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Evidence on the Motivation for Management Forecasts of Corporate Earnings

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A multivariate model of the process by which managers decide to release public forecasts of their firms' earnings is developed, based on factors that are hypothesized to affect the demand for and the willingness to supply such forecasts. We test the model on data from a comprehensive sample of earnings forecasts, and find support for our hypotheses about the likely joint influence of those factors. Larger firm size, greater leverage, higher and more stable earnings rates and less rapid growth rates are found to be associated with an increased propensity for management to provide earnings forecasts for their firms.

INTRODUCTION

Among the possible contributors to the informational efficiency of the securities markets are the voluntary releases by corporate managers of public forecasts of their firms' future earnings. Research has shown that information disclosure of this sort can affect investors' decisions, since statistically significant positive abnormal stock returns on and around the dates when firms issue earnings forecasts have been documented. Given those findings, and the fact that an earnings forecast is a very low-cost way for managers to provide information to investors, one might expect that most (if not all) firms would routinely publish such forecasts. Because this appears not to be the case in practice, the reasons why firms do or do not choose to release forecasts have been the subject of continuing interest for research.

The purpose of the present paper is to provide some additional insight into those reasons. Our analysis covers a time period that we believe to be of particular interest, and is based on a sample of observed public earnings forecasts by management that is more comprehensive than that of most past studies. The sample includes not only all quantitative forecasts (e.g. numerical estimates of earnings) released by US companies during the period, but also all *qualitative* forecasts (e.g. directional predictions of earnings) concurrently released.

From these data we are able to distinguish between firms that regularly provide public earnings forecasts and those that seldom or never do. Unlike past studies, therefore, our unit of observation is not the individual forecast, but instead the *category*—'forecaster' or 'nonforecaster'—into which a firm falls. Employing that distinction, we develop and test a multivariate logit model of the determinants of the decision to become a forecaster firm. The model allows for the simultaneous influence of a wider array of firm-specific attributes than have previously been considered (see Ruland *et al.*, 1990). The model is founded on a set of factors that we hypothesize differentially to affect the *demand* by investors for, and the willingness of mangement to *supply*, public earnings forecasts.

Our results indicate that firms that regularly release earnings forecasts differ systematically from those that do not, in several important respects. The forecaster firms are larger, more highly levered, have higher and more stable earnings rates and display lower growth rates. Each of these differences are statistically significant and in the direction predicted by our hypotheses about the underlying demand and supply influences on the propensity to provide public forecasts. In the next section of the paper we discuss the potential motivations for forecasting that the literature has thus far suggested. In the section following we expand upon and extend those suggestions to

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develop the specific hypotheses that we test. Subsequent sections describe our research design and present our findings. A summary and conclusions are contained in the final section.

MOTIVES FOR FORECASTING

For the great majority of publicly traded corporations the incremental direct costs of providing investors with information on the firm's earnings prospects are almost certainly minimal. Management's normal oversight activities associated with monitoring the firm's performance, and the normal processes of planning for future investments and financings, should automatically produce the necessary information internally. If, then, some managers elect to provide public earnings forecasts and others do not, there would appear to be two possible explanations.

One is that such forecasts are perceived both by managers and by investors as containing no new information and thus the act of forecasting is some sort of near-zero-cost 'neutral mutation' as a securities market phenomenon. Random selection or the peculiarities of individual senior managers' tastes would then account for the forecasts we observe, and one would expect to find little systematic pattern in those observations. The extant evidence on stock price reactions to management forecasts, however, would cast doubt on this interpretation (Ajinkya and Gift, 1984; Foster, 1973; Gonedes *et al.*, 1976; Han and Wild, 1991; Lev and Penman, 1990; McNichols, 1989; Patell, 1976; Pownall and Waymire, 1989; Skinner, 1992; Waymire, 1984).

The second possibility is that new information *is* contained in managers' earnings forecasts and that the incidence of those forecasts is attributable to differences among firms in the relative *value* of the information. Diamond (1985), for example, argues that voluntary information disclosure can reduce investors' information search costs and improve risk sharing. When these benefits are particularly important to attain, investors may exert differential pressure on managers to issue forecasts. We shall term this the *demand hypothesis*, and shall seek to determine whether the profile of earnings forecasts we observe may be explained in part by across-firm differences in the likely intensity of security holders' demands for information because of its value to them, regardless of whether the information is favorable or unfavorable.

On the other side of the bargain, the willingness of managers to provide forecasts may also be value driven. In particular, it seems reasonable to believe that earnings forecasts that are perceived by management as likely to produce a positive stock price reaction are more apt to be released. Penman (1980) and Verecchia (1983) propose that this inclination will lead to a bias toward the issuance of forecasts that predominantly contain *favorable* information about a firm's future prospects (see also Lev and Penman, 1990; McNichols, 1984; Waymire, 1984). This, however, is not the only possibility. Trueman (1986) argues that both firms' market values and the levels of managers' compensation are increasing functions of investors' perceptions of the ability of managers to deal with the external as well as the internal problems of their firms. Thus, managers may have incentives to provide earnings forecasts even if the information is *unfavorable*—as long as the forecast is considered to be *credible*. If it is, the act of releasing a forecast can be positively received by the securities market because investors will interpret the forecast as a signal that managers are aware of and attuned to their firms' operating circumstances and environment.[1] The available empirical evidence is in part consistent with this interpretation (Ajinkya and Gift, 1984; Patell, 1976; Waymire, 1984). Collectively, we label these explanations the *supply hypothesis* for the issuance of earnings forecasts. In our analysis, we examine characteristics of firms that may reflect differences in managers' perceptions of the value to them of supplying such forecasts.

In sum, we accept that an earnings forecast can contain new information, and that both investors and corporate managers believe that it might. Our proposition then is that a public forecast is most likely to occur in situations where the potential information is perceived by investors to be especially useful, and where it is perceived by managers as especially worthwhile to convey. We describe below the specific form in which the demand and supply hypotheses implied by this proposition may be tested. The data we have compiled and analyzed in fact appear to offer reasonable support for these hypotheses. As we shall see, our findings both extend and complement those of earlier investigations (e.g. Han and

Wild, 1991; Lev and Penman, 1990; Penman, 1980; Waymire, 1985), which generally have not addressed demand and supply influences together.

HYPOTHESES

We posit that one motivation for managers to publish earnings forecasts is to respond to a perceived *demand* by investors for the information contained therein. We hypothesize therefore that this demand should be felt more strongly in situations where: (1) investors' collective information search costs are relatively high; (2) there are powerful investor constituencies present who are able to exert pressure on managers to provide a forecast; and (3) the information that may be conveyed is regarded by investors as particularly important to receive. We use the term 'investors' advisedly, rather than merely 'shareholders', because the owners of the firm's common stock are not necessarily the only consumers of forecast information to which managers may feel obliged to respond.

Specifically, we hypothesize that the larger the firm in question, and the greater its degree of financial leverage, the more likely it is to be a regular and frequent forecaster. Thus, larger size generally brings with it two phenomena: a larger *number* of individual stockholders and a larger *proportionate* share of stockholdings held by institutional investors. The former have relatively high per capita information search costs, and the latter are well positioned by the weight of their large holdings to influence managers to keep them apprised of corporate prospects. Similarly, firms with heavier debt service obligations are ones for which the consequences of changes in earnings can be particularly significant, and thereby for which advance information about the firm's ability to meet those obligations would be of special interest both to shareholders and lenders. In turn, since companies with large amounts of debt are also apt to be dealing with a group of large lenders, the latter themselves are a concentrated key constituency that may well be able to press effectively for forecast information.

On the *supply* side of the transaction, we hypothesize that managers will be most inclined to issue forecasts frequently—even in the absence of any felt pressure to do so—when the forecast is thought by managers as most likely to be received positively by the securities market. Hence, following Penman (1980) and Verecchia (1983), we predict that firms having above-average profitability will be over-represented among frequent forecasters. In addition, as Trueman (1986) argues, even poor news may be well received if it is taken by investors to be an indication of managers' clear awareness of their firms' circumstances. Since managers are best able to demonstrate that awareness by *accurately* forecasting, we further hypothesize that firms whose earning power is relatively stable—and thereby relatively easy for managers to estimate—will be more likely to issue regular forecasts. Because earnings predictability is apt to be greater for firms that are not rapidly growing, we would also anticipate an inverse relationship between growth and the frequency of management forecasts.

Our demand and supply hypotheses, therefore, can be summarized in the following manner:

$$\Pr(FC) = f(SIZE, LEVERAGE, PROFITABILITY, STABILITY, GROWTH)$$

where Pr(FC) is the probability that a firm appears in our identified regular forecaster sample. We predict that the direction of the influence on this probability of the first four firm-specific attributes indicated will be positive, and that the direction of the influence of the last will be negative. We test these hypotheses simultaneously in a multivariate model, using selected proxies to measure the corporate attributes of concern.

RESEARCH DESIGN

The Forecast Sample

The earnings forecasts we examine are all those that were publicly issued by American corporate management and reported in the *Wall Street Journal Index* during the years 1973 through 1979. The data are exhaustive for the period, and the list contains 3665 observations from 1742 firms. In contrast to previous studies,[2] we include and retain in these observations not only forecasts that offered specific projected earnings figures but also those that are 'qualitative' in nature. Examples of the former would be point or range

estimates of earnings per share, total earnings on common or percentage changes in EPS or total earnings. Examples of the latter would be forecasts that state that earnings are expected to 'increase from last year', 'be the best ever', 'fall short of the previous period', or predict that the firm will 'lose money', 'have another good year' or 'return to profitability'. Each observation was coded according to the type of forecast involved —into one of 41 different categories that were developed to delineate their character. Of these, 15 were quantitative in nature and 26 were qualitative. Appendix 1 lists those classifications.

The advantage of including both types of forecasts in the analysis is that the database thereby encompasses the full set of published messages about projected earnings that were conveyed by managers to investors. Because our primary concern here is with *who* forecasts—and *why* they do—rather than with how accurate the forecasts are (Hassell and Jennings, 1986; Jennings, 1987; Ruland, 1978), it is not necessary to have a specific estimated earnings figure against which to compare either actual results or other forecasts. Moreover, there is no reason to assume that the publication of a particular numerical earnings forecast is the only vehicle management might logically choose to attempt to transmit information to the market about a firm's prospects. Indeed, of the 3665 published forecasts identified, 2354 (or 64%) fell in the qualitative categories. Many of these also implicitly provide at least a numerical forecast *range* to investors. Thus, a projection that 'earnings are expected to increase' imbeds the level of last period's earnings as a lower bound in the projection. Finally, as the indicated mix of observations suggests, the inclusion of qualitative forecasts substantially expands the sample size available for analysis. This is a desirable by-product, in seeking to discern patterns in the data.

We concentrate specifically on the period 1973–9 because it spans a major transition in the regulatory environment relating to the issuance of earnings forecasts by managers. Such forecasts were prohibited in official corporate reports filed with the Securities and Exchange Commission prior to 1973. In February 1973, the SEC announced that it would permit forecasts to be included in those filings (Securities Act Release 33-5362). A subsequent proposal in 1975 would have *required* the disclosure of forecasts, but this was altered in 1978 to an adopted policy only of *encouraging* forecast disclosure (Securities Act Release 33-5992). That decision was followed in June 1979 by the issuance of so-called 'Safe Harbor' rules designed to protect managers from legal liability if published forecasts turned out to be inaccurate, as long as they were made in good faith and not intentionally misleading (Securities Act Release 33-6084).

During this time period, therefore, the logic and value of earnings forecasts were the objects of considerable attention by regulators, management and the accounting profession. The attendant highlighting of the issues involved, we believe, would have occasioned a similar heightening of the perceptions of investors and corporate executives about the particular circumstances in which earnings forecasts were worthwhile. In our terms, both the *demand* and *supply* motivations should have been especially acute during this interval and it should thereby offer a rich environment in which to attempt to detect such motivations. Conveniently, the same interval also connects and fills a gap between those that were examined in two groups of previous analyses of management forecasts which dealt, respectively, with the late 1960s and early 1970s (Gonedes *et al.*, 1976; Lev and Penman, 1990; Patell, 1976; Penman, 1980; Waymire, 1984, 1985), and with the late 1970s and early 1980s (Han and Wild, 1991; Jennings, 1987; McNichols, 1989; Pyo and Lustgarten, 1990).

Attributes of the Forecasts

We provide in Table 1 a profile of the major characteristics of the sample of forecasts in question. As indicated, 1742 different companies are included in the sample, approximately two-thirds of which are firms listed on the New York Exchange. The predominant interval to which the forecasts apply is a full fiscal year for the firm involved, with 92% of the observations addressing that period. Eight major categories, of the 41 identified in Appendix 1, account for 80% of the forecasts issued. In roughly one-fourth of the cases, either a specific EPS figure or a specific percentage changes in EPS is announced as the projection. Slightly over 40% of the total is composed of forecasts that state merely that earnings (per share or in the aggregate) are expected to increase or increase 'substantially' from the prior period—or, equivalently, that the firm's earnings are anticipated to be at an unspecified record

Table 1. Characteristics of the Sample of Management Forecasts of Corporate Earnings: 3665 Observations for 1742 Companies Over the Period 1973 through 1979 (%)

Forecast type:	Quantitative	36
	Qualitative	64
Forecast interval:	Quarter	6
	Six months	2
	One year	92
Exchange listing of forecasting firms:	New York Stock Exchange	68
	American Stock Exchange	17
	Over-the-counter	15
Forecast origin:	New	98
	Revised	2
Forecast categories:[a]	Specific EPS figure (1)	12
	Specific EPS percentage change (2)	15
	More than a specific EPS (10)	3
	Earnings will increase (16)	21
	Earnings will increase substantially (19)	6
	Earnings will decrease (20)	4
	Record level of earnings (27)	14
	Strong/good earnings level (28)	5
	All other	20

[a]Figures in parentheses correspond to the designated forecast categories listed in Appendix 1.

level in the coming period. Only a very small minority of the observed forecasts are revisions of previous forecasts.

A tendency for managers to convey predominantly good news to investors is evident in the content of the forecasts. Of the 3501 observations for which the direction of the projected change in earnings from the prior base period could be identified,[3] the distribution of those projections was: for improved earnings, 88%; for flat or lower earnings, 12%. The frequency with which improved earnings were forecast was virtually identical within both the quantitative and qualitative subcategories. Over the 7-year study period, however, the earnings of most US firms did in fact generally increase from year to year. The question as to whether there was a 'good news bias' in the forecasts must therefore be put in the context of the kind of news that was *available* to forecast.

As an attempt partially to answer this question, we computed for all the companies listed on the COMPUSTAT tape from 1973 to 1979 the frequency with which earnings on common stock were observed to increase from one year to the next during that interval. Earnings improvements comprised approximately 72% of the total number of year-to-year changes recorded. We take those data to be representative of the population of possible directional movements in earnings for US corporations at the time. If so, the probability that a sample of 3501 forecasts for such firms, within which 88% of the predictions were for improved earnings, could have been drawn merely by chance from an underlying (much larger) population of events wherein just 72% of the *opportunities* to forecast would have been for improved corporate earnings is well below 1%. Thus, we find some initial support for the conjectures by Penman (1980) and Verecchia (1983) that favorable news is more likely to be released in the typical management forecast. We return to this issue below.

Forecasters and Nonforecasters

In order to address the central question of the motivation for management to provide a public

forecast, we used our data to establish two categories of firms, designated 'forecasters' and 'nonforecasters'. The former group was defined to include every firm in our sample that released four or more earnings forecasts (whether quantitative or qualitative) during the 7-year study period. The nonforecaster group in turn consists of all firms in the sample that released only one forecast during the period, and all other firms that were listed concurrently on the COMPUSTAT tape—and thereby by inference released *no* forecasts, since our forecast sample is exhaustive for the period.[4]

While the division between the two categories must necessarily be somewhat arbitrary, our reasoning was that unless the managers of a firm issued an earnings forecast in at least a majority of the years examined, the firm was not one that could logically be considered to be a regular and consistent provider of such information to investors. Conversely, if either no forecasts or just one were issued in a 7-year time span, it also seemed logical to classify the company as one for which the provision of earnings forecasts was not a normal element of corporate practice. Because we felt it impossible to establish a precise natural dividing line between the two groups of firms, we eliminated from either group—as an ambiguous observation—any company that issued two or three forecasts during the period.

The intent, therefore, was to dichotomize the corporate universe (or, more accurately, that portion of the universe that is represented in the COMPUSTAT database) into a set of firms that generally *did*, and a set of firms that generally *did not*, issue earnings forecasts to the public. The classification scheme we adopted is not the only one possible. Nonetheless, we believe it to be both objective and reasonable, given the information available, and that the removal of firms characterized by 'intermediate' forecast frequencies enhances the dichotimization. This should accentuate the between-group differences and thereby improve the power of our tests.

There were 242 firms in our sample of 1742 firms that released four or more forecasts from 1973 to 1979. We examined the industry composition of this group and found that, as compared with the industry composition (2-digit SIC codes) of the full COMPUSTAT list of firms, two categories were under-represented in statistically significant proportions: (1) public utilities and (2) banks, insurance companies and other financial institutions. Because the operating characteristics of these firms also differ substantially from those of nonregulated nonfinancial corporations, we elected to restrict our attention to the latter. Equivalently, we report at least one 'industry' finding for the period—that utilities and financial institutions were distinctive in the very low frequency with which they provided public earnings forecasts[5]—and we focus our analysis on the attributes of other firms that may explain why they did or did not.

To define the potential firm-specific explanatory variables for analysis, we required that complete and continuous COMPUSTAT data be available for the firms in question over the full decade 1970–79.[6] The application of this criterion resulted in a final sample of 192 'forecaster' firms. The industry makeup of that group, and of all nonutility nonfinancial companies in the 1970–79 COMPUSTAT file, is shown in Appendix 2. With one exception, there were no statistically significant differences—at the 99% confidence level—in the proportionate industry compositions of the two groups. The exception was the chemical and drug industry (SIC codes 2800-2899), which was detectably *over*-represented on the forecaster list. Accordingly, we include a dummy variable for that industry in our analysis. Applying the same test for complete 1970–79 data, the final 'nonforecaster' group contains 937 firms from COMPUSTAT who either provided no earnings forecast or just a single such forecast during the study period. Once more, only for chemical and drug companies was there a significant difference in industry representation among forecaster companies, as compared with the nonforecaster comparison group.

Variable Definitions

The independent variables employed as descriptors of the firms in the indicated sample, to test our hypotheses, are taken from COMPUSTAT and represent either single observations for each company as of the midpoint or end of the study period, or averages for the company over the full decade 1970–79. Those variables include:

For *SIZE*:

TMVAL = the total market value of the firm's common stock (in billions) as of the

end of 1979, computed as the number of shares then outstanding multiplied by the concurrent market price per share.

For *LEVERAGE*:

AVDBT = the average debt ratio of the firm over the period 1970–79, computed each year as the ratio of total liabilities (excluding preferred stock) to total assets.

For *PROFITABILITY*:

AVROE = the average rate of return on common equity for the firm over the period 1970–79, computed each year as the ratio of total earnings available to common (excluding extraordinary items) to total year-end equity.

For *STABILITY*:

SDROE = the standard deviation of the annual rate of return on common equity for the company over the period 1970–79, computed from the time series used to define *AVROE* for the same period.

For *GROWTH*:

AVYLD = the firm's average dividend yield over the period 1970–79, computed each year as dividends per share divided by year-end share prices.

The first four of these are standard measures of the corporate attributes in question. Our demand hypothesis predicts that the direction of the influence of the *SIZE* and *LEVERAGE* variables on the probability that a firm's management will regularly issue public earnings forecasts will be positive. The *PROFITABILITY* and *STABILITY* measures focus specifically on earnings to common equity. Our supply hypothesis predicts that the directional influence of the former will be positive and the latter will be negative, since a higher value of *SDROE* corresponds to *less* stability in earnings. Similarly, because relatively high dividend yields should be associated with relatively low equity earnings growth rates, the predicted direction of the influence of the (inverse) *GROWTH* proxy *AVYLD* on the propensity to issue earnings forecasts is positive.

Following Lev and Penman (1990), we also include the firm's market beta as an additional *STABILITY* measure that addresses the degree of external *systematic* risk of the firm:

MBETA = the firm's market model beta as of the approximate midpoint of the study period (September 1976) as reported by Merrill Lynch. The computation employs five years of monthly stock returns, adopts the *S&P* 500 as the market index, and is adjusted for the tendency of high and low betas to regress toward the mean over time.

The predicted sign of the coefficient on *MBETA* is therefore negative. Finally, we include a dummy variable for the firm's *INDUSTRY* membership:

INDUS = a dummy variable that takes on a value of 1 if the firm involved is in the chemical and drug industry (SIC codes 2800-2899), and 0 otherwise.

This choice was prompted by the preliminary findings on proportionate industry representation in the forecaster sample, which were discussed earlier. Because chemical and drug companies are over-represented in that sample, the predicted sign of the coefficient of *INDUS* is positive.

EMPIRICAL RESULTS

Distributions of the Variables

The distributional properties of the specified variables, as compiled for the respective 'forecaster' and 'nonforecaster' company categories, are reported in Table 2. A comparison of the mean values observed for these variables in the two categories indicates that the firms in the forecaster group are in fact considerably larger on average than those in the nonforecaster comparison group. Additionally, the forecaster firms have a higher mean debt ratio and are, on average, more profitable than the nonforecaster companies, as predicted. Also as predicted, the forecaster firms display more stability in their earnings rates, with the standard deviation of return on equity being detectably less than for the nonforecaster group. In a similar way, the forecaster firms' average dividend yields exceed those of the

Table 2. Distributional Properties of the Independent Variables: 1129 Observations on Each of 192 Forecaster (FC) and 937 Nonforecaster (NF) Firms

Variable		Mean	Median	Standard deviation	Skewness	Minimum	Maximum
TMVAL:	FC	1.191	0.457	2.520	5.546	0002	24.179
	NF	0.262	0.053	0.663	5.848	0.001	7.790
AVDBT:	FC	0.511	0.508	0.114	−0.130	0.195	0.821
	NF	0.482	0.489	0.156	−0.051	0.057	0.910
AVROE:	FC	0.130	0.130	0.044	0.108	−0.055	0.334
	NF	0.099	0.108	0.073	−1.062	−0.041	0.448
SDROE:	FC	0.047	0.032	0.051	3.649	0.005	0.375
	NF	0.081	0.050	0.105	4.605	0.004	0.137
AVYLD:	FC	0.039	0.041	0.018	−0.264	0.000	0.081
	NF	0.029	0.027	0.022	0.427	0.000	0.104
MBETA:	FC	1.154	1.125	0.257	0.941	0.640	2.260
	NF	1.184	1.150	0.338	0.623	0.200	2.970

Variable definitions, one observation per firm over the study period:

TMVAL = total equity market value ($ billions), 1979
AVDBT = average ratio of liabilities to assets, 1970–79
AVROE = average rate of return on common equity, 1970–79
SDROE = standard deviation of rate of return on equity, 1970–79
AVYLD = average dividend yield, 1970–79
MBETA = Merrill Lynch adjusted market beta, September 1976

nonforecaster firms, and their mean betas are lower, consistent with our hypotheses.[7] The usual univariate *t*-tests of the differences in means between the two groups, however, are compromised by the fact that—as the reported skewness measures suggest—the distribution of the variables are generally non-normal in character.[8]

The Pearson product-moment correlation coefficients between the variables are shown in Table 3. Because of the large sample sizes involved, the majority of those coefficients are statistically significant, but the great majority are also relatively small in magnitude. Not surprisingly, the market betas are negatively correlated

Table 3. Pearson Product-moment Correlation Coefficients between the Independent Variables Used in the Analysis

	TMVAL	*AVDBT*	*AVROE*	*SDROE*	*AVYLD*
AVDBT	−0.012				
AVROE	0.194[a]	−0.177[a]			
SDROE	−0.121[a]	0.323[a]	−0.545[a]		
AVYLD	0.081[a]	−0.183[a]	0.223[a]	−0.302[a]	
MBETA	−0.106[a]	0.165[a]	−0.068	0.179[a]	−0.399[a]

[a]Cases for which the hypothesis that the respective variables are uncorrelated can be rejected at the 99% confidence level.
Variable definitions as listed in Table 2.

with company size, positively correlated with corporate debt ratios, positively correlated with the variability of earnings on common equity and negatively correlated with dividend yields.

Logit Analysis of the Decision to Forecast

The data in Table 2 therefore suggest the possibility that there may be systematic differences in attributes between companies whose senior managers elect to provide public forecasts of corporate earnings, and companies whose managers refrain from doing so. We test this possibility by estimating a multivariate logit model of the decision to forecast which allows for the joint influences of our proposed measures of the determinants of the demand for and supply of management forecasts. The focus of such a model is an identification of the directional effects of the company attributes in question on the probability that a given firm will fall in the 'forecaster' category.

The appropriateness of the logit model in accounting and financial research applications has been examined at length in a recent paper by Maddala (1991). He argues that the model is particularly suited to settings in which firms are observed to sort themselves into dichotomous groupings, where the candidate explanatory variables are not necessarily multivariate normally distributed, and where there are substantial differences in the sample sizes in the dichotomous groupings which are occasioned naturally by the sorting process. These characteristics are representative of the estimation problem we confront here. Palepu (1986) employs a similar approach, for similar reasons, in his development of a model for the prediction of corporate takeover targets. Corresponding models have often been used in marketing research, in analyzing the determinants of consumers' brand choices (e.g. Guadagni and Little, 1983).

We estimate the parameters of the logit model by a maximum likelihood procedure, using the SAS statistical package. The dependent variable is the category into which each firm in our sample is observed to fall. A value of one is assigned to the forecaster firms and a value of zero to the nonforecaster companies. Hence, a positive (negative) and statistically significant coefficient on a given independent variable indicates that the probability that a firm will become a forecaster increases (decreases) as the magnitude of the variable increases. The resulting model estimate is shown in Table 4.

As can be seen, the estimated coefficient on the corporate size variable *TMVAL* is positive and statistically significant at well beyond the 99% level, supporting our hypothesis that larger firms are the ones for which the felt demand to provide public earnings forecasts is most acute.[9] Also as hypothesized, the coefficient on the leverage measure *AVDBT* is positive and significant, indicating that management is particularly attentive to keeping lenders and other investors apprised of the firm's earnings prospects when debt comprises an increasing proportion of the firm's financing. The coefficient on the profitability measure *AVROE* has the expected positive sign and is similarly statistically significant. The latter finding in part reinforces the notion that managers generally have a greater inclination to release forecasts when there is good news to report.[10] Perhaps a better characterization, however—given the nature of the profitability measure in question—would be that it is news about *good firms* that tends more often to be released, even if, on occasion, the immediate news may not be favorable. The distinction is subtle, but worth noting. The negative and significant coefficient on the earnings-variability measure *SDROE*, in turn, would suggest that management prefers to forecast when there is greater assurance that the forecast will be accurate. Thus, inaccurate forecasts may have a *cost*—in the form of reduced credibility with investors that may ultimately affect the firm's market value—and management appears to be reluctant to incur that potential cost. This is consistent with our supply hypothesis.

The positive and significant coefficient for the dividend yield variable *AVYLD* supports the notion that firms with relatively rapid growth rates are less likely to issue public earnings forecasts, since dividend yields and growth rates should be inversely correlated. We infer that this is a further manifestation of the greater difficulty in predicting earnings under such circumstances. Waymire (1985) has suggested another possible explanation: that rapidly growing firms may be those with particular proprietary advantages in their product markets, and they therefore may be reluctant to alert their competitors to those

Table 4. Estimate of the Logit Model of the Determinants of the Probability that a Firm is a Forecaster: 1129 Observations on 192 Forecaster and 937 Nonforecaster Companies

Variable[a]	Predicted sign	Coefficient estimate[b]
TMVAL	+	0.536 (5.414)*
AVDBT	+	3.159 (4.775)*
AVROE	+	4.798 (2.725)*
SDROE	−	−5.436 (−2.705)*
AVYLD	+	21.721 (4.631)*
MBETA	−	0.603 (1.888)
INDUS	+	0.545 (1.742)
Constant		−5.166 (−8.194)*
Likelihood Ratio Index[c]		0.440
Likelihood Ratio Statistic[d]		668.068

[a] Variable definitions as listed in Table 2.
[b] Figures in parentheses are *t*-statistics. The (*) indicates significance at the 99% confidence level.
[c] The (log) likelihood ratio index is defined as [1 − (log likelihood at convergence)/(log likelihood at zero)]. It is similar to the R^2 statistic for a multiple regression.
[d] The likelihood ratio statistic is computed to test the hypothesis that all the parameters in the model are simultaneously equal to zero. Under the null hypothesis, the statistic has an asymptotic distribution which is chi-square. The statistic is significant at the 99% level for the model estimated.

prospects, by forecasting. The evidence here would permit either interpretation. By contrast, neither the firm's market beta *MBETA*, nor the *INDUS* dummy variable for the chemical and drug industry, emerge as statistically significant correlates of the propensity to forecast. The absence of the former would suggest that it is the *firm-specific* component of the variability in earnings that discourages senior management from releasing (potentially inaccurate) forecasts, rather than the market-wide systematic component. Moreover, while chemical and drug companies are over-represented in the forecaster category of firms, that phenomenon appears to be less a consequence of the possible 'norms' of industry membership than of the fundamental economic attributes that are *associated* with such membership—and that thereby are the factors that induce a tendency to provide forecasts.[11]

The likelihood ratio index reported in Table 4 is the logit model counterpart of the usual R^2 statistic in a regression estimate. It indicates the degree of explanatory power of the model, which in our case accounts for 44% of the variation across the firms in our sample in the probability that they fall in the forecaster category. We deem this a respectable showing. The attendant likelihood ratio statistic corresponds to a regression *F*-statistic, and the value reported implies statistical significance for our seven-variable model at well beyond the 99% confidence level. In all, then, the findings are strongly supportive of the proposition that firms are motivated to provide public earnings forecasts by a set of factors which reflect the value of the information contained in those forecasts, both to the consumers and the purveyors of the information. The variables we have employed as proxies for those factors appear consistently to have the directional influences which are predicted by our underlying demand and supply hypotheses, and the resulting model of the earnings-forecast decision process has some reasonable overall explanatory content.

Quantitative and Qualitative Forecasters

A final issue of interest is the extent to which, *within* our sample of firms that regularly forecast, those which do so in the form of specific quantitative earnings predictions differ systematically from those that provide only qualitative (directional) forecasts. The literature has not addressed this issue in the past, and there are few theoretical guidelines from which to develop specific hypotheses as to the factors that may influence the choice of forecast form. Nonetheless, because we found that such attributes as corporate size, profitability, earnings stability, expected growth rates and leverage appeared to have an impact on the fundamental decision *to* forecast, we sought to determine whether variables that measure those same attributes would also allow us to distinguish between quantitative and qualitative forecaster firms.

For that purpose, we divided the sample of 192 forecaster firms into two subgroups. The 'quantitative' forecaster group consists of all firms for which half or more of the observed public forecasts during the study period were quantitative in

nature. There are 65 companies in this category. The remaining 127 firms comprise the 'qualitative' forecaster group. We then replicated for these two groupings the same multivariate logit analysis that was employed to test for differences between forecaster and nonforecaster firms. Neither the logit model nor the coefficients on any of the candidate independent variables were statistically significant (two-tailed tests) at the 99% confidence level.[12] We therefore cannot reject the null hypothesis that all the coefficients are jointly zero. Accordingly, it would appear that the group of companies in our sample whose managements regularly provide earnings forecasts to investors are substantially homogeneous in their characteristics, regardless of the *form* in which they chose

APPENDIX 1

Categories for the Classification of Earnings Forecasts: Sample of 3665 Observations Over the Period 1973 through 1979

1. Specific EPS figure predicted
2. Specific percentage change in EPS or total earnings
3. Specific total earnings figure
4. Maximum of (up to; no more than) specific EPS
5. Maximum of (up to; no more than) specific percentage change
6. Maximum of (up to; no more than) specific total earnings
7. Minimum of (at least; no less than) specific EPS
8. Minimum of (at least; no less than) specific percentage change
9. Minimum of (at least; no less than) specific total earnings
10. More than a specific EPS figure
11. More than a specific positive percentage change
12. More than a specific total earnings figure
13. Less than a specific EPS figure
14. Less than a specific negative percentage change
15. Less than a specific total earnings figure
16. Earnings will increase/surpass/exceed last period
17. Earnings will increase slightly/mildly
18. Earnings will increase moderately/reasonably/solidly
19. Earnings will increase sharply/significantly/materially
20. Earnings will decrease/fall short of/fail to match last period
21. Earnings will decrease slightly/mildly
22. Earnings will decrease moderately/noticeably
23. Earnings will decrease sharply/significantly/materially
24. Earnings same/flat/level/as good as/no improvement/match
25. Easy time matching last period
26. Difficult to match last period
27. Record level/best ever
28. Strong/good/excellent/successful earnings
29. Profitable/another profitable period
30. Earnings will be satisfactory
31. Earnings weak/poor/uncertain/difficult period/one of poorer
32. Will exceed past rate of growth in earnings
33. Will maintain past rate of growth in earnings
34. Will be below past rate of growth in earnings
35. Will lose money
36. Will have a larger loss
37. Will have a smaller loss
38. Will break even
39. Will return to profitability
40. Will be better than expected or previously forecast
41. Will be worse than expected or previously forecast

APPENDIX 2

Industry Composition of the Sample of 192 Forecaster Firms, and of All Firms on the COMPUSTAT Tape, Over the Period 1973 through 1979

SIC code	Industry	Proportionate composition (%) Forecasters	COMPUSTAT
0000–0999	Agricultural Production	0.52	0.47
1000–1499	Mining/Petroleum Production	4.66	7.83
1500–1999	Construction	1.04	1.56
2000–2199	Food/Beverages/Tobacco	6.74	4.54
2200–2399	Textiles/Carpet/Apparel	2.07	4.64
2400–2699	Paper/Wood/Lumber	4.15	4.32
2700–2799	Printing/Publishing	5.18	2.50
2800–2899	Chemicals/Drugs	11.92	5.64
2900–2999	Petroleum Refining	4.66	2.18
3000–3099	Rubber/Plastics	2.59	2.35
3100–3199	Shoes/Leather	1.04	0.94
3200–3299	Glass/Cement/Plaster	2.59	1.72
3300–3399	Iron/Steel/Aluminum	4.66	3.23
3400–3499	Metal Fabricating	3.11	4.18
3500–3599	Machinery/Computers	8.81	8.92
3600–3699	Electrical/Electronic Equipment	7.25	8.72
3700–3799	Vehicles/Transport Equipment	6.21	3.76
3800–3899	Instruments	3.11	3.40
3900–3999	Toys/Jewelry/Recreation	1.55	1.77
4000–4799	Airlines/Rail/Trucking	2.59	3.91
4800–4899	Telecommunications/Broadcasting	2.07	1.62
5000–5199	Wholesalers	2.07	4.28
5200–5999	Retailers	4.15	8.24
6500–6699	Real Estate/Homebuilders	1.55	2.45
7000–7199	Hotels/Motels	—	0.73
7200-------	Services	5.71	6.10

Note: SIC codes 4900–4999 (utilities), 6000–6499 (financial institutions), and 6700–6999 (REITs and royalty trusts) excluded from both categories.

to convey those forecasts. This finding would suggest that future studies directed toward identifying the impetus to and consequences of managerial earnings forecasts need not be confined—as they generally have been to date—to samples wherein only specific quantitative forecasts are observed.

SUMMARY AND CONCLUSIONS

Considerable attention has been paid in the literature to the motivations for corporate managers to issue public forecasts of their firms' earnings. We provide here a multivariate model of the forecast decision process that is based on potential differences among firms in factors that should affect the intensity of investors' demands for, and management's willingness to supply, earnings forecasts. Both the proposed demand and supply motivations reflect developed hypotheses as to differences among firms in the relative value of the information that may be contained in a forecast. Unlike most previous investigations, we allow in our model for the *joint* impact of demand and supply influences on the propensity to forecast, and we include both quantitative *and* qualitative forecasts.

We test the model on data from a large and comprehensive sample of managerial earnings forecasts covering a time period when the desirability of releasing forecasts was the subject of

particular regulatory scrutiny and extensive professional debate. The data permit us to categorize firms into forecasters and nonforecasters, and the forecaster group into quantitative and qualitative forecasters. Thus—and also unlike previous investigations—our unit of observation is the *firm* which does or does not regularly forecast, rather than simply the forecast event.

The empirical results strongly support our hypotheses about the demand and supply factors that should induce managers to provide public earnings forecasts. Specifically, we find that firms which regularly issue forecasts are larger, more highly levered, have higher and more stable earnings rates and display less rapid expected growth rates than firms that seldom or never forecast. Within the regular forecaster category, however, differences in company attributes of the sort that distinguish those firms from nonforecasters do not allow us to distinguish between firms that provide their forecasts in quantitative rather than qualitative form.

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NOTES

1. In addition, Skinner (1992) finds that managers often release forecasts that contain particularly bad news, even if the stock price reaction is negative, in order to pre-empt an even worse price reaction upon the announcement of the *actual* bad news.
2. The exceptions being Lev and Penman (1990) and Skinner (1992).
3. Among the unclassifiable ones were forecasts which predicted that earnings would be 'satisfactory', that the firm would have 'another profitable year' (if the preceding year was profitable) or that the firm would 'lose money' (if the prior period showed a loss) or were similarly ambiguous. These comprised 4% of the total forecast sample.
4. Or, at least, as exhaustive as the coverage in the *Wall Street Journal Index* (see Thompson *et al.*, 1987). It is possible that we may have missed an occasional forecast in collecting the data, despite our best efforts. It is also unlikely, however, that we missed an entire series for a firm that would have placed it in the 'forecaster' category.
5. Of the 242 companies in the 'forecaster' group, just six were utilities or financial institutions, as compared with approximately 500 such firms in the COMPUSTAT database.
6. Because, as we shall see below, several of the independent variables are measured as standard deviations of a time series, we included the years 1970–72 in defining them simply to have a minimum of 10 observations for the computations.
7. Mean betas greater than 1.0 for both groups of companies would be expected from simple (equal-weighted) averages of individual betas which are calculated using a value-weighted portfolio to represent the market, if firms' total equity market values and their betas are generally negatively correlated. See Table 3.
8. We computed *t*-statistics for the various pairwise differences in means and found that—if one assumes *approximate* normality—all the differences shown in Table 2 are statistically significant at well beyond the 99% confidence level, with the exception of the variable *MBETA*. Accordingly, those tests would generally support, and none would contravene, our hypotheses.
9. Supplemental logit model estimates using alternative measures of corporate size (e.g. total sales or total assets) yielded similar findings. The coefficient on the size variable was uniformly positive and statistically significant, and the coefficients on the remaining independent variables were unchanged in sign and significance.
10. As Skinner (1992) shows, however, this is a general but not a universal tendency.
11. We also included dummy variables for several other industries which appeared to be somewhat overrepresented in the forecaster group, in supplemental model estimations, and found none to be statistically significant.
12. The same results emerged under alternative definitions of the quantitative and qualitative groupings—e.g. when firms were classified into the two only if at least *two-thirds* of management's forecasts were either quantitative or qualitative in nature.

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