribution of relative differences was compiled by substituting the minimum estimates of the ranges in the relative error or difference formula. That frequency distribution is presented in Figure 6.

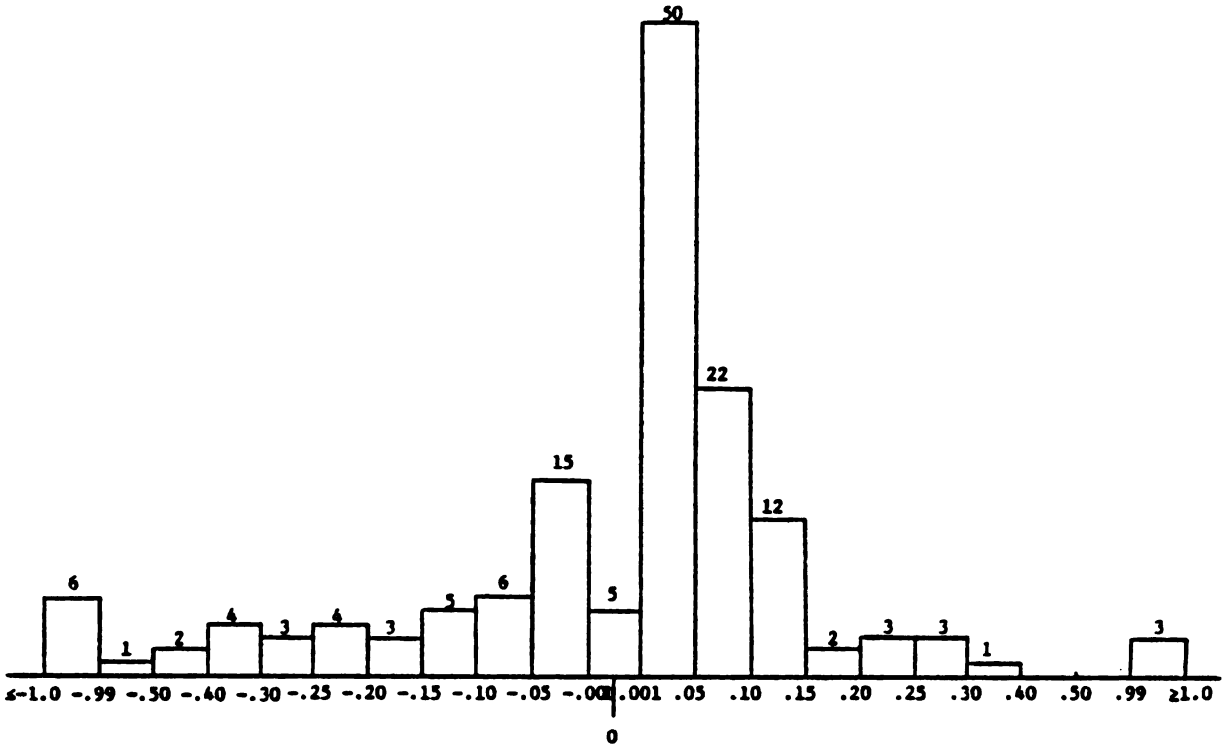


Figure 6. Frequency Distribution of Relative Differences in Closed-range Forecasts Measured from Minimum Estimates of Ranges.

The analysis of this distribution proceeded in a manner similar to that reported above for the distribution of relative differences based on the range midpoints. Key statistics from this analysis are summarized in Table 14 below together with the statistics based on the previous analysis by range midpoints for comparison purposes.

Null hypothesis Ho_6 was formulated analogous to Ho_3 for open-range forecasts as follows:

> Ho_6: The proportion of closed-range forecasts for which the minimum EPS estimates exceed actual EPS is greater than or equal to .5.

The computed Z value for the one-sample test of proportions was -2.194 which is significant at the .05 level for the one-tailed test (.05 Z = -1.645). Thus the null hypothesis was rejected in favor of the alternate hypothesis that the proportion of closed-range forecasts for which the minimum estimates exceed actual EPS is significantly less than .5.

Finally, null hypothesis Ho_7 was formulated analogous to Ho_5 in the analysis of closed-range forecasts based on midpoints as follows:

> Ho_7: The mean signed relative difference based on minimum estimates of closed-range forecasts (excluding outliers) is equal to zero.

The computed Z value for the one-sample test of the mean was -.3502 which is not significant at the .05 level for the two-tailed test (.025 Z = ±1.96). Thus, the bias component for the distribution of relative differences based on the minimum estimates of closed-range forecasts was not significantly different from zero. The results of the above hypothesis tests are also summarized in Table 14.

Further analysis of the reliability of closed-range forecasts relative to point and open-range forecasts is reported in the next section.

Comparative Analysis of Forecasts Published in Point, Open, and Closed-range Formats

It seems reasonable to assume that the selection of the format for publishing a forecast is related to management's preference with regard to conveying different, although incomplete, information about the unspecified probability distributions underlying the forecasts. For example, conceivably the choice of disclosure format might be related to the degree of management's uncertainty about future earnings. In that event, one would expect forecasts issued in point format to represent "best" or "most probable" estimates in which managements have a high degree of confidence. On the other hand, one would expect forecasts to be disclosed in one of the range formats when managements are less certain about future earnings - that is when the underlying probability distributions are flatter. In turn, one would expect to find less

TABLE 14

SUMMARY OF DESCRIPTIVE STATISTICS AND HYPOTHESIS TESTS FOR CLOSED-RANGE FORECASTS

	Analysis based on							
	Range Midpoints				Minimum estimates			
	Original Sample		Independent Sample		Original Sample		Independent Sample	
	Entire Sample	Less Outliers	Entire Sample	Less Outliers	Entire Sample	Less Outliers	Entire Sample	Less Outliers
STATISTICS								
Sample size	150	141	91	83	150	141	91	83
Proportions of forecasts for which:								
a) ranges encompassed actual (right forecasts)	.360	-	.308	-	.360	-	.308	-
b) minimum estimates exceeded actual	.347	-	.385	-	.347	-	.385	-
c) maximum estimates fell below actual	.293	-	.307	-	.293	-	.307	-
d) midpoints exceeded actual	.507	-	.505	-	.507	-	.505	-
e) midpoints came within ±10 percent of actual	.713	-	.682	-	-	-	-	-
f) minimum estimates came within ±10 percent of actual	-	-	-	-	.653	-	.594	-
Variance of signed relative differences	.075	.023	.099	.026	.076	.021	.102	.024
Mean of signed relative differences	-.092	-.034	-.123	-.039	-.061	-.001	-.093	-.006
Mean of absolute relative differences	.144	.089	.175	.096	.148	.093	.179	.100
HYPOTHESIS TESTS								
Ho_5: The mean signed relative difference based on midpoints of closed-range forecasts (excluding outliers) is equal to zero.	N/A	N/A	N/A	Rejected	N/A	N/A	N/A	N/A
Ho_6: The proportion of closed-range forecasts for which the minimum EPS estimates exceed actual EPS is greater than or equal to .5.	N/A	N/A	N/A	N/A	N/A	N/A	Rejected	N/A
Ho_7: The mean signed relative difference based on minimum estimates of closed-range forecasts (excluding outliers) is equal to zero.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Rejected

dispersion in the relative differences between estimated EPS and actual EPS associated with point forecasts than with range forecasts.

Conceivably, the choice of format could also be related to the desire of management to focus attention on particular segments of the unspecified probability distributions underlying the forecasts. For example, management might express a forecast in such terms as "fully diluted net earnings are expected to be 'at least' $3.00 per share" with the intention of focusing attention on the upside potential of earnings. In connection with this line of reasoning, it is imperative from the standpoint of users that the choice of disclosure format not be used as a device for misleading users. For example, it further seems reasonable to infer that the probability of future EPS exceeding an "at least" or minimum EPS estimate is greater than the probability of earnings falling below that amount. The finding in the previous section on open-range forecasts that the proportion of such forecasts for which actual EPS fell below the minimum estimates was significantly less than .5 supports this expectation. But, if the selection of disclosure format is related to differences in the probability distributions underlying the forecasts, one would expect the proportion of minimum estimates which exceed actual to be significantly smaller than the proportion of point forecasts which exceed actual. At the same time, if the minimum EPS estimates in open-range forecasts are more conservative than point forecasts as one would expect, the bias component or mean of the open-range forecasts would likely be significantly more positive than that for the point forecasts.

This line of reasoning suggests that comparisons among designated proportions, variances, and means of the relative errors or

differences for forecasts published in different formats may be useful. In particular, such comparisons may be used to examine the extent to which forecast disclosure practices conform to inferences which might be drawn based on disclosure format. Accordingly, several hypotheses were formulated and tested as described in the following paragraphs. All tests were based on the relevant statistics for the reduced samples of independent observations. Because the occurrence of extreme relative differences does not bias the proportion statistics, tests of proportions are based on the independent samples including outliers. But because the extreme values were found to distort the variances and means of the relative differences, tests of those statistics are based on the independent samples excluding outliers. For convenient reference, the relevant statistics reported in the previous sections are summarized in Table 19 on page 111.

Comparative analysis of proportions. Because the proportions of forecasts issued in different formats which are classified as "right" in this thesis are not measured on the same basis, comparisons among such proportions are not meaningful. The comparative analysis of proportions here focuses on proportions of forecasts for which actual EPS fall below the point estimates in point forecasts, minimum estimates in open-range forecasts, and the midpoints or minimum estimates in closed-range forecasts. To determine whether there are significant differences among these proportions for forecasts issued in different formats, the following null hypotheses were tested:

Ho_8: The proportion of open-range forecasts for which actual EPS fall below the minimum EPS estimates is greater than or equal to the proportion of point forecasts for which actual EPS fall below the point estimates.

Ho_9: The proportion of closed-range and point forecasts for which actual EPS fall below the range midpoints and point estimates, respectively, are equal.

Ho_{10}: The proportion of closed-range forecasts for which actual EPS fall below the minimum estimates is greater than or equal to the proportion of point forecasts for which actual EPS fall below the point estimates.

Ho_{11}: The proportion of open-range forecasts for which actual EPS fall below the minimum EPS estimates is greater than or equal to the proportion of closed-range forecasts for which actual EPS fall below the range midpoints.

Ho_{12}: The proportions of closed-range and open-range forecasts for which actual EPS fall below the minimum estimates are equal.

The two independent samples test of proportions was applied for each null hypothesis using the following test statistic:

$$Z = \frac{P_1 - P_2}{\sqrt{\left(\frac{f_1 + f_2}{n_1 + n_2}\right)\left(1 - \frac{f_1 + f_2}{n_1 + n_2}\right)\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

where for each null hypothesis:

P_1 and P_2 = the first and second proportions identified,

f_1 and f_2 = the numbers of forecasts possessing the characteristic of interest in the samples from the first and second populations identified, and

n_1 and n_2 = the size of the samples from the first and second populations identified.

The tests were conducted at the .05 level of significance. The results of the tests are presented in Table 15.

In Table 15 it can be seen that while the minimum estimates in open-range forecasts exceeded actual EPS less often than the point estimates in point forecasts as would be expected (Ho_8), the difference

TABLE 15

RESULTS OF TESTS OF PROPORTIONS USING INDEPENDENT SAMPLES

Null Hypothesis	P_1	P_2	Computed Z	Critical Z	Decision
Ho_8: $p_{open} \geq p_{point}$	.244	.371	-1.496	-1.645	Not rejected
Ho_9: $p_{closed(MID)} = p_{point}$	.505	.371	1.851	±1.96	Not rejected
Ho_{10}: $p_{closed(MIN)} \geq p_{point}$	.385	.371	.197	-1.645	Not rejected
Ho_{11}: $p_{open} \geq p_{closed(MID)}$	.244	.505	-2.903	-1.645	Rejected
Ho_{12}: $p_{open} = p_{closed(MIN)}$	.244	.385	-1.636	±1.96	Not rejected

in proportions was not significant at the .05 level. But the direction of the difference in the same proportions for closed-range and point forecasts was opposite that expected (Ho_{10}) - that is, the minimum estimates in closed-range forecasts exceeded actual EPS more often than did the point forecasts. While the difference is not statistically significant at the .05 level, the implication is that the closed-range minimum estimates are no more conservative than point forecasts and therefore are not very reliable as indicators of "minimum" earnings.

Ho_9 provides a test of the a priori reasoning that point forecasts and the midpoints of closed-range forecasts are equivalent as EPS estimators. Table 15 shows that the two-tailed test was not significant. But further inspection indicates that a one directional test would lead to the conclusion that the midpoints of closed-range forecasts exceed

actual EPS significantly more often than do point forecasts. Thus, the midpoints of closed-range forecasts may be said to be significantly optimistically biased relative to point estimates.

Comparing the open and closed-range proportions, Table 15 shows that as would be expected the minimum estimates in open-range forecasts exceed actual EPS significantly less often than do the closed-range midpoints (Ho_{11}). Also, it may be noted that the minimum estimates in the sample of open-range forecasts tended to be more conservative than the minimum estimates in the sample of closed-range forecasts but the difference was not significant at the .05 level (Ho_{12}).

In summary, based on the above analysis, it can be concluded that the open-range and point forecasts are significantly more conservative than the midpoints of closed-range forecasts like those studied.

Comparative analysis of dispersion. Next, to determine whether there are significant differences among formats in the objectivity or dispersion of the relative error or difference measures, the following null hypotheses were tested:

Ho_{13}: The variances of the relative differences for point and open-range forecasts are equal.

Ho_{14}: The variances of the relative differences for point and closed-range forecasts (based on midpoints) are equal.

Ho_{15}: The variances of the relative differences for point and closed-range forecasts (based on minimum estimates) are equal.

Ho_{16}: The variances of the relative differences of open-range and closed-range forecasts (based on midpoints) are equal.

Ho_{17}: The variances of the relative differences for open-range and closed-range forecasts (based on minimum estimates) are equal.

The significance test used for each hypothesis was the Bartlett-Box F test. The results of the tests are presented in Table 16.[1]

TABLE 16

RESULTS OF TESTS OF VARIANCES USING INDEPENDENT SAMPLES

Null Hypothesis	S_1^2	S_2^2	Bartlett-Box F	Significance Level	Decision
Ho_{13}: σ^2 point = σ^2 open	.024	.013	5.510	.019	Rejected
Ho_{14}: σ^2 point = σ^2 closed(MID)	.024	.026	.199	.656	Not rejected
Ho_{15}: σ^2 point = σ^2 closed(MIN)	.024	.024	.006	.938	Not rejected
Ho_{16}: σ^2 open = σ^2 closed(MID)	.013	.026	6.973	.008	Rejected
Ho_{17}: σ^2 open = σ^2 closed(MIN)	.013	.024	5.632	.018	Rejected

Table 16 reveals significant differences at less than the .05 level in all pairs of variances involving open-range forecasts. Specifically, the variance of the relative differences for open-range forecasts was significantly less than the variance of the relative

[1]The standard F test for equality of variances is known to be sensitive to violations of the assumption of normality. Since non-normality in the populations of relative differences of interest here is suspected, a modified F test known as the Bartlett-Box F test was employed. This test is less sensitive to non-normality. The Bartlett-Box F statistics and significance levels reported in Table 16 were obtained as output of the "Oneway" (analysis of variance) procedure of the "Statistical Package for the Social Sciences." For an explanation of the modified F test, see G. E. P. Box and S. L. Andersen, "Permutation Theory in the Derivation of Robust Criteria and the Study of Departures from Assumption," Journal of the Royal Statistical Society (Series B) 17 (No. 1, 1955):16-22.

differences for point forecasts (Ho_{13}) and less than the variances of both distributions for closed-range forecasts (Ho_{16} and Ho_{17}). There is no significant difference in the variance of the relative differences for point forecasts and the variances for either closed-range distribution (Ho_{14} and Ho_{15}).

A further indication of the comparative dispersion of the relative differences for forecasts issued in different formats can be obtained by comparing the proportions of relative differences for each format which fell within ±10 percent of zero. As reported previously, these proportions were 74, 78, 68, and 59 percent for the point, open-range, closed-range (based on midpoints), and closed-range (based on minimum estimates) relative differences, respectively. Both analyses suggest the open-range forecasts possess greater objectivity.

Comparative analysis of means. Finally, to determine whether there are significant differences among formats in the bias components or means of the relative differences, the following null hypotheses were tested:

Ho_{18}: The mean signed relative difference for open-range forecasts is less than or equal to the mean signed relative difference for point forecasts.

Ho_{19}: The means of the signed relative differences for closed-range forecasts (based on midpoints) and point forecasts are equal.

Ho_{20}: The mean signed relative difference for closed-range forecasts (based on minimum estimates) is less than or equal to the mean signed relative difference for point forecasts.

Ho_{21}: The mean signed relative difference for open-range forecasts is less than or equal to the mean signed difference for closed-range forecasts (based on midpoints).

Ho_{22}: The means of the signed relative differences for

open-range forecasts and closed-range forecasts (based on minimum estimates) are equal.

The two independent samples test of means was applied for each null hypothesis using the following test statistic:

$$Z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

where for each null hypothesis:

$\bar{x}_1$ and $\bar{x}_2$ = the first and second means identified,

S_1^2 and S_2^2 = the variance of the samples from the first and second populations identified, and

n_1 and n_2 = the size of the samples from the first and and second populations identified.[1]

The results of the tests which were based on the independent samples excluding outliers, and which were conducted at the .05 level of significance, are presented in Table 17.

Table 17 reveals that the mean for closed-range forecasts based on midpoints is significantly smaller than the mean for point forecasts (Ho_{19}). This indicates that the range midpoints are significantly optimistically biased relative to the point forecasts. Additionally, Table 17 shows the mean of the closed-range forecasts based on midpoints to be significantly smaller than the mean of the open-range relative differences as would be expected (Ho_{21}). The means of the relative differences for minimum estimates were not significantly different from the mean for point estimates, thus failing to demonstrate any significant

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[1]The arguments presented in footnote 1 on page 83 regarding robustness of the one sample test of means to non-normality also apply to the two independent samples test of means. For each of the hypotheses tested in this section, the sample size for each sample mean was considerably greater than 30.

TABLE 17

RESULTS OF TESTS OF MEANS OF SIGNED RELATIVE DIFFERENCES USING INDEPENDENT SAMPLES

Null Hypothesis	$\bar{x}_1$	$\bar{x}_2$	Computed Z	Critical Z	Decision
Ho_{18}: μ open $\leq$ μ point	.028	.018	.425	1.645	Not rejected
Ho_{19}: μ closed(MID) = μ point	-.039	.018	-2.385	±1.96	Rejected
Ho_{20}: μ closed(MIN) $\leq$ μ point	-.006	.018	-1.026	1.645	Not rejected
Ho_{21}: μ open $\leq$ μ closed(MID)	.028	-.039	2.716	1.645	Rejected
Ho_{22}: μ open = μ closed(MIN)	.028	-.006	1.406	±1.96	Not rejected

conservative bias in the minimum estimates (Ho_{18} and Ho_{20}).

To provide an additional comparison among formats of the magnitude of the relative differences but not of their direction, the absolute means were examined. Hypothesis tests of the differences between pairs of the absolute means provide a method of testing the validity of the inference that point forecasts represent best estimates which generally have a higher probability of occurring than do specified common points in range forecasts such as the minimum estimates in either open or closed-range forecasts or the midpoints of closed-range forecasts. If this inference were valid, one would expect to find larger absolute mean relative differences for the range forecasts than for point forecasts. Thus, hypotheses Ho_{23} through Ho_{27} were formulated similar to Ho_{18} through Ho_{22} except for the substitution of absolute for signed means and changes in the directionality of some of the tests. Null hypotheses Ho_{23} through

Ho_{27} are summarized in Table 18 together with the results of the tests which again were based on the Z test statistic for two independent sample means.[1] No significant differences were found at the .05 level, failing to conform to the a priori reasoning that the selection of disclosure format is related to the degree of uncertainty about the forecast.

TABLE 18

RESULTS OF TESTS OF ABSOLUTE MEANS USING INDEPENDENT SAMPLES

Null Hypothesis	$\bar{x}_1$	$\bar{x}_2$	Computed Z	Critical Z	Decision
Ho_{23}: μ open $\leq$ μ point	.073	.081	-.412	1.645	Not rejected
Ho_{24}: μ closed(MID) $\leq$ μ point	.096	.081	.730	1.645	Not rejected
Ho_{25}: μ closed(MIN) $\leq$ μ point	.100	.081	.998	1.645	Not rejected
Ho_{26}: μ open = μ closed(MID)	.073	.096	-1.135	±1.96	Not rejected
Ho_{27}: μ open = μ closed(MIN)	.073	.100	-1.442	±1.96	Not rejected

Summary of Analysis of Reliability

The foregoing analysis suggests that neither proportions of right versus wrong forecasts nor measures of the bias and objectivity components of the degree of closeness to being right in the form of means and variances are adequate by themselves for assessing the

[1] While the population of absolute relative differences is highly skewed, the sampling distribution of $\bar{x}$ will still be approximately normal for large samples like those used in these tests.

reliability of published forecasts. But a composite of these statistics does provide information about the reliability of past forecasts and the kinds of inferences that can be made about like forecast disclosures. A summary of the key statistics from the preceding analyses is presented in Table 19.

In the separate analyses of format, both the analysis of proportions and the analysis of the means showed the point forecasts to be unbiased. The separate analysis of open-range forecasts found the minimum estimates to be conservatively biased in the sense that significantly less than half of the minimum estimates turned out to be overpredictions and the mean or bias component of the distribution of relative differences was positive and significantly different from zero. However, the proportion and mean statistics for the open-range forecasts were not significantly different from those for the point forecasts, leading to the conclusion that the minimum estimates in open-range forecasts are not significantly more conservative than point forecasts. Therefore, it cannot be inferred that the probability of actual EPS falling below the minimum estimates in open-range forecasts is less than that of actual EPS falling below forecasts issued in point format. The same conclusion applies to the minimum estimates in closed-range forecasts based on the finding that none of the statistics related thereto was significantly different from those for the point forecasts. Nor was there any significant difference found in the degree of conservatism or bias between the minimum estimates in open-range and closed-range formats.

The separate analysis of closed-range forecasts based on midpoints revealed them to be optimistically biased based on the mean of the relative differences which was significantly less than zero.

TABLE 19

SUMMARY OF DESCRIPTIVE STATISTICS BASED ON INDEPENDENT SAMPLES USED IN COMPARATIVE ANALYSIS OF POINT, OPEN-RANGE, AND CLOSED-RANGE FORECASTS

	Samples			
			Closed-Range	
	Point	Open-Range	Midpoint Analysis	Minimum Estimate Analysis
Statistics based on independent samples including outliers:				
Sample size	97	45	91	91
Proportions of forecasts for which actual EPS fell below:				
a) point estimates in point forecasts	.371			
b) minimum estimates in open-range forecasts		.244		
c) midpoints of closed-range forecasts			.505	
d) minimum estimates in closed-range forecasts				.385
Statistics based on independent samples excluding outliers:				
Sample size	93	44	83	83
Variance of signed relative differences	.024	.013	.026	.024
Mean of signed relative differences	.018	.028	-.039	-.006
Mean of absolute relative differences	.081	.073	.096	.100

Moreover, the midpoints were found to be significantly optimistically biased relative to point forecasts and the minimum estimates in open-range forecasts.

In terms of objectivity, each of the separate analyses by format revealed that the absolute values of relative differences ranged from zero to greater than 100 percent. The comparison of variances among formats revealed that the open-range forecasts had a significantly smaller variance than either point forecasts or closed-range forecasts. There was no significant difference in the variance of the point and closed-range forecasts. But comparisons among the absolute mean relative differences revealed no significant differences among forecasts, failing to support the a priori reasoning that the selection of disclosure format is related to the degree of uncertainty about future earnings. Thus, no inference should be drawn about the dispersion in the probability distribution of future earnings underlying a forecast based on the disclosure format. Finally, fairly large proportions, 74, 78, and 68 percent, respectively, of the point estimates, minimum estimates in open-range forecasts, and midpoints of the closed-range forecasts were found to come within ±10 percent of actual EPS.

This concludes the analysis of the reliability of management forecasts of earnings per share published in point, open-range, and closed-range formats. The remainder of this chapter reports on the investigation of the association between designated independent variables and selected management forecast disclosure practice variables.

ANALYSIS OF ASSOCIATION BETWEEN INDEPENDENT VARIABLES AND SELECTED MANAGEMENT FORECAST DISCLOSURE PRACTICES

While the research reported in the first part of this chapter represents a refinement and extension of prior empirical research on the reliability of published earnings forecasts, the research reported in the remainder of this chapter is exploratory in nature, dealing with an issue not examined in prior empirical studies. Specifically, this exploratory research addresses the third research question posed in Chapter III - what variables are associated with management forecast disclosure practices?

The variables examined in this part of the study were:

Dependent (Disclosure Practice) Variables:

1. Decision to disclosure or not disclose:
   a. An initial forecast.
   b. A revised forecast.
2. Format (point, open-range, or closed-range) of a forecast.
3. Timing of a forecast disclosure:
   a. Horizon - measured as the number of days between the issuance of a forecast and the end of the forecasted period.
   b. Time lapse between the issuance of an initial forecast and a subsequent revision measured in days.

Independent Variables:

1. Accuracy of a firm's prior forecast:
   a. Accuracy of prior year forecast classified as accurate or inaccurate.
   b. Accuracy of initial forecast for year classified as overprediction or underprediction.
2. Horizon of a forecast (measured as described above).
3. Actual earnings trends:
   a. Change in actual EPS for year n relative to year n-1.
   b. Change in actual EPS growth rate for year n relative to year n-1.
4. Forecasted earnings trends:
   a. Change in forecasted EPS for year n relative to actual EPS for year n-1.
   b. Change in implicit forecasted EPS growth rate for year n relative to actual EPS growth rate for year n-1.

5. Issuance of a revised forecast disclosure classified as upward or downward.

Specific relationships examined were the association between:

1. Prior year forecast accuracy and current year disclosure format.
2. Horizon and disclosure format.
3. Actual earnings trend and the decision to disclose or not disclose a forecast.
4. Forecasted earnings trend and the horizon of a forecast disclosure.
5. Direction of error in initial forecast and decision to disclosure or not disclose a revision.
6. Direction of revision and timing of revision.

Relationships three through six listed above deal with an examination of the existence and timing of initial and revised forecast disclosures to determine whether favorable and unfavorable earnings expectations are given comparable treatment.

In addition to providing users with information about the possible motives behind management forecast disclosure practices, the analysis of association between the designated independent variables and disclosure practice variables should be helpful in evaluating the need for, and desirability of, specific proposals for the regulation of forecast disclosures. For example, evidence that managements tend to disseminate favorable expectations on a timely basis but to suppress unfavorable expectations would lend support to proposals that managements be required to issue revisions on a timely basis and/or disclose reasons for withdrawing a forecast or withdrawing from the forecast disclosure system altogether.

The analyses reported in the following sections are based on the disclosure practices of the 233 firms represented in the data base used in the analysis of reliability, or subsamples thereof, as explained in each section. A limitation which should be acknowledged at the outset

is that certain analyses utilize the classification of a firm as not having issued a forecast when no forecast by the firm was included in the data base for a given year. In some cases, conceivably the firm could have issued a forecast through a medium other than the Wall Street Journal or in a form which in some other way failed to meet the selection criteria for inclusion of a forecast in this study. This limitation is mitigated, however, by two factors. First, the Wall Street Journal undoubtedly has been, and continues to be, the major communication channel for the wide dissemination of management earnings forecasts. Second, forecasts not meeting the other selection criteria for this study may be ambiguous or lack comparability with those forecasts meeting the selection criteria.

Association Between Prior Forecast Accuracy and Current Disclosure

The purpose of this analysis was to determine whether the accuracy of a firm's prior forecast disclosure has any effect on (1) its decision to issue or not issue a forecast in the current period or (2) the format of a current forecast if issued.

The sample for the analysis of association between prior accuracy and the decision to issue or not issue a forecast consisted of 180 firms for which one or more forecasts issued during the first three years of the four-year study period were included in the data base. For firms represented by more than one forecast during the three years, the year included (year n-1) was randomly selected. The initial forecast was used whenever more than one forecast occurred for the selected year. For each of these firms, the format of the first forecast included in the data base in the following (current) year (year n), if any, was

then determined.

The contingency table shown in Figure 7 was then constructed by classifying each firm by the accuracy of its forecast for year n-1 and the presence or absence in the data base of a forecast by the firm for year n. A dichotomous measure of accuracy was used, year n-1 forecasts not meeting the following criteria for "accurate" being classified as "inaccurate":

Format of Forecast For Year n	Accurate when
Point	$-.10 \leq$ Relative Difference $\leq .10$
Open-range	Relative Difference ≥ 0
Closed-range	Minimum estimate $\leq$ Actual EPS $\leq$ Maximum estimate

The 10 percent criterion for point forecasts is arbitrary, but a level frequently cited in the literature as representing a reasonable tolerance for error.[1] The criteria for open and closed-range forecasts are based on literal evaluations of the forecasts.

	Year n		
Year n-1	Forecast	No Forecast	Total
Accurate	27	74	101
Inaccurate	18	61	79
Total	45	135	180

Figure 7. Contingency Table Showing Relationship Between Accuracy of Forecast for Year n-1 and Existence of Forecast for Year n.

[1]For example, the SEC's April 1975 proposals on forecasts adopted a 10 percent criterion for reasonable error.

To determine whether the variables represented in the contingency table in Figure 7 are independent, the X^2 test of independence was used to test the following null hypothesis:

Ho_{28}: There is no association between the accuracy of a firm's forecast for year n-1 and its decision to issue or not issue a forecast in year n.

The test statistic used was:

$$X^2 = \sum_{j=1}^{J} \sum_{k=1}^{K} \frac{(f_{ojk} - f_{ejk})^2}{f_{ejk}}$$

where:

f_{ojk} = the number of observations in the (jk)th cell of the contingency table,

f_{ejk} = the expected number of observations in the (jk)th cell of the contingency table based on the sample marginal proportions.

The computed X^2 for the contingency table was .481 which is not significant at the .05 level (critical X^2 with one degree of freedom = 3.841). Thus, the null hypothesis of no association between forecast accuracy in year n-1 and the decision to issue or not issue a forecast in year n was not rejected. It may be noted that Figure 7 shows that the majority of firms were not represented in the data base in year n regardless of the accuracy of their forecasts in year n-1.

A further analysis was made to determine whether for firms issuing forecasts in two consecutive years there is any association between forecast accuracy in year n-1 and the forecast format used in year n. The sample for this analysis consisted of one pair of forecasts for each of the 50 firms in the data base for which there were forecasts for two consecutive years. For firms with more than one pair of consecutive forecasts in the data base, one pair was randomly

selected for inclusion in this sample.[1]

Each firm was classified by the accuracy of its forecast for the first year (year n-1) using the same criteria used in the preceding analysis. Each firm was also classified by the format (point or range) of its forecast for year n. The range category includes both open and closed-range formats. The resulting contingency table is shown in Figure 8.

	Year n Format		
Year n-1	Point	Range	Total
Accurate	14	13	27
Inaccurate	5	18	23
Total	19	31	50

Figure 8. Contingency Table Showing Relationship Between Accuracy of Forecast for Year n-1 and Forecast Format Used in Year n.

To determine whether the variables represented in the contingency table in Figure 8 are independent, the X^2 test of independence was used to test the following null hypothesis:

Ho_{29}: There is no association between the accuracy of a firm's forecast for year n-1 and the format of its forecast for year n.

The computed X^2 for the contingency table was 5.461 which is significant at the .05 level (critical X^2 with one degree of freedom = 3.841).

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[1]As shown in Figure 7, the sample of 180 firms used in the analysis of prior accuracy and the decision to issue or not issue a forecast included 45 firms issuing forecasts in both years n-1 and n. The five additional firms in the present sample were among the 180 firms in the previous sample. But the pairs of consecutive forecasts for these firms did not commence with the randomly selected base year included in the previous sample.

Therefore, Ho_{29} was rejected. Inspection of the contingency table reveals the nature of the relationship. Firms with forecasts classified as inaccurate for year n-1 used one of the range formats in year n significantly more often, relative to the use of the point format, than did firms with forecasts for year n-1 that were classified as accurate. This is in accord with what one would expect.

Association Between Horizon and Disclosure Format

Since point forecasts may be perceived by some users as more precise or more certain than range forecasts, it might be hypothesized that forecasts with shorter horizons and therefore presumably less uncertainty would more often be disclosed in point format, while forecasts with longer horizons would more often be disclosed in either open or closed-range format. To examine this relationship, the point-biserial correlation coefficient which is used to measure the association between one nominal-dichotomous variable and one ratio variable was computed.[1] Format was treated as the nominal-dichotomous variable with value 0 for point format and value 1 for range format. No distinction was made between open and closed-range format (for which it happens a supplementary analysis showed the mean horizons to be equal at 141 days). Horizon, defined as the number of days between the issuance of a forecast and the end of the forecasted period, was treated as the ratio variable. The following null hypothesis about the correlation coefficient was then tested:

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[1]For an explanation of the point-biserial correlation coefficient and a related significance test, see Gene V. Glass and Julian C. Stanley, Statistical Methods in Education and Psychology (Englewood Cliffs: Prentice-Hall, Inc., 1970), pp. 163-5, 318.

Ho_{30}: The population point-biserial correlation coefficient for the relationship between horizon and format is less than or equal to zero.

The formula used to compute the point-biserial correlation coefficient was:

$$r_{pb} = \frac{\bar{X}_1 - \bar{X}_o}{S_x} \cdot \sqrt{\frac{n_1 n_o}{n(n-1)}}$$

where:

$\bar{X}_1$ = the mean horizon of those forecasts in range format,

$\bar{X}_o$ = the mean horizon of those forecasts in point format,

S_x = the standard deviation of all n horizons,

n_1 = the number of range forecasts,

n_o = the number of point forecasts, and

$n = n_1 + n_o$.

As is evident from the formula, r_{pb} is a measure of the difference between the average horizons for the range and point forecasts. The coefficient can assume values of from -1 to +1, the extremes representing a large difference between means and a value of zero representing no difference. Ho_{30} was then tested by computing the following test statistic for the computed value of r_{pb}:

$$t = \frac{r_{pb}}{\sqrt{(1 - r_{pb}^2)/(n-2)}}$$

If r_{pb} is zero in the population sampled, then t is approximately distributed as Student's t-distribution with n-2 degrees of freedom. Note that a one-tailed test of r_{pb} is closely equivalent to testing the null hypothesis that in the population, the mean horizon for range forecasts is less than or equal to the mean horizon for point forecasts.

The point-biserial correlation coefficient was computed for the sample of 233 independent forecasts used in the analysis of reliability, 97 of those being in point format and 136 in range format (45 in open-range format plus 91 in closed-range format). The mean horizons of the point and range forecasts were 146 and 141 days, respectively. The computed value of r_{pb} was -.023 indicating virtually no association between horizon and format in the sample forecasts. As would be expected given the small difference between the sample mean horizons, the null hypothesis about r_{pb} was not rejected (computed t = -.350; critical t (±.975 t with 231 degrees of freedom = 1.98 (approximately))). It may be noted, that in the sample forecasts, the mean horizon for point forecasts was actually slightly (not significantly) larger than the mean horizon for range forecasts.

Association Between Actual Earnings Trend and Current Disclosure

One might hypothesize that management would be more reluctant to issue forecasts when they expect their firms' economic performance to decline than when it is expected to rise. To examine this relationship, the earnings performance for each firm for year n in a sample of firms which issued forecasts in two consecutive years (years n-1 and n) was determined. The earnings performance of these firms was then compared to the earnings performance of a sample of firms for which no forecasts were included in the data base for years n but for which forecasts were included for the prior years (years n-1).

Actual earnings performance in year n was used as a surrogate for management's expectations for year n for both groups of firms. This was done to avoid any bias that might result from using the

forecasts for year n to represent the expectations of one group while using actual earnings in year n to represent the expectations of the other group. The objective was to determine whether there is an association between the favorable or unfavorable character of a firm's earnings expectations and the issuance of a forecast. If the firms for which no forecast was included for year n were found to have a significantly larger frequency of unfavorable earnings trends than the firms for which forecasts were included in the data base for year n, an association, though not causality, would be demonstrated. The requirement that each firm had issued a forecast for year n-1 addresses the examination to factors associated with the decision to withdraw from the forecast disclosure system once having entered it.

Two measures of a firm's actual earnings trend for year n were used as surrogates for the firm's expectations for that year. The first was the change in the firm's actual EPS in year n relative to year n-1. The second was the change in the firm's actual EPS growth rate for year n relative to year n-1. This second variable is based on the idea that management might still be reluctant to disclose a forecast of increasing EPS if the rate of growth is less than that expected by the market based on past performance. Earnings per share for years n-1 and n-2 were restated on the basis of common equivalent shares outstanding at the end of year n prior to making the trend analysis. Both trend variables were converted to dichotomous measures classifying trend as favorable or unfavorable based on the direction of the change. This eliminates the problem of non-meaningful percentages which result when the signs of the earnings variables change.

The sample for this analysis consisted of all firms (50) with

forecasts for two consecutive years in the data base (repeating firms) and a matching randomly selected sample of 50 firms for which forecasts were included in the data base for year n-1 but not year n (withdrawing firms). One pair of forecasts was randomly selected for firms with more than one set of two consecutive forecasts in the data base. Two contingency tables were then constructed based on the classification of each firm by the favorable versus unfavorable status of each of the two surrogate earnings expectation variables for year n, and the firm's status as a repeat forecaster or withdrawer in year n. These tables are shown in Figures 9 and 10.

Forecast Status in Year n	Trend in Actual EPS in Year n		Total
	Favorable	Unfavorable	
Repeater	39	11	50
Withdrawer	33	17	50
Total	72	28	100

Figure 9. Contingency Table Showing Relationship Between Forecast Status and Trend in Actual EPS.

Forecast Status in Year n	Trend in Actual EPS Growth Rate in Year n		Total
	Favorable	Unfavorable	
Repeater	23	27	50
Withdrawer	19	31	50
Total	42	58	100

Figure 10. Contingency Table Showing Relationship Between Forecast Status and Trend in Actual EPS Growth Rate.

To determine whether the variables represented in the contingency tables are independent, the X^2 test of independence was used to test the following null hypotheses:

Ho_{31}: There is no association between a firm's forecast status in year n (repeat forecaster versus withdrawer) and the trend in its actual EPS in year n.

Ho_{32}: There is no association between a firm's forecast status in year n (repeat forecaster versus withdrawer) and the trend in its actual EPS growth rate in year n.

The results of the tests are summarized in Table 20.

TABLE 20

RESULTS OF TESTS OF ASSOCIATION BETWEEN EARNINGS TREND AND CURRENT DISCLOSURE

Null Hypothesis	Corrected Chi-square	Significance Level	Decision
Ho_{31}	1.24	.266	Not rejected
Ho_{32}	.37	.543	Not rejected

The frequency of withdrawer firms which experienced unfavorable earnings trends in year n on both trend variables was larger than the corresponding frequencies for repeater firms as can be seen in Figures 9 and 10. But Table 20 shows that the differences in frequencies were not significant in either table at the .05 level. Thus, the null hypotheses of no association were not rejected.

The sample data did not support the hypothesis that unfavorable earnings trends are associated with firms' decisions to withdraw from the forecast disclosure system. Alternatively, it might be hypothesized that, while not leading to the complete suppression of forecast disclosures,

unfavorable expectations might be delayed or published on a less timely basis than favorable expectations. This reasoning led to the analysis reported in the next section.

Association Between Forecasted EPS Trend and Horizon of Initial Forecasts

The sample of 50 firms used in the preceding analysis for which forecasts were included in the data base for two consecutive years was also used in the analysis reported in this section. For each of the sample firms, the horizon of the initial forecast issued by the firm in year n (the second consecutive year for which a forecast for the firm was included in the data base) was correlated with two earnings expectations trend variables.

For this analysis, actual rather than surrogate earnings expectations were available. The first variable was the forecasted change in EPS for year n relative to year n-1. The second variable was the implicit forecasted EPS growth rate for year n relative to year n-1. Forecasted EPS for year n and actual EPS for years n-1 and n-2 were restated on the basis of common equivalent shares outstanding at the end of year n. Both of the continuous earnings expectations trend variables were converted to dichotomous measures with the categories favorable and unfavorable representing the direction of change in the forecasted variable relative to the prior year.

To examine the relationship between the forecasted EPS trend variables and the horizon of initial forecasts, biserial correlation coefficients which were used to measure association between one dichotomous measure with an underlying normal distribution (the forecasted EPS variables) and one ratio measure (horizon) were computed.

The computational formula used for the biserial correlation coefficients was:

$$r_{bis} = \frac{\bar{X}_1 - \bar{X}_0}{S_x} \cdot \frac{n_1 n_0}{un\sqrt{n^2-n}}$$

where:

$\bar{X}_1$ and $\bar{X}_0$ = the mean horizons of initial forecasts classified as favorable and unfavorable, respectively,

s_x = the standard deviation of all n horizons,

n_1 and n_0 = the numbers of initial forecasts classified as favorable and unfavorable, respectively,

$n = n_1 + n_0$, and

u = the ordinate of the unit normal distribution at the point above which lies $100(n_1/n)$ percent of the area under the curve.

The biserial correlation coefficients were then tested for significance to provide a test of the following null hypotheses:

Ho_{33}: The population biserial correlation coefficient for the relationship between horizon and forecasted trend in EPS is equal to zero.

Ho_{34}: The population biserial correlation coefficient for the relationship between horizon and forecasted trend in the EPS growth rate is equal to zero.

The test statistic used was:

$$Z = \frac{r_{bis}}{\sigma r_{bis}}$$

which, if the population value of r_{bis} is zero, is approximately normally distributed with mean 0 and standard deviation 1. The results of this analysis are summarized in Table 21 which shows that there was no significant association between either forecasted EPS trend variable and the horizon of initial forecasts.

TABLE 21

RESULTS OF TESTS OF ASSOCIATION BETWEEN FORECASTED EARNINGS TREND AND HORIZON OF INITIAL FORECASTS

Null Hypothesis	$\bar{X}_1$	$\bar{X}_0$	r_{bis}	Computed Z	Critical Z	Decision
$Ho_{33}: r_{bis} = 0$	187	175	.046	.202	±1.96	Not rejected
$Ho_{34}: r_{bis} = 0$	155	215	-.279	-1.577	±1.96	Not rejected

Association Between Direction of Error in Initial Forecast and Disclosure of Revision

Further insight into managements' forecast disclosure practices can be obtained by studying past practices with respect to the issuance of revisions. A question of interest is whether comparable treatment is given to favorable versus unfavorable changes in expectations. This section reports the results of an examination into the frequency with which upward (favorable) versus downward (unfavorable) revisions occur compared to the relative frequencies with which we would expect them to occur. The next section reports the results of an investigation into the comparability of the timeliness of the issuance of upward and downward revisions.

The analysis of the frequency of revisions is based on the notion that if comparable treatment is afforded both upward and downward revisions, the proportion of upward revisions to all revisions and the proportion of downward revisions to all revisions should correspond to the proportions of underpredictions and overpredictions, respectively, in the population of initial forecasts. To determine whether the disclosure practices of the firms represented by revisions in the data base

conform to this expectation, a sample was compiled consisting of one set of initial and revised forecasts for each firm which issued a revision. If the data base included multiple revisions for a given firm, the first revision and associated initial forecast for a year randomly selected from among those in which the firm issued revisions was included in the sample. This resulted in a sample of 32 sets of initial and revised forecasts.

Each revision was then classified as either upward or downward based on the criteria displayed in Table 22. The minimum estimates in open-range and closed-range forecasts and the point estimates in point forecasts were treated as common reference points based on the finding in the analysis of reliability that there is no significant difference among formats in the bias or degree of conservatism reflected in these estimates. Format combinations not represented in the table did not occur in the sample. Based on these criteria, 16 of the 32 revisions were classified as downward and 16 as upward.

TABLE 22

CRITERIA FOR CLASSIFYING REVISIONS AS DOWNWARD OR UPWARD

Initial Forecast (F_1)	Revised Forecast (F_2)					
			Minimum Estimates			
	Point		Open-range		Closed-range	
	Upward	Downward	Upward	Downward	Upward	Downward
Point	$F_2>F_1$	$F_2<F_1$	$F_2\geq F_1$		$F_2\geq F_1$	$F_2<F_1$
Open-range	$F_2>F_1$	$F_2\leq F_1$		$F_2<F_1$		$F_2<F_1$
Closed-range	$F_2>F_1$	$F_2<F_1$			$F_2>F_1$	$F_2<F_1$

Next, to determine the expected frequency of revisions, a sample was compiled consisting of one randomly selected initial forecast for each of the 233 firms represented in the data base. The proportions of total inexact initial forecasts which turned out to be overpredictions and underpredictions were then determined. These proportions were 45 and 55 percent, respectively. The total number of revisions in the sample was then multiplied by these proportions to get the expected frequencies of downward and upward revisions, respectively, of 14 and 18.

To determine whether the observed frequencies of downward and upward revisions are significantly different from the expected frequencies, the chi-square goodness of fit test was then applied to the data summarized in Table 23, providing a test of the following null hypothesis:

Ho_{35}: The frequency of occurrence of downward and upward revisions is proportional to the occurrence of overpredictions and underpredictions, respectively, in the population of initial forecasts.

The computed value of the chi-square statistic was .5079 which is not significant at the .05 level. Thus, the null hypothesis was not rejected and it was concluded, based on the use of the direction of errors in the initial forecasts as a surrogate for the direction of changes in expectations, that firms have disclosed unfavorable changes in expectations proportionately as often as favorable changes.

TABLE 23

OBSERVED AND EXPECTED FREQUENCIES OF DOWNWARD AND UPWARD REVISIONS

Direction of Revision	Observed	Expected
Downward	16	14
Upward	16	18
Total	32	32

Association Between Direction of Revision and Timing of Revision

While not determining the decision to disclose or not disclose a revision, the favorable or unfavorable character of a change in expectations might be related to the timing of the issuance of a revision. Specifically, one might hypothesize that downward revisions are issued on a less timely basis than upward revisions.

To examine this relationship the time lapse measured in days between the issuance of initial and revised forecasts was computed for each set of forecasts in the sample used in the analysis of frequency of occurrence of revisions reported in the previous section. This timing variable was then correlated with a variable representing the classification of the revision as upward or downward. The biserial correlation coefficient was calculated with time lapse designated as the ratio variable and direction of revision designated the dichotomous measure with an underlying normal distribution. The computed value of r_{bis} was then tested for significance to provide a test of the following null hypothesis:

Ho_{36}: The population biserial correlation coefficient for the relationship between the time lapse between the issuance of initial and revised forecasts and the direction of the revision is equal to zero.

The mean time lapses between the issuance of the initial and revised forecasts were 161 days for the 16 downward revisions in the sample and 155 days for the 16 upward revisions. It may be noted that the difference in means for the sample firms was in the expected direction, but the computed r_{bis} value was only .0344 indicating virtually no association. As would be expected given the small difference in means, the computed r_{bis} is not significant at the .05 level (computed Z = .155; critical .025Z = ±1.96). It was concluded that there is no association between the direction of a revision and the time lapse following the issuance of the initial forecast.

Summary of Association Analyses

The second part of this chapter has reported the results of exploratory research into the association between designated independent variables and disclosure practice variables. The purpose of this research was to obtain some evidence from the study of past unregulated management forecast disclosures bearing on possible motivations for the disclosure practices used, and on the need for regulating disclosure practices.

A summary of the hypotheses tested about the disclosure practice and independent variables is presented in Table 24. No significant difference was found in firms' decisions to disclose or not disclose forecasts based on the accuracy of the firms' forecasts for the prior year. But firms issuing forecasts in two consecutive years tended to use a range format in the second year if the prior year's forecast was

TABLE 24

SUMMARY OF HYPOTHESIS TESTS OF ASSOCIATIONS
BETWEEN INDEPENDENT VARIABLES AND
DISCLOSURE PRACTICE VARIABLES

	Null Hypothesis	Decision
Ho_{28}:	There is no association between the accuracy of a firm's forecast for year n-1 and its decision to issue or not issue a forecast for year n.	Not rejected
Ho_{29}:	There is no association between the accuracy of a firm's forecast for year n-1 and the format of its forecast for year n.	Rejected
Ho_{30}:	The population point-biserial correlation coefficient for the relationship between horizon and format is less than or equal to zero.	Not rejected
Ho_{31}:	There is no association between a firm's forecast status in year n (repeat forecaster versus withdrawer) and the trend in its actual EPS in year n.	Not rejected
Ho_{32}:	There is no association between a firm's forecast status in year n (repeat forecaster versus withdrawer) and the trend in its actual EPS growth rate in year n.	Not rejected
Ho_{33}:	The population biserial correlation coefficient for the relationship between horizon and forecasted trend in EPS is equal to zero.	Not rejected
Ho_{34}:	The population biserial correlation coefficient for the relationship between horizon and forecasted EPS growth rate is equal to zero.	Not rejected
Ho_{35}:	The frequency of occurrence of downward and upward revisions is proportional to the occurrence of overpredictions and underpredictions, respectively, in the population of initial forecasts.	Not rejected
Ho_{36}:	The population biserial correlation coefficient for the relationship between the time lapse between the issuance of initial and revised forecasts and the direction of the revision is equal to zero.	Not rejected

judged inaccurate. Nor was there any significant association found between the horizon of a forecast and its format. Based on the general presumption that horizon and uncertainty are directly related, this finding is consistent with the inference drawn in the preceding analysis of reliability. Based on the absence of significant differences in the absolute means of the relative differences for forecasts issued in each format, the inference drawn was that selection of format does not appear to be related to dispersion in the probability distributions underlying forecasts.

Six hypotheses about association between the favorable versus unfavorable nature of a firm's earnings expectations and disclosure practices were tested. No significant associations were found between the earnings expectations variables and the decision to disclose or not disclose initial or revised forecasts or the horizons of initial or revised forecasts. Based on these tests it appears that unfavorable changes in expectations are treated comparably with favorable changes in expectations.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Forecast Disclosure - Developments, and Issues Examined in this Thesis

The challenge of reporting forecasts of future economic performance has been before the accounting profession for well over a decade. The basis for the challenge lies in the role of accounting as a service activity, the function of which is to provide information for economic decision making, and the primary relevance to economic decision making of expectational data. Particular emphasis has been placed on earnings expectations as inputs for decision models developed in the discipline of finance for fundamental financial analysis for investment decision making purposes. Recognition of these relationships pervades recent statements of accounting fundamentals by both the academic and practicing arms of the profession, including A Statement of Basic Accounting Theory, APB Statement No. 4, and Objectives of Financial Statements.

A further major impetus for the thorough study of issues surrounding the disclosure of corporate management earnings forecasts was provided by a statement issued by the SEC in February 1973. In that statement the SEC revealed its decision to abandon its long standing prohibition against the inclusion of earnings forecasts in Commission filings and announced that specific proposals for integrating forecasts

into the formal financial reporting framework would be forthcoming. In the interim between the SEC's February 1973 statement and the release of its specific proposals on forecast disclosure in April 1975, efforts on the part of various groups to resolve some of the issues related to forecasting resulted in the publication of several documents and studies. Among those were Guidelines for Systems for the Preparation of Financial Forecasts and "Statement of Position on Presentation and Disclosure of Financial Forecasts," both by the AICPA. Also published were reports on major research studies by the Financial Analysts Federation, the Financial Executives Research Foundation, and several individual researchers.

Yet in spite of all these and previous efforts, both the AICPA and the SEC continue to hold positions neither encouraging nor discouraging the disclosure of forecasts. Actions taken by both bodies to date are seemingly based on recognition of the fact that forecasts are being prepared and disseminated rather than upon convictions as to the desirability of disclosing forecasts. Moreover, in April 1976, citing important unresolved legal, disclosure policy, and technical issues as reasons, the SEC withdrew all of the April 1975 proposals except one. The withdrawn proposals would have mandated filing forecast disclosures with the SEC if they were disclosed anywhere else. The one proposal not withdrawn was the proposed amendment eliminating the Commission's former prohibition against forecasts. That proposed amendment was adopted in April 1976. At the same time the Commission announced a new proposal to issue a general guide allowing considerable flexibility in the voluntary disclosure of forecasts in SEC filings. In taking this action, the SEC specifically acknowledged the continued

diversity of views as to the reliability of forecasts. The Commission also expressed concern about companies meeting their responsibility to make full and prompt disclosure of material facts, both favorable and unfavorable, including situations where management knows its previously disclosed forecasts no longer have a reasonable basis.

In recognition of the insufficient data available as a basis for formulating policy on forecast disclosure, the research reported in this thesis addressed three research questions:

1. With what frequency are corporate managements making earnings forecast disclosures in point, open-range, and closed-range format?

2. How reliable are the earnings forecast disclosures made in each of these formats?

3. What variables are associated with management forecast disclosure practices, including the decision to disclose or not disclose a forecast, and the format and timing of disclosures made?

Empirical data about past unregulated voluntary forecast disclosures bearing on these three questions should be helpful in evaluating the need for, or desirability of, prohibiting or mandating forecast disclosures or regulating further voluntary disclosures. For example, data showing that past disclosures in a given format have been frequent should demonstrate a need for greater concern over the appropriateness of such disclosures than if they occurred only infrequently. Regarding reliability, data showing that the majority of past forecasts deviated from actual earnings by large percentages would mitigate against mandating such disclosures. On the other hand, data indicating that a large proportion of past forecasts have been reliable, but that a significant number have not, could be used to support proposals to regulate further disclosures in ways designed to inhibit the issuance of less reliable

forecasts. As another example, data showing that firms have generally failed to comparably disclose unfavorable and favorable expectations could be used to support arguments that regulation of such disclosures is needed.

The data base for this study consisted of forecasts appearing in the Wall Street Journal during the four year period 1969 through 1972 issued by firms included on the Primary Industrial File of the Compustat annual data tapes. To be included in the data base, a forecast must have been an unqualified forecast of earnings for an annual period ending during the study period, and expressed in terms of dollar earnings per share in point, open-range (minimum estimates stated), or closed-range format. Further, the forecast must have been issued prior to the end of the forecasted period but with a maximum horizon not exceeding eighteen months. Forecasts expressed in terms of percentage change from prior year results, or as goals, targets, or budgets were specifically excluded.

The nature of the data examined and the methodology employed in the investigation related to the frequency and reliability of past disclosures in different formats represents an extension and refinement of prior research in these areas. The investigation of the association between selected independent variables and disclosure practice variables was exploratory in nature. Summaries of the research approach and findings together with conclusions and policy recommendations related to each of the three research questions are presented in the following three sections. Recommendations for further research are presented in the final section of this chapter.

Frequency of Forecasts Issued in Point, Open-range, and Closed-range Formats

Summary. A total of 383 qualifying management forecasts comprised the data base for this study. Of those, 163 were in point format, 70 in open-range format, and 150 in closed-range format. Thus, the closed-range format was used nearly as often as the point format, and the number of forecasts issued in the combined range formats exceeded the number issued in point format.

Two-hundred thirty three firms were represented in the data base, or slightly over 25 percent of the firms on the Compustat Primary Industrial File. The data base included forecasts in all four years for only two of those firms, in three years for 18 firms, in two years for 52 firms, and in one year for 161 firms. Firms disclosing a forecast in one year often did not continue to do so in subsequent years. Thirty-seven of the firms issued one or more revisions during the study period. Firms with multiple forecast disclosures did not always use the same format.

Relating the frequency of forecasts to individual years in the study period, the level of activity was higher in the latest year studied than in the earliest year studied. And while the data are too limited to be conclusive, there is some indication that the level of forecast disclosure activity was sensitive to general economic conditions as represented by annual changes in the level of aggregate corporate profits.

It should be noted that even the 383 forecasts meeting the selection criteria for this study were characterized by varying levels of ambiguity. Only a small minority of the forecasts specified

whether the EPS computation was based on earnings before or after extraordinary items, or whether simple, primary, or fully diluted EPS was being forecasted. The majority of forecasts were expressed simply as "earnings for fiscal 19X are expected to be $Y per share."

Thus, it is necessary for the user to make an assumption as to the EPS figure being forecasted. For purposes of this study, unless otherwise specified, a forecast was assumed to be of primary earnings per share after extraordinary items. The rationale for this approach was that firms would be unlikely to issue a forecast of fully diluted earnings per share without so describing it. And if some firms were forecasting simple EPS, if there were any dilutive common stock equivalents, the reported earnings subsequently available to the user for comparison with the forecast would be primary, not simple, EPS. The assumption that earnings were after extraordinary items unless otherwise specified was based on the rationale that failure to specify expected or known extraordinary components is misleading and ought to be considered in assessing the reliability of forecasts as should the impact of unexpected or unknown extraordinary components. The necessity of making these assumptions must be acknowledged as a limitation of any empirical study based on large samples of past forecast disclosures.

Numerous additional forecasts were observed in the Wall Street Journal during the study period which failed to meet the selection criteria for inclusion in this study due to additional and more serious ambiguities. For example, for multi-division companies it was sometimes not clear whether a forecast applied to consolidated or division results. In other cases the period being forecasted was unclear. Many forecasts were expressed in terms of percentage change from prior

year's "earnings" without specifying whether the percentage change applied to aggregate or per share earnings.

Conclusions and recommendations. The conclusions and recommendations in this section are based on the frequency analysis of forecasts in point, open-range, and closed-range formats included in the data base and on observations made in the process of collecting the data. The finding that qualifying forecasts of earnings per share for over 25 percent of the 900 firms of greatest investor interest were disclosed through the Wall Street Journal during the study period suggests that such disclosures are indeed being made with even greater frequency than might be inferred from prior studies. An unknown additional number of firms on the Compustat Primary File disclosed forecasts not meeting the selection criteria for this study. The frequency with which forecasts are being disclosed in various formats, and the fact that forecasts are undoubtedly the most significant financial information not now regulated, suggests the importance of making a thorough study as a basis for formulating policy on such disclosures.

The observation that numerous past forecast disclosures have been characterized by varying levels of ambiguity raises questions as to their usefulness and the possibility of their being misleading or misinterpreted. A type of ambiguity characteristic of many disclosures was failure to specify the precise earnings variable being forecasted. Based on this finding, it is recommended that if forecasts are to be issued, whether voluntarily or by mandate, consideration be given to requiring the issuer to specify precisely the variable being forecasted (e.g., primary EPS excluding extraordinary items). To facilitate comparison of forecasted and actual results, it also seems reasonable

to require that the variable forecasted be one for which the actual result will subsequently be published in the financial statements in accordance with APB Opinion No. 15. Neither the AICPA's "Statement of Position on Presentation and Disclosure of Financial Forecasts" nor the SEC's latest proposed guides on forecast disclosure are specific on this point.

Other observations from this part of the study were: (1) firms once having entered the voluntary disclosure system often switched among formats or ceased issuing forecasts; (2) the frequency of revised forecast disclosures was relatively low. These observations add weight to the argument for further study of past disclosures and the need for formulating policy. The research summarized in the next two sections which was aimed at answering the second and third research questions addressed in this thesis is a step in that direction.

Analysis of Reliability

Summary. The reliability of forecasts included in the data base for this study was analyzed in two ways. First, various proportions of forecasts were computed, including the proportions of right forecasts and over and underpredictions. Second, the degree of closeness to being right was measured as the difference between actual and forecasted EPS expressed as a percentage of actual EPS. The point estimates and minimum estimates of point and open-range forecasts, respectively, were substituted for forecasted EPS in computing the relative (percentage) differences. A dual analysis of closed-range forecasts was performed, substituting first the midpoints and then the minumum estimates of the closed-range forecasts in the relative difference

formula.

Both types of reliability measures were used to assess the objectivity and bias of forecasts issued in point, open-range, and closed-range formats. Objectivity was assessed in terms of the proportions of forecasts falling within stated percentage intervals above or below actual EPS, and in terms of the variances of the frequency distributions of relative differences for forecasts issued in different formats. Bias, or tendency toward conservation or optimism, was assessed by examining the relative proportions of over and underpredictions, and by examining the sign and magnitude of the means of the frequency distributions of relative differences. Separate analyses of objectivity and bias by format, and a comparative analysis among formats, were carried out.

Descriptive statistics based on all forecasts in the data base in each format were computed. Additionally, statistics based on reduced samples limited to one randomly selected forecast per firm were computed for use in significance tests. The significance tests were based on viewing the forecasts studied as a sample from a hypothetical population of forecasts which might be issued by the same or like firms. These significance tests were used to test hypotheses about bias in forecasts issued in each format and about differences in the objectivity and bias of forecasts issued in different formats. Based on the results of these tests, inferences were drawn about the relative reliability of forecasts issued in different formats.

The analysis of the 163 point forecasts in the data base revealed that 34, 10, and 56 percent of the forecasts turned out to be over, exact, and underpredictions, respectively. Seventy-five percent

of the forecasts came within ±10 percent of actual EPS. The mean of the relative differences for the entire sample was -.023 including outliers, and +.021 after removing seven outliers defined as relative errors with absolute values greater than or equal to 100%. The absolute mean of the relative differences was .115 including outliers and .075 excluding outliers. An hypothesis of equality of the proportions of over and underpredictions was not rejected. Similarly, the hypothesis that the mean relative difference for point forecasts is zero was not rejected.

The analysis of the 70 open-range forecasts in the data base revealed that 51 or 73 percent of the forecasts were right (having zero or positive relative differences) while 19 or 27 percent of the minimum estimates exceeded actual EPS. Sixty-nine percent of the minimum EPS estimates came within ±10 percent of actual EPS. The mean relative difference for all 70 open-range forecasts was -.042 including outliers and +.031 after removing four outliers. The absolute mean was .155 including outliers and .090 excluding outliers. Hypothesis tests indicated that significantly fewer than half of the minimum estimates exceeded actual EPS and that the signed mean relative difference was significantly greater than zero.

Of the 150 closed-range forecasts studied, only 36 percent were found to encompass actual EPS within the minimum and maximum estimates stated. However, 74 percent of the closed-ranges either encompassed or came within 10 percent of actual EPS. The closed-ranges tended to be stated in narrow discrete intervals of $.05, $.10 or $.25 rather than a standard percentage of the midpoints, 50 percent of the ranges encompassing an interval of less than or equal to ± three

percent around the midpoint. The midpoints of the closed ranges exceeded actual EPS 51 percent of the time, coincided with actual 3 percent of the time, and fell below actual EPS 48 percent of the time. The minimum estimates exceeded actual EPS 35 percent of the time while the maximum estimates fell below actual 29 percent of the time. Seventy-one percent of the midpoints fell within ± 10 percent of actual while sixty-five percent of the minimum estimates came within ± 10 percent of actual.

The mean of the relative differences based on the range midpoints was -.092 including outliers and -.034 after removing nine outliers. The absolute means including and excluding outliers, respectively, were .144 and .089. The mean of the relative differences based on the minimum estimates was -.061 including outliers and -.001 excluding nine outliers. The corresponding absolute means were .148 and .093. Hypothesis tests indicated that significantly fewer than half of the minimum estimates in the closed-ranges exceeded actual EPS, and that the mean relative difference based on midpoints was significantly less than zero.

In the comparative analysis of forecasts issued in different formats, hypothesis tests of proportions showed no significant differences in the proportions of point or minimum estimates in either type of range forecast which exceeded actual EPS. The proportion of closed-range midpoints that exceeded actual EPS was significantly greater than the proportions of point forecasts and open-range forecasts that exceeded actual.

Hypothesis tests of variances indicated the open-range forecasts had significantly less dispersion in the frequency distribution

of relative differences than did the point or closed-range forecasts. Hypothesis tests of the signed means revealed that the means of the relative differences for closed-range forecasts based on midpoints was significantly smaller than the means for the relative differences of either the point or open-range forecasts. There were no significant differences in the signed means of the relative differences for the point forecasts and the minimum estimates of the open and closed-range forecasts. Nor were there any significant differences in the absolute means of the various distributions.

Conclusions and recommendations. Study of the descriptive statistics and results of hypothesis tests summarized above leads to the following conclusions:

1. The significant proportions of forecasts issued in point, open-range, and closed-range formats which fell within ± 10 percent of actual EPS indicates that many firms can issue forecasts which are probably sufficiently reliable to aid users in forming their own expectations. But caution must be used in extending inferences from the sample findings on reliability, taking into account the possibility that the proportion of firms voluntarily disclosing forecasts which possess satisfactory forecasting ability may exceed the corresponding proportion for all firms. It should also be kept in mind that the mean horizon of the forecasts studied was only 145 days.

2. The frequency with which forecasts issued in each of the formats differ from actual by greater than ± 10 percent of actual EPS indicates that probably not all firms can issue forecasts sufficiently reliable to aid users in forming their own expectations.

3. While the proportion of point forecasts which turn out to be overpredictions is less than that which turn out to be underpredictions, both the insignificant difference in proportions and the small positive mean of the relative differences support the conclustion that point forecasts are not significantly

biased toward either conservatism or optimism.[1]

4. Comparisons among the proportions of point estimates and the minimum estimates of open and closed-range forecasts suggest that while the minimum estimates for both types of range forecasts exceed actual EPS significantly less than half of the time, the minimum estimates are not significantly more conservative than the point estimates. The minimum estimates are not reliable estimators of minimum or worst possible EPS.

5. Since the maximum estimates of closed-range forecasts fell below actual EPS 29 percent of the time, they are not reliable estimators of maximum or best possible EPS.

6. Comparisons among proportions and signed means suggest that the midpoints of closed-range forecasts are significantly optimistically biased relative to point forecasts and the minimum estimates of open-range forecasts.

7. Comparison among variances indicates the relative differences for the open-range forecasts show a statistically significant smaller variance than the point or closed-range forecasts. However, the differences in variances were fairly small. This fact, coupled with the fact that relative differences with absolute values greater than 100 percent were found for forecasts in all three formats, casts doubt on the meaningful significance

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[1]While it was concluded that the point forecasts in this study were not significantly conservatively biased, the finding that a greater proportion of the forecasts studied turned out to be underpredictions than overpredictions is consistent with results of a survey of financial analysts' and executives' beliefs about forecast practices. That survey indicated beliefs that management would generally tend to understate forecasts to assure their achievability and to avoid adverse market reaction to forecasts not achieved. (See the discussion of the AICPA survey results in Chapter 2 on page 37.) But this finding is contrary to the results of prior empirical studies which found more overpredictions than underpredictions. (For example, see summaries of studies by Copeland and Marioni, and McDonald, in Chapter 2, pages 26 and 28.) A possible explanation for this contradiction may lie in the selection criteria adopted in the different studies. For example, conceivably forecasts expressed as a percentage change from prior results could be more casual and less conservative than those quantified in dollars per share. Forecasts expressed as goals, targets, or budgets would also likely be less conservative. Both of these types of forecasts were excluded from this study. Prior studies have either acknowledged their inclusion or not specified their treatment.

of the differences in variance or objectivity of the forecasts issued in each format.

8. Synthesis of the descriptive statistics and results of the hypothesis tests suggests that inferences should not be drawn about the conservatism of a forecast or the shape of the probability distribution of future earnings underlying a forecast based upon whether it is issued in point, open-range, or closed-range format. To the extent that users make such inferences, forecasts like those studied may be misleading.

Recommendations based on these conclusions about reliability must be viewed as tentative pending an appropriate weighting of these findings with the findings on other aspects of forecast disclosure. Other significant aspects include equity in the dissemination of forecasts and legal liability. But these conclusions about reliability contribute toward evaluating alternative policies on future forecast disclosures by virtue of the larger sample studied relative to prior studies, and the separate and comparative analyses of forecasts issued in different formats. The alternative policies on future disclosures previously identified were prohibiting or mandating future forecast disclosures, regulating or establishing standards for future voluntary disclosures, or maintaining the status quo of unregulated voluntary disclosures.

In this researcher's opinion, the alternative to prohibit all forecast disclosures is not supported by the results of this study based on the conclusion that significant proportions of past forecasts have been sufficiently reliable to aid users in forming their own expectations. A recommendation not to prohibit forecast disclosures, and the conclusion from this study on which it is based, are both consistent with the results of prior research on management forecasts showing them

to be used in making investment decisions[1] and to be more accurate than alternative sources of forecasts.[2]

At the same time, the conclusion that significant proportions of forecasts in each format have not been sufficiently reliable to enhance users' predictions does not support recommending mandatory disclosure of forecasts. But the conclusion that forecasts like those studied may be misleading suggests that establishing standards aimed at improving forecast disclosures may be desirable, if not essential.

The ambiguity characteristic of many past disclosures and the potential for such disclosures to be misleading was noted in the section on conclusions and recommendations based on the frequency analysis of forecasts. A second characteristic of many past forecast disclosures contributing to the potential for their being misleading is the use of alternative formats without apparent regard for the connotations of the formats. The AICPA voiced concern about this matter when it noted that expressing a forecast solely in terms of ranges could result in users' attributing an unwarranted degree of reliability to the ranges by assuming the ranges represent the spread between the worst and best possible results.[3]

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[1]Stewart, "Research Report on Corporate Forecasts," p. 83.

[2]For example, see Basi, et. al.,"A Comparison of the Accuracy of Corporate and Security Analysts' Forecasts of Earnings," p. 250. Also, Copeland and Marioni, "Executives' Forecasts of Earnings per Share versus Forecasts of Naive Models," p. 504. A more recent study in which the authors concluded that management forecasts are not superior to more sophisticated time series models (Lorek, et. al., "Management and Box-Jenkins Forecasts") does not imply management forecasts should not be disclosed. It is not known to what extent users could or would utilize sophisticated time series models to generate forecasts.

[3]Accounting Standards Executive Committee, "Statement of Position on the Presentation and Disclosure of Financial Forecasts" (New York: American Institute of Certified Public Accountants, Inc., 1975), p. 4.

The results of this research, revealing that closed-range forecasts are frequently stated as arbitrarily narrow ranges and that actual EPS fall outside the ranges more than half the time, demonstrate the real potential for such forecasts to be misleading. The finding that forecasts labeled minimum estimates in open and closed-range forecasts are not significantly more conservative than point forecasts further suggests a real potential for users to draw inappropriate inferences based on the disclosure format.

While allowing flexibility in the format to be used, both the AICPA position statement and the latest SEC proposed guides recommend that forecasts be accompanied by probabilistic or other statements about the certainty of a forecast. In this researcher's opinion, the characteristics of published range forecasts summarized in the preceding paragraph support these recommendations. Such statements should aid the user in determining what degree of reliability to attach to a forecast issued in a given format.[1]

In summary, based on the analysis of format and reliability of forecasts included in this study, it is recommended that pending further study of other aspects of forecast disclosure, forecasts should be neither prohibited nor mandated at the present time. But due to ambiguities in past forecasts and the potential for like forecasts to be misleading, it is recommended that as a minimum clear standards be

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[1]This assertion is based on the assumption that management has a reasonable basis for specifying a probability distribution of future earnings. Thus, a user provided with the forecast "there is a 75 percent probability that EPS will fall in the range $2.00 to $2.25" would have a basis for viewing the end points of such forecast as less reliable indicators of worst and best possible earnings than the forecast "there is a 90 percent probability that EPS will fall in the range $2.00 to $2.25."

developed to require precise specification of the variable being forecasted and to facilitate evaluation of the degree of certainty about a forecast.

The majority of forecasts will likely continue to be disclosed through media such as the Wall Street Journal and meetings with analysts rather than in annual reports or SEC filings. Accordingly, adherence to the minimum standards in the popular media as well as in annual reports and SEC filings should be monitored. Evidence of noncompliance may support the urgency of further study of the impact of such disclosures on users' decisions and reassessment of policy on forecast disclosures.

Analysis of Association Between Independent Variables and Disclosure Practice Variables

Summary. The decision to disclose or not disclose a forecast and the format and timing of forecasts issued were identified as three disclosure practice variables in this study. Specific relationships examined included the association between the accuracy of prior years' forecasts and the existence and format of current year disclosures and the association between horizon and format. Emphasis was placed on examining the association between the favorable versus unfavorable nature of firms' expectations, and firms' decisions to disclose or or not disclose initial or revised forecasts and the timing of disclosures made. Chi-square tests of independence and goodness of fit and correlation analyses were used to explore the relationships. The objective of the analysis was to obtain information about possible motives behind unregulated management forecast disclosure practices which might bear on evaluating the need for, and desirability of, specific proposals for regulating forecast disclosure.

The association between prior forecast accuracy and current disclosure was examined through two analyses. For the first analysis, the forecasts of firms in given years were classified as accurate or inaccurate. The same firms were then classified based on the presence or absence in the data base of a forecast for the following year. A chi-square test of independence applied to the 2x2 contingency table revealed no significant association. For the second analysis, a sample limited to firms with forecasts in the data base for two consecutive years was examined. A chi-square test of independence of variables representing prior accuracy and format (point or range) of the current disclosure revealed a statistically significant relationship. Firms whose base year forecasts were classified as inaccurate used one of the range formats in the following year more often than did those whose base year forecasts were classified as accurate.

Based on the notion that the choice of forecast format might be related to the degree of uncertainty about a forecast which would in turn be related to its horizon, the association between horizon and format, classified as point or range, was examined. The mean horizons of the point and range forecasts were 146 and 141 days, respectively, resulting in a point-biserial correlation coefficient of .023 which is not significantly different from zero, indicating no association.

The next relationship explored was whether the favorable or unfavorable nature of a firm's expectations is related to the decision to disclose a forecast. For this analysis, the earnings trends of a sample of firms with forecasts in the data base for two consecutive years were compared with the earnings trends of a sample of firms for which forecasts were included in the data base for one year but not in

the succeeding year. Two earnings trend variables were used - (1) the change in EPS in the second year relative to the first year, and (2) the change in the EPS growth rate in the second year relative to the first year. Both variables were treated as dichotomous based on the direction of the change in the variable. Chi-square tests of independence revealed no significant association between the forecast status of a firm as a repeater or withdrawer and direction of change in either earnings trend variable. The actual earnings trend variables were used as surrogates for expectations in this analysis.

To determine whether firms which do disclose forecasts delay the issuance of unfavorable forecasts, the mean horizons of forecasts classified as favorable or unfavorable were examined. Two forecasted earnings trend variables were examined - (1) the change in forecasted EPS relative to the prior year, and (2) the change in the implicit forecasted EPS growth rate relative to the prior year, both variables being dichotomized based on the direction of change. Biserial correlation coefficients for the association between horizon and the direction of change in forecasted EPS and implicit forecasted EPS growth rate were .046 and -.279, respectively, neither of which is significantly different from zero, indicating no significant association.

Next, the disclosure of revisions was examined to determine whether companies give comparable treatment to unfavorable as well as favorable changes in expectations. First, the observed frequencies of downward and upward revisions were determined and compared to expected frequencies based on the proportions of initial forecasts which turned out to be over and underpredictions. Half of the observed revisions were downward and half upward. A chi-square goodness of fit test showed no significant difference between the observed frequencies and

the expected frequencies.

Finally, the mean time lapses between the issuance of initial and revised forecasts classified as downward and upward were examined to determine whether downward revisions are delayed relative to upward revisions. The mean time lapses were 161 and 155 days, respectively, for the downward and upward revisions. The biserial correlation coefficient for the association between time lapse and direction of revision was .034 which is not significantly different from zero, indicating no significant association.

Conclusions and recommendations. Based on the analysis of association between independent variables and disclosure practice variables, the only significant relationship found was a tendency for firms to disclose forecasts in range format when their prior years' forecasts were classified as inaccurate. Based on the failure to find other significant relationships, it might be concluded that (1) the accuracy of a firm's prior forecast does not affect its decision to disclose or not disclose a forecast, (2) the choice of format is not related to horizon, and (3) comparable treatment is given to the disclosure of favorable and unfavorable expectations, both with respect to initial and revised forecasts.

It may be that, due to the experimental nature of forecast disclosures during the study period, patterns of behavior had not yet emerged. On the other hand, with respect to the apparent comparable treatment of unfavorable and favorable expectations, the findings may be indicative of the presence of market constraints and forces acting to police forecast disclosure practices. The findings do not suggest a pressing need for disclosure regulations aimed at ensuring comparable

treatment of favorable and unfavorable expectations.

But since this research was exploratory in nature, the conclusions must be viewed as tentative pending replication with additional data for other periods and refinement of the methodology. Possible refinements in methodology are suggested in the next section together with other recommendations for further research.

Recommendations for Further Research

It was noted previously that numerous forecasts were noted in the Wall Street Journal that failed to meet the selection criteria for this study. Any policy decisions about regulating forecast disclosures must consider the frequency of all types of voluntary disclosures now being made and their potential for aiding or misleading investors. Accordingly, it is recommended that separate studies of forecasts excluded from this study be undertaken.

Forecasts expressed in terms of percentage change from the prior year were especially frequent. Separate study of these forecasts and comparison of the results with those of other studies would be useful. Numerous forecasts for interim periods (quarterly and semi-annual results) were also noted. With the recent emphasis on interim reporting and the apparent shortening of investment horizons, these disclosures need to be examined.

An assumption repeatedly stated in the literature is that the comparison of prior years' forecasts and actual results for individual firms would be helpful to users in assessing the reliability of subsequent forecasts issued by those firms. This assumption should be tested as the number of firms which have issued forecasts for several years

increases.

Several of the analyses used in this study to explore the relationship between independent variables and disclosure practice variables were based on nominal-dichotomous measures of the independent variables. For example, no association was found between the direction of earnings trend expectations and the decision to issue, or the timing of, a forecast. More powerful tests designed to determine whether the magnitude, as well as the direction of change, in expected earnings trend is associated with disclosure practice variables might be conducted by utilizing additional classifications or ordinal or ratio measures of the independent earnings trend variables.

A further refinement of the association analyses could possibly be achieved by including additional types of forecasts not included in this study. For example, some firms included in this study might have been classified as withdrawing from the disclosure system when in fact they merely switched to another format not meeting the selection criteria for this study, such as forecasts expressed as a percentage change from the prior year's results. If there are systematic differences in the earnings expectations of these firm's relative to firms which actually withdrew from the disclosure system altogether, the power of the tests about the association between expectations and disclosure practices would have been weakened.

Finally, additional research should be undertaken to determine how users utilize management forecasts issued in different formats and what impact the forecasts have on users' decisions. In this connection, any data pertaining to users' materiality functions as related to the accuracy of forecasts should be helpful in establishing standards for forecast disclosure.

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