The Impact of Management Earnings Forecasts on Firm Risk and Firm Value

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Abstract

This study investigates whether voluntary management disclosure of earnings forecasts influences investors' long-term assessment of firm risk and firm value. We attempt to control for possible endogeneity between various firm-specific characteristics and the voluntary issuing of different types of management earnings forecasts by utilizing a two-stage Heckman treatment analysis. We find a clear negative relationship between the issuance of management earnings forecasts and a variety of risk measures including idiosyncratic risk, stock return volatility, beta, and bid-ask spreads. We fail to find the expected positive relationship between management earnings forecasts per se and firm value as captured by Tobin's Q. However, the expected positive relationship is clearly established when the issuance of earnings is (i) precise, (ii) frequent, and (iii) credible, as captured by our overall "reputation" variable.

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1. Introduction

Capital market participants rely on a steady stream of information to assess risk and judge future prospects in order to accurately price financial securities such as stocks. Firm management assists in this process by providing information through a variety of channels, such as regulatory filings as well as voluntary communication with outside investors and analysts (Healy and Palepu, 2001). Forecasts related to the firm's earnings are one of the primary voluntary disclosure mechanisms through which managers can provide additional information to outside stakeholders about the expected future performance of their firm. The most common voluntary disclosure is management's forecasts of the firm's anticipated earnings per share for the next period. In this study we evaluate the economic implications of management earnings forecasts for U.S. firms. Although the Securities Exchange Commission (SEC) mandates certain disclosures, management earnings forecasts are not required by the SEC. Consequently, they represent one of the few remaining voluntary disclosure mechanisms by which managers can signal information to the market. The question we investigate is whether the release of this supplementary information influences investors' long-term assessment of firm risk and firm value.

The importance attached to voluntary management disclosures has been documented in other contexts. Management earnings forecasts have been shown to affect short-term movements in stock prices (Pownall et al., 1993), analysts' forecasts (Baginski and Hassell, 1990) and bid-ask spreads (Coller and Yohn, 1997). Building on these studies, we are interested in examining how the choice by management to provide extra information regarding the current and expected future state of the firm through earnings forecasts influences the asymmetry of information between management and investors. We argue that this relationship can be examined by studying how changes in the level of information disclosed by management influences the perceived level of risk for investors and the associated long-term measures of firm value. This study supplements existing studies by considering the impact of

management earnings forecasts on long-term measures of firm value rather than the short-term measures more frequently considered.

The first stage of our analysis focuses on the impact of choosing to voluntarily issue earnings forecasts. By deciding to provide guidance to outside stakeholders, management appears to be making a clear statement regarding its commitment to providing investors with extra information, yet the decision to simply disclose such forecast information may not be sufficient to impact risk perceptions or firm value – it is also important to consider the characteristics of these forecasts. Having chosen to issue an earnings forecast, the manager faces a broad array of choices regarding the attributes of that forecast. These choices involve the form of the forecast (e.g., point estimate, range or qualitative, etc.), the frequency (e.g., quarterly versus annual), the horizon (e.g., next quarter, next year or further) and the information to accompany the forecast (e.g., the presence or absence of attributions). Voluntary earnings forecasts appear more important to investors because the market often reacts to voluntary earnings forecasts but often shows very little reaction when mandatory earnings reports are released (i.e., the market appears to already anticipate the news in mandatory announcements via other sources of information such as management earnings forecasts). Because of the significant role played by these forecasts in financial markets, it is important to understand what aspects of management earnings forecasts influence investors' expectations for the firm's future performance and thus firm value. In addition to the forecast and attributes per se, it is important to examine the credibility of such forecasts, i.e., some measure of the extent to which actual earnings are related to forecast earnings.

In our study we characterize management earnings forecasts using the framework proposed by Wiedman (2000). In her study she characterizes both voluntary and mandatory disclosures as having three components – antecedents, characteristics and consequences. Antecedents are the environmental and firm-specific characteristics, such as the legal setting and the incentives of firm managers that influence the likelihood of a forecast being issued. Forecast characteristics pertain to the choices that a

manager makes relating to the content of the forecast itself, such as its form, horizon and the level of detail. Consequences pertain to the reactions to the forecast, such as stock price changes and analyst behavior. Not surprisingly, the consequences are a function of antecedents and forecast characteristics. Much of the prior research has focused on the consequences of either forecast antecedents or characteristics. We build on these studies by explicitly examining the potential interactions between all three components. This is an important issue to address as the consequences of the current management forecasts influence the antecedents and the characteristics in subsequent periods and these, in turn, influence the subsequent consequences. Although we control for environmental (or market) antecedents, we focus on the least well-understood aspect of management earnings forecasts, the forecast characteristics. Specifically, we examine how i) these characteristics are influenced by antecedents and past consequences and ii) the markets react to different characteristics. There has been less work on understanding the role of the characteristics of management earnings forecasts in terms of either theory or empirical research (Hirst, Koonce and Venkatraman, 2008) which is somewhat surprising given that it is the component over which managers have the most control (Choi et al., 2006).

Because of the complexity in how the information provided by management is interpreted by outside stakeholders, it is important to identify and evaluate possible interactions among various antecedents and characteristics to determine which are the most important to outside stakeholders and thus have the largest influence on the consequences. Given the large number of studies looking at the consequences of individual components, studying the potential interactions will push forward our knowledge and understanding of such forecasts (Libby et al., 2002). We build on some of the classic work on these potential interactions such as Baginski et al. (1993) who find that stock price reactions to earnings forecasts are contingent on the forecast form, and specifically that point forecasts lead to greater stock price reactions relative to range forecasts. In contrast, Pownall et al. (1993) and Atiase et al. (2005a) find no variation in stock price reactions conditional on forecast form. One possible explanation for these mixed results may originate from Hirst et al. (1999) who examine how prior forecast accuracy may

moderate the effects of forecast form therefore suggesting a possible interaction between antecedents and characteristics.

Recent studies have shown that better governance and better mandatory disclosure practices are associated with higher firm valuation (Klapper and Love, 2004; and Durnev and Kim, 2005), lower cost of capital (Botoson, 1997; Sengupta, 1998; Francis et al., 2002; Lambert, Leuz and Verrechia, 2007; and Francis, Nanda and Olsson, 2008) and with a decrease in both idiosyncratic risk as well as the level of private information (Brown and Hillegeist, 2007; and Ferreire and Laux, 2007). Studies which have focused on voluntary disclosures have demonstrated that firms with better governance are more likely to make voluntary disclosures of earnings forecasts (e.g., Ajinkya, Bhojraj, and Sengupta, 2005; Karamanou and Vafeas, 2005) and management believes that disclosing reliable and precise information can reduce information risk about a company's stock (Graham, Harvey and Rajgopal, 2005). In an international context, Shi, Kim and Magnan (2008) find that cross-listed firms in the U.S. have higher firm valuation when they release voluntary earnings forecasts. Although these studies provide valuable insights into the consequences of improved corporate disclosure and transparency, the interaction between antecedents, characteristics and consequences of voluntary earnings disclosures remains an open question.

Our study makes three contributions to the literature. First, we focus on the direct link between the use of different types of management earnings forecasts to decrease information asymmetry and thus decrease firm risk, as well as the link between decreasing firm risk and increasing firm value. Eliminating some information asymmetries by the voluntary disclosure of information through management earnings forecasts should be related to a decrease in firm risk. Consequently, decreasing firm risk should lead to an increase in firm value. We test directly whether management earnings forecasts are related to a decrease in firm risk as well as an increase in firm value. This is important because in a survey conducted by Graham, Harvey and Rajgopal (2005), more than 90 percent of the executives believe that developing a reputation for transparent reporting through voluntary disclosure can

help lower information risk and the cost of capital to enhance firm valuation. Empirical studies have not, however, directly tested the associations among management earnings forecasts, firm risk and firm value. An additional innovation is our development of a new proxy for forecasting reputation. We use archival data to forecast reputation to firm risk and value to link and therefore provide direct empirical evidence on the survey findings by Graham et al. (2005).

Second, we extend the existing literature by examining the aggregate effect of management forecast strategy and quality on firm risk and value in a longer-term context. Anilowski, Feng and Skinner (2007) document that the number of firms releasing voluntary earnings guidance has increased from 10-15 percent in the 1990s to approximately 50 percent in 2004. This suggests that disclosing voluntary earnings forecasts has become an increasingly important strategy. Yet prior studies that examine the consequences of management earnings forecasts largely focus on short-term stock market reactions. For instance, using short-term event windows, studies find that management earnings forecasts influence firm value (e.g., Pownall, Wasley, and Waymire, 1993) and lead to a reduction in bid-ask spreads (Coller and John, 1997). We are not aware of any existing studies that explore the long-term effects of management earnings forecasts (e.g., no such studies are reported by Hirst, Koonce, and Venkataraman, 2008). While short-term market reaction can provide some important information, longer-term valuation measures may be better able to capture aggregate actions of management.

Third, we extend the literature by testing how forecast antecedents, characteristics, and consequences interact to impact firm risk and value. In their review on the management earnings forecast literature, Hirst et al. (2008) conclude that forecast characteristics (e.g., frequency, precision, accuracy and horizon) are not well understood though managers have great discretion over the forecasting characteristics. Therefore, they call for future research to explore the interactions among forecast antecedents, characteristics and consequences. In this study, we develop a series of hypotheses to study how forecast antecedents and characteristics interact to influence the economic consequences of forecast

(i.e., firm risks, and firm values). We empirically test these hypotheses using a Heckman 2-step model to explicitly consider the influence of antecedents on the characteristics and then the impact of the characteristics on investors' perception of firm risk and firm value.

We study the relationship between the voluntary submission of management earnings forecasts on several measures of firm risk (e.g., bid-ask spreads, idiosyncratic risk and Z-scores) to determine the role of the asymmetry of information between management and investors on risk and subsequently on long-term firm value captured by Tobin's Q. After controlling for many of the factors most commonly found to influence firm value and risk, we find evidence consistent with the issuing of management earnings forecasts increasing the long-term value of firms. Because of the number of factors which can influence the long-term value of firms, it is very revealing that issuing forecasts is related to an increase in firm valuation and a decrease in information risk. It is, however, more than simply the act of issuing forecasts – the forecasts must also be credible, precise, and frequent. Because of the possible endogeneity between various firm-specific characteristics and the voluntary issuing of different types of management earnings forecasts, we perform a two-stage analysis and find that this strengthens our findings.

The paper is organized as follows. Section 2 reviews some of the additional relevant literature and presents a development of our hypotheses. Section 3 describes the data as well as our empirical model. Results are presented in section 4 and section 5 presents a summary and conclusions.

2. Literature Review and Hypotheses Development

There are two strands of literature related to information asymmetry between managers and investors that are relevant to our study. The origins of the first stream can be traced back to Barry and Brown (1985, 1986), Diamond and Verrecchia (1991), and Kim and Verrecchia (1994) who develop information risk models in which voluntary disclosure reduces the information risks, thus reducing the cost of capital and enhancing firm value. The second is related to Merton (1987) who develops an

investor recognition model whereby investors who are less familiar with a firm demand a risk premium for investing in the firm's stock. In the current context, we can interpret voluntary disclosure of management earnings forecasts as increasing the familiarity of a firm and its prospects to potential investors.

The act of management voluntarily disclosing earnings forecasts decreases the asymmetry of information between management and investors. Decreasing the asymmetry of information should result in certain consequences. The consequences we focus on are a decrease in the uncertainty of the firm's future prospects as captured by measures of the uncertainty or riskiness associated with the firm's share price, such as a decrease in overall stock return volatility as well as idiosyncratic stock volatility (as estimated using the Capital Asset Pricing Model or CAPM) and average bid-ask spreads as well as accounting-based measures of risk such as the Z-score (Altman, 1968 and 1993). Decreasing the riskiness of the firm should result in a measurable increase in firm value such as an increase in Tobin's Q, the market-to-book ratio.

> **Hypothesis H_{1a}**: Firms that release voluntary earnings forecasts are associated with lower firm risk (as captured by overall stock return volatility as well as idiosyncratic stock volatility, bid-ask spreads and the risk of bankruptcy estimated using the Z-score).

> **Hypothesis H_{1b}**: Firms that release voluntary earnings forecasts are associated with an enhanced firm valuation (as captured by Tobin's Q).

There are also various characteristics of management earnings forecasts which may influence these relationships. As in the first hypothesis, disclosure occurrence is an important aspect of a firm's overall disclosure strategy; but so is the disclosure frequency. Prior research shows that there are large variations in how frequently firms choose to release earnings forecasts. For instance, Rogers and Stocken (2005) find that for their sample firms during the period 1997-2000, 63 percent of firms released only one

forecast and only 1 percent of firms provide earnings forecasts every year. The forecast frequency has also been found to depend on environmental factors. For example, Waymire (1985) shows that firms disclosing more frequent forecasts are less volatile as measured by earnings volatility. Graham et al. (2005) posit that forecast frequency is related to the firm's probability of meeting or beating earnings benchmarks.

The above evidence suggests that the frequency of forecasts that a firm chooses may be associated with the firm manager's uncertainty about future cash flows (i.e., firm risks or other firm-specific antecedents). Furthermore, economic theory predicts that commitment to *persistent* disclosure reduces the information risk of a firm, and thus reduces the cost of capital and enhances firm valuation (Diamond and Verrecchia, 1991; Leuz and Verrecchia, 2000). Botosan and Harris (2000) find that managers normally signal their commitment to disclosure by providing disclosures more frequently. Increasing disclosure frequency can improve both the content and the timeliness of the information. Therefore, by providing earnings guidance more frequently, management may supply more pertinent information to the market and the information revealed is timelier for the investors' decisions. All these benefits should result in a decrease in the risk or uncertainty of future cash flows. This leads to our second hypothesis:

Hypothesis H_{2a}: Firms releasing more frequent earnings forecasts are associated with a reduction in firm risk.

Hypothesis H_{2b}: Firms releasing more frequent earnings forecasts are associated with an enhancement in firm valuation.

Another important characteristic of management earnings forecasts is their precision: point forecasts, specific ranges (i.e., of a closed-interval nature), open-interval ranges (i.e., minimums or maximums), and of a qualitative nature (i.e., providing general impressions about the firm's earnings

prospects).[1] Ajinkya, Bhojraj and Sengupta (2005) indicate that in the period 1997-2002, 78 percent of their sample firms release point or specific range forecasts. Empirical studies suggest that forecast form captures the precision of managers' beliefs about the future (Hirst et al., 2008) and that different forms of earnings forecasts have different information content (Pownall, Wasley, and Waymire, 1993). In addition, using short-term event studies, prior studies provide evidence that management forecast precision affects the beliefs of investors and financial analysts. For example, Ajinkya and Gift (1984) develop an Expectation Adjustment Hypothesis and posit that managers will credibly label their forecasts as to precision. Baginski, Conrad, and Hassell (1993) examine the effects of information precision on short-term equity pricing, and they support a positive relation between forecast precision and the importance of forecasts on security prices.

Theoretical work suggests that a signal's precision is important in belief development (Kim and Verrecchia, 1991; and Morse, Stephan, and Stice, 1991). Specifically, Kim and Verrecchia (1991) examine a two-period rational expectations model whereby traders are assumed to be diversely informed and differ in the precision of their private prior information. They find that the price reaction to the unexpected portion of a disclosure is an increasing function of its relative importance across the posterior beliefs of traders. The relative importance is positively related to the precision of the announcement and inversely related to the precision of preannouncement information. The study by Kim and Verrecchia (1991) implies that the price reaction to the public reaction is a positive function of the information's precision. Building on this line of research, we expect that consistent disclosure of precise forecasts will have a positive long-term effect on firm risk and valuation. This reasoning leads to our third hypothesis:

> **Hypothesis H_{3a}**: Firms disclosing more precise earnings forecasts are associated with a reduction in firm risk.

[1] Point estimates are those whereby a specific estimate is disclosed such as "Earnings will be X this period." Range estimates are closed-interval forecasts of the form "Earnings will be between X1 and X2 this period." Open-interval estimates are lower or upper bound forecasts of earnings. A minimum estimate is in the form "Earnings will be greater than X1 this period" whereas a maximum estimate is disclosed such as "Earnings will be no more than X2 this period." Qualitative estimates are general impressions in the form "Earnings will be good this year compared with last year."

Hypothesis H_{3b}: Firms disclosing more precise earnings forecasts are associated with an enhancement in firm valuation.

The credibility of the forecast is another characteristic that may influence the economic consequences of the forecast. Managers may have incentives to issue self-serving forecasts and thus not all management earnings forecasts are credible as measured by how actual earnings deviate from forecasted earnings (Hutton and Stocken, 2007; and Hirst et al., 2008). However, only credible information will enhance the resource allocation in capital markets and reduce uncertainties related to the future prospects of a firm (Healy and Palepu, 2001). Prior studies document that the forecast credibility influences how analysts react to a forecast. For example, Williams (1996) finds that analysts revise their forecasts more for firms with high prior forecasting credibility. In a recent study, Hutton and Stocken (2007) show that when a firm releases credible information in previous periods, investors respond more to current management earnings forecast news. In addition, CFOs surveyed by Graham et al. (2005) believe that more credible voluntary disclosure helps to eliminate the information risk of a firm, and potentially reduce the risk premium that investors require. Taken as a whole, we predict that if firms consistently provide credible voluntary earnings forecasts (i.e., the forecasted earnings are viewed as having accurately forecasted actual earnings), they will benefit from reducing uncertainty about their future prospects. This reasoning leads to our fourth hypothesis:

Hypothesis H_{4a}: Firms releasing more credible earnings forecasts are associated with a reduction in firm risk.

Hypothesis H_{4b}: Firms releasing more credible earnings forecasts are associated with an enhancement in firm valuation.

Graham et al. (2005) survey and interview more than 400 CFOs to identify the factors that motivate managers to provide voluntary disclosure. 92 percent of the executives claim that promoting a

reputation for transparent reporting is a key driver. In the context of management earnings forecasts, Williams (1996) show that how financial analyst respond to a management earnings forecast differs greatly according to the reputation of previous forecast accuracy. In a recent study, Hutton and Stocken (2007) explore the effect of firm forecasting reputation on investors' short-term reaction to the voluntary forecasts. They find that investors are more responsive to a management earnings forecast when a firm has developed a forecasting reputation. However, no prior study has investigated the aggregate effect of forecasting reputation on a firm's risk and long-term valuation in a multiple-period context. Extending Hutton and Stocken (2007), we construct a forecasting reputation variable that reflects prior forecast frequency, precision and credibility.

More specifically, we measure the average forecast frequency, precision and credibility for each firm in our sample period, and then assign each firm a rank. Reputation for corporate financial transparency plays an important role in determining equity prices and distribution of returns. In particular, using S&P disclosure and transparency scores, Durnev and Kim (2005) find that firms with higher reputation for transparent disclosures have higher firm valuations. Klapper and Love (2004) show similar results. Additionally, Ferreira and Laux (2007) indicate that corporate governance reputation is inversely related to idiosyncratic risk. Following these lines of research, we predict that a higher forecasting reputation can make forecasts more attractive to uninformed investors, thereby reducing firm risk by decreasing information asymmetry and estimation risk. This reasoning leads to our fifth hypothesis:

Hypothesis H_{5a}: Firms with higher forecasting reputation are associated with a reduction in firm risk.

Hypothesis H_{5b}: Firms with higher forecasting reputation are associated with a an enhancement in firm valuation.

In the previous hypotheses, we have argued that different characteristics of the information in the voluntary disclosure of earnings forecasts and different antecedents may decrease the asymmetry of information more than others. Specifically, more frequent disclosures (e.g., quarterly rather than annual) and more precise guidance (e.g., specific point estimates versus ranges versus broader guidance) decrease the asymmetry of information with the effects as indicated in our discussion of the first hypotheses). Antecedents such as the degree of credibility of the information in the voluntary disclosure of earnings forecasts and the firm's reputation decrease the asymmetry of information. Specifically, a longer history of providing voluntary disclosure and a history of accurate forecasts decrease the asymmetry of information between management and investors. Similarly, as the level of new information in the disclosure increases, the more the asymmetry decreases. Specifically, if analysts update their predictions or the management forecast differs from the analysts' consensus forecast before the disclosure, the more the disclosure decreases the asymmetry of information between management and investors.

3. Data and Empirical Model

Our sample includes U.S. domestic firms with management earnings forecasts data from the Corporate Investor Guidelines (CIG) database, maintained by First Call. The data we obtain from CIG covers information on management earnings guidance for the period of 1997-2006. We ignore forecasts made before 1997 since the number of forecasts is substantially lower for years before 1997. The sample of management earnings forecasts is then matched with First Call database on financial analyst following. We also delete firms whose total assets are below $1 million to avoid possible extreme values for Tobin's Q and market to book ratio. After all these procedures, we have a total of 7,358 firms over this period where these firms submit a total of 17,297 management earnings forecasts. The CIG database carries both annual and quarterly forecasts as well as detailed information on the characteristics of both the voluntary management earnings forecasts as well as the analysts' forecasts for each firm.

We supplement this information with firm level characteristics such as market value of equity, operating income, liabilities, value of intangibles, sales growth, return on assets and earnings per share data obtained from Compustat to measure the antecedents. Firm level price information is obtained from CRSP. We estimate firm value using Tobin's Q.[2] Tobin's Q is computed as the market value of equity plus the book value of the total liabilities in the numerator and book value of assets in the denominator using the data from the firm's fiscal year end obtained from Compustat. In order to test our hypotheses, we also need estimates of the riskiness of the firm. We rely on five risk measures that are standard in the finance literature: (i) idiosyncratic or firm-specific risk, (ii) stock return volatility, (iii) beta or market risk, (iv) spreads on quoted share prices, and (v) the Z-score. The first three measures are described below in more detail. The spreads are calculated as the average of the end of month closing bid and ask prices over the past year using prices from CRSP. The Z-Score is constructed using the weighted sum of five financial ratios obtained using data from Compustat at the end of the fiscal year (Altman, 1993): Z = 1.2×(Working Capital / Total Assets) + 1.4×(Retained Earnings / Total Assets) + 3.3×(EBIT / Total Assets) + 0.6×(Market Value of Equity / Total Liabilities) + 1.0×(Sales / Total Assets). When interpreting the Z-score, a lower value indicates the firm is at a higher risk of bankruptcy.

We estimate the stock return volatility, idiosyncratic or firm-specific risk, as well as beta from the following regression of excess stock returns on the market risk premium;

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_i(R_{m,t} - R_{f,t}) + \varepsilon_{i,t}, \quad i = 1, \ldots, t = 1,\ldots,T, \tag{1}$$

where $R_{i,t}$ is the monthly stock return for firm i in month t, $R_{f,t}$ is a measure of the monthly return from holding the 30 day risk-free asset provided by CRSP, $R_{m,t}$ is the monthly return from the CRSP value-weighted market index, α_i or alpha is the intercept term, β_i or beta is the slope term, and $\varepsilon_{i,t}$ is an error term. We run this regression on a rolling 3 year basis for each firm in our sample. The volatility measure

[2] Note: we also considered other measures of firm value including the market-to-book ratio and alpha from the CAPM but found that they did not provide further insight beyond the more commonly considered Tobin's Q. Consequently, these results are not presented.

is the annualized monthly standard deviation of each firm's return series. The idiosyncratic risk measure is the standard deviation of the residuals from the regression using model (1). Each of our risk measures, generically referred to below as $Risk_i$ provides us with different versions of time-series of dependent variables in a regression analysis to test hypotheses H_{1a}:

$$Risk_{i,t} = a + b\ D1_{vol\_dis,i,t} + \Sigma\ \gamma\ F_{k,i,t} + e_{i,}t \qquad i = 1, \ldots,N,\ t = 1,\ldots,T \qquad (2)$$

where $D1_{vol\_dis,i,t}$ is a dummy variable taking on the value of 1 if the management of firm i voluntarily discloses earnings forecasts during year t and $F_{k,i,t}$ are a series of k "factors" or control variables or characteristics for firm i during year t (Note: these factors are described in detail below). Our test of hypothesis H_{1a} is, for example, whether b is significantly negative, i.e., whether by voluntarily disclosing earnings forecasts and thus decreasing information asymmetry, management can decrease various measures of firm risk.

Our various control variables, F_k, are motivated from the existing literature and are described as follows (note that the i,t subscript is suppressed but each variable is measured on a firm-year basis). Our control variables include the following. ***SIZE*** represents the log of the market value of equity as of the firm's fiscal year-end. Since larger firms tend to be less risky, we expect the coefficient to be negative. ***LIABILITY*** is the ratio of total liabilities to total assets measured at the fiscal year end. Since firms with more leverage tend to be riskier, we expect the coefficient to be positive. ***INTANGIBLE*** is the ratio of total value of intangible assets to total assets measured at the fiscal year end. The variable captures the degree of information asymmetry – more intangible assets means there is more intellectual capital and thus assets which are harder to value by investors. ***GROWTH*** is the percentage increase in sales over the past 3 years. The variable captures the firm's future prospects assuming that larger growth indicates increased future prospects. ***ROA*** or return on assets is calculated as the operating income divided by the total assets as of the firm's fiscal year-end. It is expected that firms with larger return on assets will be performing better and thus will be less risky leading to a negative estimated coefficient. We also include

YEAR and ***INDUSTRY*** dummies, not reported in the tables. We use a series of ten industry classifications based on the standard break-down according to 2-digit SIC codes. Specifically, we define the industries as agriculture/forestry/fishing, mining, construction, manufacturing, transportation, wholesale trade, retail trade, finance/insurance/real estate, services and other.

In order to test hypothesis H_{1b} we need an estimate of firm value. Using the Tobin's Q measure of firm value discussed above, we formally evaluate its relationship with the voluntary disclosure of management earnings forecasts while controlling for other factors believed to influence firm risk and firm value in a manner similar to that in equation (2). It is used in time-series models estimating the relationship between the current annual value of Tobin's Q and the current observations for our independent variables listed above and obtain the following model:

$$\text{Tobin's } Q_{i,t} = a_{,} + b\, D1_{vol\_dis,i,t} + \Sigma\, \gamma\, F_{k,i,\,t} + e_{i,t} \quad i = 1, \ldots, N \quad t = 1, \ldots, T \qquad (3)$$

where the variables and factors are the same as those used in equation (2).

To address the subsequent research questions, we decompose the voluntary disclosure dummy into other dummy variables to capture: frequency of disclosure, precision of disclosure, credibility of disclosure and reputation for disclosure (e.g., the accuracy of actual disclosed forecasts to what was observed).

Because of our interest in further exploring the potential interactions between characteristics, antecedents and consequences, we control for this potential endogeneity using a 2-stage model. Specifically, we use the Heckman 2-step model (Heckman, 1979) to explicitly model this interaction and which factors are important antecedents in each stage of the disclosure decision. In the Heckman model, the first stage of the model investigates how different factors influence the likelihood that a firm will voluntarily issue management earnings forecasts. In the second stage, the estimated likelihood that a firm will voluntarily issue such guidance is inserted into the model to offset both the discrete nature of issuing

management earnings forecasts (i.e., a firm either does or does not issue them) and the factors which may influence that decision and therefore may also influence the measures of firm valuation that we are concerned about. The model consists of the following two stages:

$$\text{Probability(Voluntary Disclosure of MEF)} = f(\omega F_{k,i,t}) \qquad (4a)$$

where a probit model or a multinomial logistic model are estimated using maximum likelihood to obtain estimates of ω. For each observation in our sample we compute: $\hat{\lambda}_{i,t} = \frac{\phi(\hat{\omega}F_{i,t})}{\Phi(\hat{\omega}F_{i,t})}$ where φ is the normal probability distribution function and Φ is the normal cumulative distribution function. This provides an estimate of the non-selection hazard or the probability that a firm with non-censored outcomes having those characteristics, $F_{i,t}$, would have issued a management earnings forecast. The characteristics we include in our model are: ***SIZE*** (as defined above) and the following variables. ***ANALYST*** is the number of analysts following the firm. The variable captures the degree of information asymmetry – more analysts covering a firm means less of an asymmetry of information. We expect the coefficient to be negative. ***GOOD NEWS*** is a dummy variable taking on a value of one if the firm's earnings per share has increased from last year to this year. We expect that firms with positive earnings growth should be less risky and thus have improving prospects (a negative estimated coefficient). ***LITIGATE*** is a dummy variable taking on the value of 1 if the firm is in the biotechnology (2833-2836 and 8731-8734), computers (3570-3577 and 7370-7374), electronics (3600-3674), or retail (5200-5961) industries, and 0 otherwise. This variable captures litigation risk as determined by Ajinkya et al., (2005) and thus these firms tend to be characterized by higher risks and more of an asymmetry of information. We expect the coefficient to be positive. ***LOSS*** is a dummy variable taking on the value of 1 if the firm reported a loss during the previous 12 months, and 0 otherwise. We expect the firms which have recently been experiencing losses to be riskier and thus we expect the coefficient to be positive. ***SURPRISE*** is the

absolute value of the differences between the current period's and previous period's earnings per share deflated by the share price at the current fiscal year-end.

The estimated probability of a firm voluntarily issuing earnings forecasts ($\hat{\lambda}_{i,t}$ also called the Inverse Mills Ratio) is inserted into the model estimated above to help control for the endogeneity and the censoring of the outcomes:

$$\text{Risk}_{i,t} = a_{,} + b\ \hat{\lambda}_{i,t} + \Sigma\ \gamma\ F_{k,i,}t + e_{i,t} \quad i = 1, \ldots,N \quad t = 1,\ldots,T \tag{4b}$$

$$\text{Tobin's } Q_{i,t} = a_{,} + b\ \hat{\lambda}_{i,t} + \Sigma\ \gamma\ F_{k,i,}t + e_{i,t} \quad i = 1, \ldots,N \quad t = 1,\ldots,T \tag{4c}$$

The interpretation of the results and the hypothesized directions are the same for model (4) as they are for model (3). The only difference between the models is that model (4) allows for non-discrete outcomes reflecting the interaction between various antecedents and the issuing of voluntary earnings forecasts.

4. Results

Before formally testing our hypotheses, we examine our data. In Table 1 we present some summary statistics. As mentioned earlier, our data set contains over 7,000 U.S. firms over the period from 1997 to 2006. We find that our firms represent a broad cross-section of the U.S. market. Our set of firms ranges from very small firms to very large firms (average market capitalization of US$3,104 million with the 25th and 75th percentiles being US$56 million and US$ 1,088 million respectively), and from very profitable to less profitable (with an average annual return on assets of 1.7% over our sample period and an interquartile range from -3.3% to 6.1% per annum) over all industries. There were no explicit screens on our sample firms beyond requiring that they have data for at least one year in our sample period.

To test our hypotheses, we start by using the models in equations (2) and (3) above. These models are estimated using a mixed model containing both fixed and random effects. To control for the systematic variation for each firm that may not be captured by our explanatory factors, we model firm-specific effects as random effects. Modeling firm effects as random effects is more appropriate than modeling them as fixed effects because our data is a sub-sample of all U.S. firms and our set of control factors contain several measures which are relatively time invariant. To model the firm-specific effects as a random effect, the residual is decomposed into a firm-level effect and a white noise component. In the complete model, the residual is decomposed as: $e_{i,t} = \mu_i + v_{i,t}$ because we model the firm-specific effects as a random effect, so the residual is decomposed into a firm-level effect (μ_i) and a white noise component ($v_{i,t}$).

In Tables 2 and 3, we present the results for the estimations of models (2) and (3) respectively. In Table 2, we start our analysis by considering measures of firm risk to capture the role played by voluntary management earnings forecasts on the asymmetry of information between the firm and its outside stakeholders. Our models include the influence of our control variables and the dummy variable for a firm's disclosure of earnings forecasts on measures of firm risk. Panel A presents the results from the estimation of the fixed-effects model (model 2), while Panel B summarizes the results from the two-stage Heckman treatment model (models 4a and 4b). In Panel A we see that the level of a firm's idiosyncratic risk, stock return volatility, and bid-ask spread decrease when firms voluntarily issue management earnings forecasts – the estimated coefficient on MEF is significantly negative as we predicted. However, we find that the estimated coefficients are counter those anticipated for our beta (expected negative MEF coefficient) and Z-score measures of firm risk (expected positive coefficient).

In Panel B we present the results from the estimation of model 4b. In these results we find that the estimated coefficient on the Inverse Mills Ratio (our estimated value for the MEF correcting for external factors) continue to be negative for a firm's idiosyncratic risk, stock return volatility, and bid-ask

spread and it has become negative for beta. The results, however, remain counter to those we hypothesized for the Z-score. In general, our findings therefore indicate that firms disclosing management earnings forecasts are associated with lower firm risks, which supports H_{1a}. Moreover, we fit in the framework of Wiedman (2000) by considering how the forecast antecedents influence the consequences.

In Table 3 we present the results from using models 4a and 4c to perform the 2-stage analysis on our measure of firm value so we can examine how the decision to voluntarily disclose earnings forecasts influences how investors value a firm. To capture the important role played by firm risk and thus the asymmetry of information between management and investors, we include our measures of risk in the model as well. Our measure of firm value is Tobin's Q – a measure which provides a broad perspective on how investors are valuing a firm. It includes the entire value of the firm (i.e., its enterprise value) relative to the assets that it employs so an increase in this value is related to an increase in how investors are valuing the firm.

In Table 3, we only present the results from the Heckman treatment model (model 4c) in which we have already controlled for the self-selection bias of releasing management earnings forecasts. As discussed earlier, we expect that the coefficients on the Inverse Mills Ratio (i.e., the predicted value of the likelihood of management earnings forecasts) will be positive and significant. However, we find that the estimated coefficients in all six models are negative and significant. These results imply that firms releasing management earnings forecasts are associated with lower firm valuation, which is opposite to our predictions in our H_{1b}.

There are a number of potential explanations for the apparently conflicting results. The major concern is that the management earnings forecast dummy variable is simply one measure (and a very coarse measure as it is a dichotomous variable) to capture the degree to which management is able to decrease the asymmetry of information between management and investors. There may be characteristics

and antecedents which play a significant role and we are only considering the fact of issuing forecasts. This will be considered in subsequent tests. It is, however, also possible that endogeneity between the decision to voluntarily disclose a forecast of earnings per share and other factors is masking subtle differences in the firms. We investigate the possible influence of other factors on our results by investigating Hypotheses 2 through 5 which deal with different characteristics of the earnings forecasts issued by management.

Table 4 presents the results from the estimation of the Heckman 2-step model in which we have further refined our measure of management earnings forecasts to consider the frequency of management earnings forecasts on firm valuation. Using a variable defined as 2 if a firm issues quarterly forecasts, 1 if a firm issues annual forecasts and zero otherwise, we estimate a multinomial logit version of model 4a and insert the resulting estimated frequency of forecasting into model 4c. As shown in our previous discussion of H_2, we conjecture that firms disclosing more frequent earnings forecasts will have higher valuations reflecting the decrease in the asymmetry of information between management and outside stakeholders. Consequently, we expect a positive and significant coefficient on the Inverse Mills Ratio.

Our results on H_2 presented in Table 4 are rather mixed. In the models without a risk measure, and with beta, average spread and Z-score as the risk measures, the coefficients on the Inverse Mills Ratios are positive but not significant. However, in models with idiosyncratic risk and stock return volatility as our risk measures, the coefficients on the Inverse Mills Ratios are negative and significant. Once again, we do not obtain convincing results from our models, however, there are some interesting differences across the risk measures for which the models work as predicted – those for which it does not work are stock price related and thus are more impacted by short-term changes in the level of risk.

Moving to our measures of reputation, Table 5 presents the results from the Heckman model using the precision of management earnings forecasts. In this model, precision is defined as having a value of 4 when management provides a qualitative forecast for future earnings, 3 for an open-interval

forecast, 2 for a rang forecast, 1 for a point forecast and 0 otherwise. We estimate a multinomial logit version of model 4a and insert the resulting estimated frequency of forecasting into model 4c. The estimated coefficients on the Inverse Mills Ratios are generally positive but they are only significant in the model with the Z-score as the risk measure. The results appear to indicate that firms making less precise disclosures are associated with an increase in firm valuation. This runs counter our discussion for H_3.

The results of the effects of the credibility of management earnings forecasts on firm valuation are presented in Table 6. We define credibility such that it takes on a value of 1 if the absolute value of the difference between the forecast earnings and the actual earnings (deflated by the forecasted earnings) is below the median, and 0 otherwise. In all six models, the coefficients on the Inverse Mills Ratios are negative and significant suggesting that firms releasing information which more predicts the actual results are not rewarded with an enhancement in firm valuation. Finally, we consider the influence of the overall reputation of the management earnings forecast on firm valuation in Table 7. We construct a reputation variable which takes on the value of 1 if a firm meets all three requirements (1, a firm releases quarterly forecasts in a given year; 2, a firm releases point forecasts in a given year; 3, a firm releases more credible earnings forecasts than the median level of the whole sample population) and zero otherwise. The results are summarized in Table 7. In all six model specifications, the coefficients on the Inverse Mills Ratios are positive and very significant. These findings provide support for H_5 signifying that firms with strong reputation for quality disclosure are valued more highly than those who do not.

Taken together with the findings from our tests of the other hypotheses, our findings suggest that although releasing management earnings forecasts per se are not necessarily associated with an increase in firm valuation, firms are rewarded with their high-quality management earnings forecasts once they have set up their disclosure reputation.

Overall, our results provide suggestive evidence that voluntarily providing earnings forecasts may decrease the asymmetry of information between management and investors. It is, however, not a simple relationship. Firms must provide regular, credible guidance for investors to value the information. The lack of a clear relationship between our measures of firm risk and simply the act of voluntarily issuing management forecasts is not surprising given the number of factors which can influence the level of risk and thus how investors value a firm. Our results therefore suggest that the process of disclosing information does play a role and there should be further investigation of the interaction between firm characteristics and antecedents.

5. Summary and Conclusions

This paper examines the economic consequences of voluntary disclosure of forward-looking information for a sample of U.S. firms over the period 1997-2006. Essentially, we study how forecast antecedent, forecast characteristics interact with each other to affect firm values and risks. Our findings strongly support that forward-looking earnings information leads to a reduction in a variety of measures of investor uncertainty regarding firm risks. To control for possible endogeneity, we also perform a Heckman Treatment Model. This two-stage model allows us to estimate the likelihood that a firm will voluntarily issue each type of earnings forecast in the first stage and use this in testing our hypotheses. Results from the Heckman Treatment Model correcting for the potential endogeneity problem are largely consistent with the primary results. Overall, our evidence suggests that releasing management earnings forecasts may benefit the firms by decreasing the information asymmetry between management and investors.

While our results suggest that by issuing earnings forecasts per se, management does not seem able to increase firm value, looking more carefully at our results, we find that voluntarily providing earnings forecasts decreases the asymmetry of information between management and investors but it is not a simple relationship. Firms must provide regular, credible and precise guidance for investors to

value the information. The lack of a clear relationship between our measures of firm risk and simply the act of voluntarily issuing management forecasts is not surprising given the number of factors which can influence the level of risk and thus how investors value a firm. Our results therefore suggest that the process of disclosing information does play a role and there should be further investigation of the interaction between firm characteristics and antecedents.

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Table 1
Summary Statistics

Dependent and independent variables used in the analysis over the period from 1997 to 2006. Idiosyncratic Risk is estimated as the standard deviation of the residuals (slope coefficient) from the CAPM regression in equation (1) using three years of monthly data; Stock Return Volatility is the annualized standard deviation of each firm's return series using three years of monthly data; Beta is estimated as the slope coefficient from the CAPM regression in equation (1) using three years of monthly data; Average Spread is calculated as the average of the end-of-month closing bid and ask prices over the past year using prices from CRSP; Z-Score is constructed using the weighted sum of five financial ratios obtained using data from Compustat at the end of the fiscal year (Altman (1993)): Z = 1.2×(Working Capital/Total Assets) + 1.4×(Retained Earnings/Total Assets) + 3.3×(EBIT/Total Assets) + 0.6×(Market Value of Equity/Total Liabilities) + 1.0×(Sales/Total Assets); Tobin's Q is computed as the market value of equity plus the book value of the total liabilities in the numerator and book value of assets in the denominator; Size represents the log of the market value of common equity, in $millions, as of the firm's fiscal year-end; Liability is the ratio of total liabilities to total assets measured at the fiscal year end; Intangible is the ratio of total value of intangible assets to total assets measured at the fiscal year end; Growth is the percentage increase in sales over the past 3 years; Analysts is the number of analysts following a firm, as proxied by the number of forecasting estimates in a given year; Loss is an indicator variable taking on the value of 1 if a firm reported a loss during the previous 12 months, and 0 otherwise; ROA is the ratio of net profit to total assets; Good_News is an indicator variable taking on the value of 1 if the current-period EPS is greater than previous-period EPS, and 0 otherwise; and Surprise is the absolute value of the difference between the current-period EPS and the previous-period EPS, deflated by the price at the fiscal year end.

	Mean	Median	Standard Deviation	25%	75%
Idiosyncratic Risk	0.917	0.756	0.639	0.482	1.165
Stock Return Volatility	0.972	0.811	0.654	0.523	1.234
Beta	1.134	0.957	1.119	0.433	1.633
Average Spread	0.266	0.135	2.802	0.053	0.307
Z-score	7.142	3.370	126.570	1.825	6.012
Tobin's Q	2.149	1.336	3.411	1.047	2.149
Size	5.587	5.471	2.153	4.029	6.989
Liability	0.543	0.532	0.338	0.109	0.747
Intangible	0.109	0.026	0.165	0	0.156
Growth	0.266	0.248	2.036	-0.212	0.789
Analysts	4.509	3	4.959	1	6
Loss	0.316	0	0.466	0	1
ROA	-0.055	0.017	0.486	-0.033	0.061
Good_News	0.560	1	0.496	0	1
Surprise	0.319	0.037	5.957	0.012	0.125

Table 2

Relationship Between Risk Measures and Management Earnings Forecasts

This table presents the regression results of the effects of the occurrence of management earnings forecasts (MEF) on firm risks. Panel A presents the results on fixed-effect models. Panel B summarizes the results on two-stage Heckman treatment models. The first stage model is described in equation (4a), which is a probit model with MEF (i.e., taking on a value of 1 when a firm releases a management earnings forecasts, and 0 otherwise) as the dependent variable. The independent variables in equation (4a) are Size, Loss, Analysts, Good_News, Surprise and Litigate. These variables are described in Table 1 except for Litigate, which is a dummy variable taking on the value of 1 if the firm is in the biotechnology (2833-2836 and 8731-8734), computers (3570-3577 and 7370-7374), electronics (3600-3674), or retail (5200-5961) industries, and 0 otherwise. In the second stage, the Inverse Mills ratio is inserted into the regression models listed below. The dependent variables are Idiosyncratic Risk, Stock Return Volatility, Beta, Average Spread, and Z-Score as described in Table 1. The independent variables include MEF, Size, Liability, Intangible, Growth, as described in Table 1, and Industry and Year Dummies. We use a series of ten industry classifications based on the standard break-down according to 2-digit SIC codes. Specifically, we define the industries as agriculture/forestry/fishing, mining, construction, manufacturing, transportation, wholesale trade, retail trade, finance/insurance/real estate, services and other. The coefficients on Industry and Year dummies are not reported in this table. For each regression the first row is t he coefficient estimates, the second row is the standard errors, and the third row is the t-statistics.

Panel A

	Intercept	MEF	Size	Liability	Intangible	Growth	R^2
Idiosyncratic Risk	1.5301	-0.0380	-0.0922	-0.0993	0.0527	0.0045	0.3
Standard Error	0.0400	0.0055	0.0012	0.0079	0.0154	0.0012	
T-statistic	38.17	-6.88	-75.84	-12.47	3.42	3.61	
Stock Return Volatility	1.5506	-0.0311	-0.0872	-0.1044	0.0517	0.0048	0.29
Standard Error	0.0414	0.0057	0.0012	0.0082	0.0159	0.0013	
T-statistic	37.5	-5.46	-69.56	-12.71	3.26	3.78	
Beta	0.9169	0.0865	0.0262	-0.1679	-0.0181	0.0139	0.19
Standard Error	0.0773	0.0106	0.0023	0.0153	0.0297	0.0024	
T-statistic	11.86	8.13	11.17	-10.93	-0.61	5.81	
Average Spread	11.8970	-0.1742	0.0603	0.0829	-0.0883	0.0197	0.13
Standard Error	0.2399	0.0321	0.0072	0.0503	0.0896	0.0073	
T-statistic	49.59	-5.43	8.43	1.65	-0.98	2.72	
Z-Score	3.4202	-3.7808	2.2961	-19.8582	-13.5899	0.1481	0.14
Standard Error	11.3342	1.5130	0.3482	2.1827	4.0302	0.3500	
T-statistic	0.30	-2.50	6.59	-9.10	-3.37	0.42	

Table 2 (continued)
Relationship Between Risk Measures and Management Earnings Forecasts

Panel B

	Intercept	Inverse Mills	Size	Liability	Intangible	Growth	R^2
Idiosyncratic Risk	1.5575	-0.2641	-0.0721	-0.1745	-0.0995	0.0181	0.66
Standard Error	0.0541	0.0132	0.0019	0.0101	0.0159	0.0016	
T-statistic	28.77	-19.94	-38.36	-17.21	-6.27	10.93	
Stock Return Volatility	1.6219	-0.2575	-0.0685	-0.1822	-0.1079	0.0191	0.65
Standard Error	0.0567	0.0139	0.0020	0.0106	0.0166	0.0017	
T-statistic	28.62	-18.58	-34.85	-17.17	-6.49	11.00	
Beta	1.5055	-0.0696	-0.0090	-0.2264	-0.1973	0.0257	0.52
Standard Error	0.1199	0.0293	0.0042	0.0225	0.0352	0.0037	
T-statistic	12.55	-2.37	-2.15	-10.08	-5.61	6.99	
Average Spread	16.2327	-0.3879	0.0917	0.0456	-0.0504	0.0117	0.47
Standard Error	0.3945	0.0940	0.0135	0.0725	0.1137	0.0119	
T-statistic	41.15	-4.13	6.79	0.63	-0.44	0.98	
Z-Score	6.2472	-3.3298	1.5052	-16.8322	-6.0008	-0.1204	0.67
Standard Error	1.7267	0.3956	0.0598	0.3058	0.4609	0.0506	
T-statistic	3.62	-8.42	25.18	-55.04	-13.02	-2.38	

Table 3
Relationship Between Firm Value and Management Earnings Forecasts

This table reports the regression results of the effects of the occurrence of management earnings forecasts on firm valuation. Heckman treatment models are used to control for self-selection bias. The first stage model is described in equation (4a), which is a probit model with MEF (i.e., taking on a value of 1 when a firm releases a management earnings forecast, and 0 otherwise) as the dependent variable. The independent variables in equation (4a) are Size, Loss, Analysts, Good_News, Surprise and Litigate, which are described in Table 1 and 2. The dependent variable for the second-stage models, reported below, is Tobin's Q as described in Table 1. In the second stage, the Inverse Mills ratio is inserted into the regression models listed below. Other independent variables include Size, Liability, Intangible, Growth, ROA, one risk measure (i.e., Idiosyncratic Risk, Stock Return Volatility, Beta, Average Spread, or Z-Score) and Industry and Year Dummies. All these variables are described in Table 1. The coefficients on Industry and Year dummies are not reported in this table. For each regression the first row is the coefficient estimates, the second row is the standard errors, and the third row is the t-statistics. The R^2 is the MacFadden's (pseudo) R^2 which indicates the degree to which the model parameters improve upon the prediction of the null model, i.e., a model predicting the dependent variable without any independent variables.

Dependent variable: Tobin's Q; "Risk" independent variable:	Intercept	Inverse Mills	Size	Liability	Growth	ROA	Risk	R^2
No Risk Measure	0.3477	-1.1461	0.3132	-0.8656	-0.0431	0.8136		0.47
Standard Error	0.2767	0.0690	0.0098	0.0532	0.0083	0.0355		
T-statistic	1.26	-16.60	31.90	-16.27	-5.16	22.95		
Idiosyncratic Risk	-1.4719	-0.8409	0.3873	-0.5613	-0.0622	1.1270	1.2157	0.51
Standard Error	0.2733	0.0677	0.0097	0.0524	0.0081	0.0354	0.0289	
T-statistic	-5.38	-12.42	39.79	-10.71	-7.63	31.86	42.12	
Stock Return Volatility	-1.4009	-0.8725	0.3768	-0.5703	-0.0620	1.1256	1.1246	0.51
Standard Error	0.2738	0.0678	0.0097	0.0525	0.0082	0.0355	0.0277	
T-statistic	-2.12	-12.87	38.78	-10.87	-7.59	31.72	40.61	
Beta	0.1653	-1.1403	0.3123	-0.8239	-0.0462	0.8603	0.1293	0.51
Standard Error	0.2770	0.0689	0.0098	0.0533	0.0083	0.0357	0.0133	
T-statistic	0.6	-16.54	31.85	-15.46	-5.54	24.08	9.72	
Average Spread	0.3309	-1.2258	0.3368	-0.8130	-0.0456	0.8290	-0.0092	0.56
Standard Error	0.3199	0.0755	0.0109	0.0589	0.0093	0.0375	0.0049	
T-statistic	1.03	-16.23	30.95	-13.8	-4.93	22.12	-1.86	
Z-Score	-0.8550	-0.8901	0.3289	0.5764	-0.0370	-0.9717	0.0911	0.65
Standard Error	0.2526	0.0595	0.0091	0.0487	0.0073	0.0311	0.0009	
T-statistic	-3.38	-14.97	36.12	11.84	-5.06	-31.21	96.30	

Table 4
Relationship Between Firm Value and Management Earnings Forecasts Frequency

This table reports the regression results of the effects of the frequency of management earnings forecasts on firm valuation. Heckman treatment models are used to control for self-selection bias. The first stage model is described in equation (4a), which is an ordered probit model with D_Frequency (i.e., taking on a value of 2 for quarterly forecasts, 1 for annual forecasts, and 0 otherwise) as the dependent variable. The independent variables in equation (4a) are Size, Loss, Analysts, Good_News, Surprise and Litigate, which are described in Table 1 and 2. The dependent variable for the second-stage models, reported below, is Tobin's Q as described in Table 1. In the second stage, the Inverse Mills ratio is inserted into the regression models listed below. Other independent variables include Size, Liability, Intangible, Growth, ROA, one risk measure (i.e., Idiosyncratic Risk, Stock Return Volatility, Beta, Average Spread, or Z-Score) and Industry and Year Dummies. All these variables are described in Table 1. The coefficients on Industry and Year dummies are not reported in this table. For each regression the first row is the coefficient estimates, the second row is the standard errors, and the third row is the t-statistics. The R^2 is the MacFadden's (pseudo) R^2 which indicates the degree to which the model parameters improve upon the prediction of the null model, i.e., a model predicting the dependent variable without any independent variables.

Dependent variable: Tobin's Q; "Risk" independent variable:	Intercept	Inverse Mills	Size	Liability	Growth	ROA	Risk	R^2
No Risk Measure	0.4007	0.1053	0.2198	-0.8337	-0.0403	0.8063		0.51
Standard Error	0.3040	0.0624	0.0104	0.0534	0.0084	0.0373		
T-statistic	1.32	1.69	21.15	-15.62	-4.79	21.64		
Idiosyncratic Risk	-0.4499	-0.4845	0.2615	-0.5187	-0.0671	1.0447	1.3032	0.51
Standard Error	0.2963	0.0621	0.0102	0.0524	0.0082	0.0366	0.0294	
T-statistic	-1.52	-7.80	25.75	-9.9	-8.19	28.51	44.30	
Stock Return Volatility	-0.3460	-0.4993	0.2459	-0.5260	-0.0670	1.0414	1.2114	0.51
Standard Error	0.2967	0.0624	0.0102	0.0525	0.0082	0.0367	0.0283	
T-statistic	-1.17	-8.00	24.23	-10.02	-8.17	28.36	42.75	
Beta	0.3843	0.0204	0.2096	-0.7920	-0.0442	0.8384	0.1306	0.51
Standard Error	0.3035	0.0629	0.0104	0.0535	0.0084	0.0374	0.0135	
T-statistic	1.27	0.32	20.09	-14.81	-5.27	22.45	9.69	
Average Spread	0.4846	0.0526	0.2288	-0.7744	-0.0432	0.8121	-0.0071	0.56
Standard Error	0.3502	0.0694	0.0114	0.0591	0.0093	0.0395	0.0050	
T-statistic	1.39	0.76	20.08	-13.10	-4.63	20.58	-1.43	
Z-Score	-0.7596	0.0444	0.2372	0.6813	-0.0265	-0.9489	0.0934	0.65
Standard Error	0.2487	0.0355	0.0087	0.0489	0.0073	0.0319	0.0009	
T-statistic	-3.05	1.25	27.14	13.92	-3.63	-29.78	98.48	

Table 5
Relationship Between Firm Value and Management Earnings Forecasts Precision

This table reports the regression results of the effects of the precision of management earnings forecasts on firm valuation. Heckman treatment models are used to control for self-selection bias. The first stage model is described in equation (4a), which is a multinomial logistic model with D_precision (i.e., taking on a value of 4 for qualitative forecasts, 3 for open-interval forecasts, 2 for range forecasts, 1 for point forecasts, and 0 otherwise) as the dependent variable. The independent variables in equation (4a) are Size, Loss, Analysts, Good_News, Surprise and Litigate, which are described in Table 1 and 2. The dependent variable for the second-stage models, reported below, is Tobin's Q as described in Table 1. In the second stage, the Inverse Mills ratio is inserted into the regression models listed below. Other independent variables include Size, Liability, Intangible, Growth, ROA, one risk measure (i.e., Idiosyncratic Risk, Stock Return Volatility, Beta, Average Spread, or Z-Score) and Industry and Year Dummies. All these variables are described in Table 1. The coefficients on Industry and Year dummies are not reported in this table. For each regression the first row is the coefficient estimates, the second row is the standard errors, and the third row is the t-statistics. The R^2 is the MacFadden's (pseudo) R^2 which indicates the degree to which the model parameters improve upon the prediction of the null model, i.e., a model predicting the dependent variable without any independent variables.

Dependent variable: Tobin's Q; "Risk" independent variable:	Intercept	Inverse Mills	Size	Liability	Growth	ROA	Risk	R^2
No Risk Measure	0.6021	0.0024	0.2077	-0.8341	-0.0413	0.7877		0.38
Standard Error	0.1389	0.0019	0.0038	0.0267	0.0042	0.0178		
T-statistic	4.34	1.25	55.30	-31.25	-9.86	44.30		
Idiosyncratic Risk	-1.3427	0.0012	0.3131	-0.5288	-0.0615	1.1181	1.2540	0.39
Standard Error	0.1370	0.0019	0.0039	0.0262	0.0041	0.0177	0.0144	
T-statistic	-9.80	0.62	81.32	-20.17	-15.06	63.09	87.21	
Stock Return Volatility	-1.2620	0.0012	0.2993	-0.5373	-0.0612	1.1159	1.1600	0.39
Standard Error	0.1373	0.0019	0.0038	0.0263	0.0041	0.0178	0.0138	
T-statistic	-9.19	0.62	78.31	-20.45	-14.96	62.76	83.98	
Beta	0.4163	0.0022	0.2073	-0.7919	-0.0445	0.8352	0.1312	0.39
Standard Error	0.1390	0.0019	0.0038	0.0267	0.0042	0.0179	0.0067	
T-statistic	3.00	1.16	55.28	-29.62	-10.63	46.61	19.65	
Average Spread	0.5830	0.0025	0.2230	-0.7755	-0.0438	0.8032	-0.0072	0.45
Standard Error	0.1606	0.0021	0.0042	0.0296	0.0046	0.0188	0.0025	
T-statistic	3.63	1.19	53.39	-26.24	-9.43	42.72	-2.90	
Z-Score	-0.6873	0.0046	0.2304	0.6839	-0.0262	-0.9561	0.0934	0.56
Standard Error	0.1193	0.0017	0.0034	0.0244	0.0037	0.0156	0.0005	
T-statistic	-5.76	2.67	68.31	27.98	-7.17	-61.15	197.27	

Table 6

Relationship Between Firm Value and Management Earnings Forecasts Credibility

This table reports the regression results of the effects of the credibility of management earnings forecasts on firm valuation. Heckman treatment models are used to control for self-selection bias. The first stage model is described in equation (4a), which is a probit model with D_Credibility as the dependent variable. Specifically, D_Credibility takes on a value of 1 if the absolute value of the difference between the forecast earnings and the actual earnings (deflated by the forecasted earnings) is below the median, and 0 otherwise. For a range forecast, the median is chosen as the forecast earning; for an open-ended forecast, the upper or lower bound is chosen as the forecast earning. The independent variables in equation (4a) are Size, Loss, Analysts, Good_News, Surprise and Litigate, which are described in Table 1 and 2. The dependent variable for the second-stage models, reported below, is Tobin's Q as described in Table 1. In the second stage, the Inverse Mills ratio is inserted into the regression models listed below. Other independent variables include Size, Liability, Intangible, Growth, ROA, one risk measure (i.e., Idiosyncratic Risk, Stock Return Volatility, Beta, Average Spread, or Z-Score) and Industry and Year Dummies. All these variables are described in Table 1. The coefficients on Industry and Year dummies are not reported in this table. For each regression the first row is the coefficient estimates, the second row is the standard errors, and the third row is the t-statistics. The R^2 is the MacFadden's (pseudo) R^2 which indicates the degree to which the model parameters improve upon the prediction of the null model, i.e., a model predicting the dependent variable without any independent variables.

Dependent variable: Tobin's Q; "Risk" independent variable:	Intercept	Inverse Mills	Size	Liability	Growth	ROA	Risk	R^2
No Risk Measure	0.1427	-2.8691	0.3731	-0.8897	-0.0492	0.9123		0.51
Standard Error	0.2768	0.1443	0.0112	0.0532	0.0083	0.0359		
T-statistic	0.52	-19.88	33.36	-16.74	-5.90	25.40		
Idiosyncratic Risk	-1.5164	-1.7437	0.4079	-0.5793	-0.0652	1.1758	1.1856	0.51
Standard Error	0.2736	0.1437	0.0110	0.0525	0.0082	0.0357	0.0293	
T-statistic	-5.54	-12.13	37.22	-11.04	-8.00	32.95	40.53	
Stock Return Volatility	-1.4315	-1.7411	0.3943	-0.5886	-0.0648	1.1721	1.0916	0.51
Standard Error	0.2740	0.1443	0.0110	0.0526	0.0082	0.0358	0.0282	
T-statistic	-5.22	-12.07	35.97	-11.19	-7.93	32.75	38.78	
Beta	0.0295	-2.7237	0.3645	-0.8559	-0.0512	0.9409	0.0963	0.51
Standard Error	0.2771	0.1457	0.0112	0.0533	0.0083	0.0361	0.0134	
T-statistic	0.11	-18.70	32.42	-16.05	-6.14	26.06	7.18	
Average Spread	0.0689	-3.1629	0.4078	-0.8317	-0.0532	0.9338	-0.0081	0.56
Standard Error	0.3198	0.1587	0.0124	0.0588	0.0092	0.0379	0.0049	
T-statistic	0.22	-19.93	32.77	-14.15	-5.75	24.62	-1.65	
Z-Score	-0.8913	-1.6779	0.3446	0.5882	-0.0388	-0.8900	0.0917	0.65
Standard Error	0.2374	0.1004	0.0096	0.0490	0.0073	0.0314	0.0009	
T-statistic	-3.76	-16.71	35.95	12.01	-5.31	-28.37	96.78	

Table 7

Relationship Between Firm Value and Management Earnings Forecasts Reputation

This table reports the regression results of the effects of the reputation of management earnings forecasts on firm valuation. Heckman treatment models are used to control for self-selection bias. The first stage model is described in equation (4a), which is a probit model with D_Reputation as the dependent variable. Specifically, D_Reputation takes on the value of 1 if a firm issue quarterly forecasts (D_Frequency=2), point forecasts (D_Precision=1) and more credible forecasts (D_Credibility=1) in a given year. The independent variables in equation (4a) are Size, Loss, Analysts, Good_News, Surprise and Litigate, which are described in Table 1 and 2. The dependent variable for the second-stage models, reported below, is Tobin's Q as described in Table 1. In the second stage, the Inverse Mills ratio is inserted into the regression models listed below. Other independent variables include Size, Liability, Intangible, Growth, ROA, one risk measure (i.e., Idiosyncratic Risk, Stock Return Volatility, Beta, Average Spread, or Z-Score) and Industry and Year Dummies. All these variables are described in Table 1. The coefficients on Industry and Year dummies are not reported in this table. For each regression the first row is the coefficient estimates, the second row is the standard errors, and the third row is the t-statistics. The R^2 is the MacFadden's (pseudo) R^2 which indicates the degree to which the model parameters improve upon the prediction of the null model, i.e., a model predicting the dependent variable without any independent variables.

Dependent variable: Tobin's Q; "Risk" independent variable:	Intercept	Inverse Mills	Size	Liability	Growth	ROA	Risk	R^2
No Risk Measure	0.3713	38.1489	0.1508	-0.7568	-0.0456	0.7623		0.51
Standard Error	0.2774	3.0116	0.0087	0.0536	0.0084	0.0355		
T-statistic	1.34	12.67	17.28	-14.12	-5.45	21.45		
Idiosyncratic Risk	-1.5242	32.8962	0.2630	-0.4654	-0.0650	1.0927	1.2408	0.51
Standard Error	0.2738	2.9361	0.0089	0.0527	0.0082	0.0355	0.0287	
T-statistic	-5.57	11.20	29.58	-8.84	-7.97	30.83	43.18	
Stock Return Volatility	-1.4381	32.4023	0.2499	-0.4753	-0.0646	1.0903	1.1458	0.51
Standard Error	0.2742	2.9426	0.0089	0.0528	0.0082	0.0356	0.0276	
T-statistic	-5.24	11.01	28.24	-9.01	-7.90	30.65	41.50	
Beta	0.2040	36.8344	0.1525	-0.7198	-0.0485	0.8079	0.1235	0.51
Standard Error	0.2776	3.0112	0.0087	0.0537	0.0084	0.0358	0.0133	
T-statistic	0.73	12.23	17.48	-13.41	-5.80	22.55	9.26	
Average Spread	0.3398	38.5708	0.1663	-0.7033	-0.0481	0.7761	-0.0064	0.56
Standard Error	0.3209	3.4069	0.0097	0.0593	0.0093	0.0376	0.0049	
T-statistic	1.06	11.32	17.10	-11.85	-5.18	20.64	-1.28	
Z-Score	-0.7347	37.3418	0.1892	0.7218	-0.0435	-1.0042	0.0919	0.65
Standard Error	0.2363	1.7686	0.0070	0.0485	0.0073	0.0311	0.0009	
T-statistic	-3.11	21.11	27.15	14.88	-5.96	-32.29	97.48	