Macroeconomic Uncertainty and Management Earnings Forecasts

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SYNOPSIS: To provide evidence on the role macroeconomic uncertainty plays in managers' decision to issue management earnings forecasts (MFs), this study develops and tests hypotheses about how such uncertainty affects the issuance and characteristics of MFs. Macroeconomic uncertainty is measured using the dispersion in GDP forecasts and the CBOE's Volatility Index (*VIX*). We find that during periods of high macroeconomic uncertainty there is a decrease in the likelihood of MF issuance, consistent with managers assigning a higher cost to releasing forward-looking information as macroeconomic uncertainty increases. We also find that managers issue fewer good and bad news MFs, but more neutral MFs, during periods of high macroeconomic uncertainty. Macroeconomic uncertainty also affects the characteristics of the MFs that managers do issue; for example, managers shift to more earnings preannouncements and to shorter-horizon, but more precise, MFs. Further analysis indicates that the regulatory changes imbedded in the Sarbanes-Oxley Act increased the costs of providing MFs, thereby increasing the sensitivity of MF issuance to macroeconomic uncertainty. The findings provide insight into the role macroeconomic uncertainty plays in managers' decision to issue MFs and the characteristics of the MFs they choose to issue.

Keywords: aggregate market uncertainty; macroeconomic uncertainty; voluntary disclosure; management earnings forecasts; management earnings guidance; litigation risk; CBOE Volatility Index; VIX; GDP; GDP forecast dispersion.

INTRODUCTION

Citing heightened macroeconomic uncertainty many firms announced changes to their earnings guidance policies in early 2009. For example, BMW, Cisco Systems, Inc., Unilever, and United Parcel Service, Inc. either extended the horizon of their management earnings forecasts (MFs), forecasted a wider range of outcomes, or declined to provide guidance (examples of actual firm disclosures are included in the Online Appendix, see Appendix A for the link). These decisions were widely covered in the business press where, for example, *The Economist* (2009) highlighted the decline in guidance:

> Citing the chaos of the global downturn, a growing number of companies, including Unilever, an Anglo-Dutch consumer-goods firm, Costco, a big American retailer, and Union Pacific, one of America's big railroads, have decided not to give annual earnings estimates for 2009.

In addition, a survey of corporate disclosure practices by the National Investor Relations Institute (Morgan 2009) revealed that 64 percent of respondents who had suspended guidance cited an inability to make accurate forecasts due to economic uncertainty as the main driver of their decision.

While the above anecdotal evidence suggests macroeconomic uncertainty affects firms' MF policies, there is little, if any, empirical evidence on how and why macroeconomic uncertainty affects MF policies. While early MF studies considered *firm-specific* uncertainty, no study has focused on how macroeconomic uncertainty affects MF issuance and characteristics. Such evidence is important given the role of MFs in capital markets (Healy and Palepu 2001; Beyer, Cohen, Lys, and Walther 2010). In this study we develop and test hypotheses about how macroeconomic uncertainty affects firms' MF decisions, as well as the characteristics of the MFs firms choose to issue. Consistent with our hypotheses, we find that managers alter their MFs in response to macroeconomic uncertainty.

Verrecchia (1982, 1990) and Dye (1985) develop models where the quality of managers' private information affects the amount of disclosure provided. The observed issuance of MFs implies that they provide net benefits to issuing firms. However, uncertainty about future earnings imposes costs on managers—e.g., loss of reputation, stock price declines, and shareholder lawsuits—if they fail to meet their MFs. Our main prediction is that by reducing the net benefits from issuing MFs, macroeconomic uncertainty will affect managers' decisions to issue (i.e., supply) MFs, as well as the characteristics of any MFs they do choose to issue.

Drawing on the above theoretical studies, the economic intuition underlying our hypotheses is that by affecting the quality of managers' information about their firms' future earnings, macroeconomic uncertainty is a determinant of their MF decisions. This intuition is consistent with recent research suggesting that managers have a comparative advantage when processing firm-specific information, but are at a disadvantage when dealing with macroeconomic information (Hutton, Lee, and Shu 2012). Based on this differential effect, we expect that managers will take into account the additional costs imposed by macroeconomic uncertainty when deciding whether to issue an MF. Since macroeconomic uncertainty adversely affects the quality of managers' information about future earnings, we expect it to be negatively associated with the frequency with which managers issue MFs. This prediction is not without tension because during periods of higher macroeconomic uncertainty it is likely that investors would demand more information, putting pressure on managers to increase the supply of MFs, and thereby providing them with an opportunity to build a reputation for timely disclosure. We incorporate this alternative explanation (reputation building) into the tests by including measures of investor information demand. We also hypothesize that macroeconomic uncertainty affects the attributes of the MFs that managers choose to issue such as forecast horizon, precision, and news. While managers can cease issuing MFs, that decision is not costless. As a result, we predict that if managers prefer to maintain a policy of MF disclosure, then they will not only alter the frequency, but also MF form and precision as a function of macroeconomic uncertainty.

Our main findings are as follows. Based on a sample of 61,764 firm quarters for firms in First Call's Company Issued Guidance (CIG) database from 1996–2008 we find that as macroeconomic uncertainty increases, managers' propensity to issue MFs decreases, and that the magnitude of the effect of macroeconomic uncertainty is twice as large as that of firm-specific uncertainty (historical earnings volatility). We also find that, having decided to issue MFs in periods of higher macroeconomic uncertainty, managers are more likely to issue (1) an earnings preannouncement, i.e., an MF after the fiscal period end; (2) a short forecast horizon MF that is more precise; and (3) a higher proportion of neutral news MFs, and lower proportions of good and bad news MFs. Additional analysis reveals that the effect of macroeconomic uncertainty is stronger post-Sarbanes-Oxley Act (SOX), consistent with SOX increasing the costs associated with issuing inaccurate MFs.

As to the economic importance of our findings, at a general level, we begin by noting the economic significance Beyer et al. (2010, 300) assign to voluntary disclosures (e.g., MFs):

> [F]or the average firm, 28.37% of the quarterly stock return variance occurs on days when accounting disclosures are made. *Surprisingly, management forecasts provide, on average, approximately 55% of accounting-based information.* (emphasis added)

Beyer et al.'s (2010) evidence reaffirms the value-relevance of MFs to investors. By documenting that macroeconomic uncertainty affects MF frequency, timing, precision, and news, our findings identify a new economic attribute (macroeconomic uncertainty) affecting the value relevance of MFs that has implications for how investors and analysts may interpret MFs.

To be more precise about implications, our finding that the magnitude of the effect of macroeconomic uncertainty on MF issuance and characteristics is larger than that of firm-specific uncertainty has practical significance for investors and analysts for several reasons. First, at any point in time, investors and analysts have expectations about the frequency and characteristics of a firm's future MF decisions. By knowing that the level of macroeconomic uncertainty has a greater effect on MF issuance decisions and MF characteristics than firm-specific uncertainty, investors and analysts can make more timely changes to their expectations of a firm's future MF decisions by monitoring the macroeconomic uncertainty measures we examine; namely, the dispersion in GDP forecasts and *VIX* rather than changes in historical earnings volatility (a firm-specific uncertainty measure).

More specifically, since our macroeconomic uncertainty measures are observable on a continuous basis, whereas firm-level earnings-related signals are observed less frequently (e.g., at the time of quarterly earnings announcements), our macroeconomic variables provide more timely information to investors and analysts about the frequency and characteristics of a firm's future MF decisions.

In addition, GDP forecasts and *VIX* are arguably less costly for investors and analysts to analyze and interpret *vis-à-vis* individual firm signals (related to historical earnings volatility), which, because they are firm-specific, will require more detailed analysis at the individual firm level. Given the opportunity cost associated with investor and analyst time and effort, the additional effort required to perform firm-level analysis is not costless. Finally, in addition to forming expectations about the frequency and characteristics of a firm's MF decisions, investors and analysts also have to interpret the economic implications of changes in a firm's MF guidance policies. Knowing macroeconomic uncertainty has a greater effect on MF issuance and characteristics than firm-specific uncertainty means that investors and analysts will be better able to interpret why managers are altering MF frequency or characteristics, and how they should update the firm's stock price or their forecasts of the firm's future earnings accordingly.

The remainder of the paper is organized as follows. The second section reviews the literature and develops our hypotheses; the third section describes variables, sample selection, and the research design; the fourth section presents the results; and the fifth section concludes.

PRIOR RESEARCH AND HYPOTHESIS DEVELOPMENT

Related Research

A number of papers model managers' voluntary disclosure decisions (e.g., MFs) (see Verrecchia [2001] for a review), while empirical research has tested various rationales for why managers issue MFs (see Healy and Palepu [2001] and Beyer et al. [2010] for reviews). However, to our knowledge no prior study has focused on the role that macroeconomic uncertainty plays in the issuance of MFs or on the characteristics of the MFs managers choose to issue.[1]

At a general level, given our focus on macroeconomic uncertainty, our study is related to research on the pricing of aggregate earnings. For example, Konchitchki and Patatoukas (2014a) show that growth in aggregate earnings relates to forecasts of gross domestic product (GDP) as well as the realized GDP; Patatoukas (2014) studies how changes in aggregate earnings relate to changes in the components of future stock returns; while Gkougkousi (2014) examines the relation between aggregate earnings and bond returns (also see, e.g., Konchitchki and Patatoukas 2014b; Ball and Sadka 2015).

Turning to MFs, some recent studies link MFs to macroeconomic variables, but in ways fundamentally different from our research. For example, Anilowski, Feng, and Skinner (2007, 36) examine how guidance affects aggregate stock returns and report "modest evidence that guidance, again, largely downward guidance, is associated with market returns—market returns appear to respond to guidance toward the end of each calendar quarter, when most earnings preannouncements are released, and there is some evidence that firm-level guidance affects market returns in short windows around its release." Bergman and Roychowdhury (2008) find that during periods of high investor sentiment managers reduce the frequency of long-horizon MFs, while during low-sentiment periods they increase MF frequency. Rogers, Skinner, and Van Buskirk (2009) study how the release of MFs impacts short-run market volatility (implied volatilities from traded options), and find that MFs increase short-term volatility, potentially due to bad news MFs. Billings, Jennings, and Lev (2015) revisit the question of whether MFs lead to higher volatility and find that earnings announcements bundled with MFs are followed by a decline in post-announcement volatility. Finally, Bonsall, Fischer, and Bozanic (2013) decompose MFs into macroeconomic and firm-specific components to determine whether such disclosures provide information about the economy.

Our study differs from the above studies in fundamental ways. Specifically, the studies above focus on how MFs affect market-level stock returns, option volatilities, or how market-wide and firm-specific earnings components affect the information contained in MFs, while we study how macroeconomic uncertainty affects managers' *ex ante* MF disclosure decisions and MF characteristics such as forecast frequency, horizon, and precision.

Firm-Specific versus Macroeconomic Uncertainty and MF Issuance

Firm-specific (i.e., unsystematic) uncertainty arises from factors unique to a firm such as new market entry, mergers and acquisitions, management turnover, and technological innovation, while macroeconomic (i.e., systematic) uncertainty is

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[1] Some of the empirical rationales are to signal good performance (Lev and Penman 1990), reduce litigation risk (Skinner 1994; Kasznik and Lev 1995), facilitate capital market access (Frankel, McNichols, and Wilson 1995), opportunistic (insider) trading (Cheng and Lo 2006; Rogers 2008), comply with SEC disclosure rules ((Li, Wasley, and Zimmerman 2015), and adjust analysts' and investors' expectations (Healy, Hutton, and Palepu 1999).

attributable to factors beyond managers' control; for example, competitive uncertainty that arises from rival firm action, demand uncertainty driven by changes in the demand for an industry's products, as well as factors such as changes in consumer sentiment or consumer spending. Although managers can respond to macroeconomic uncertainty, they cannot eliminate it. Consistent with this intuition we expect macroeconomic uncertainty to affect managers' MF choices beyond any effect of firm-level uncertainty. The nondiversifiable nature of macroeconomic uncertainty makes its effects important to managers because investors and analysts (sources of demand for information from the firm) make economic decisions based on MFs. Such demand provides the rationale to expect macroeconomic uncertainty to affect managers MF issuance decisions and the characteristics of any MFs they choose to issue.

Hypothesis Development

Forecast Issuance

Verrecchia (1982, 1990) and Dye (1985) model disclosure where managers choose not to disclose if the quality of their information is low or if investors are uncertain about managers' information. Consistent with this, early MF studies (see, e.g., Waymire 1985) find a negative relation between firm-specific uncertainty and MFs, evidence that managers of firms with highly variable earnings find it difficult to make MFs, due in part to poor information quality.

The intuition underlying the hypotheses we develop below is that higher macroeconomic uncertainty adversely affects the quality of managers' information because managers find it difficult to respond to shocks in product and factor markets that are driven by economy-wide factors. While managers can exercise the costly option of ceasing to issue MFs, our premise is that, when given the choice, managers would prefer to maintain (rather than cease) a guidance policy to satisfy on-going investor demand for information because by doing so they capture the benefits associated with disclosure; e.g., greater analyst following, lower information asymmetry, and lower cost of capital. That said, given the costs associated with issuing inaccurate MFs, e.g., loss of reputation, adverse stock market reactions, and increased risk of litigation, we predict that as the level of macroeconomic uncertainty increases, managers will respond by decreasing the supply and/or by changing the characteristics of the MFs they issue (e.g., horizon, precision, and news content). A decrease in MF issuance in times of higher macroeconomic uncertainty would be consistent with the costs alluded to in the survey evidence discussed in the introduction. The discussion above motivates our first hypothesis (alternate form):

H1 (Forecast Frequency): Macroeconomic uncertainty is negatively associated with the frequency of MF issuance.

MF Characteristics: Forecast Timing/Horizon and Forecast Precision

MFs benefit investors by reducing information acquisition costs and information asymmetries. When macroeconomic uncertainty is high, investors are likely to demand more information about firm performance, and for those managers who choose to issue MFs, such demand provides an opportunity to signal their ability (Trueman 1986) by issuing timely and accurate MFs. That said, during periods of higher macroeconomic uncertainty, managers must trade off the costs of issuing MFs likely to be characterized by lower levels of *ex post* accuracy with the benefits of satisfying investors and analysts information demands.

Intuitively, the quality of managers' information improves as the end of the fiscal period approaches, and even more so after the fiscal period ends. As a result, the risk of inaccurate MFs is lower for shorter-horizon MFs because they are subject to less uncertainty compared to longer-horizon MFs (Bamber and Cheon 1998). Thus, short-horizon MFs and earnings preannouncements (earnings-related disclosures issued after the end of the fiscal period but prior to the earnings announcement date) allow managers to respond to increased investor demand for forward-looking earnings information without necessarily increasing their exposure to litigation risk or reputation loss. This is because when compared to "longer-horizon" MFs, managers have more information available when they issue short-horizon MFs and when they make earnings preannouncements. Based on this intuition, we expect managers to shift to shorter-horizon MFs and earnings preannouncements during periods of higher macroeconomic uncertainty. Using forecast timing and horizon we propose two hypotheses (in alternate form):

H2a (Forecast Timing): Managers are more likely to issue earnings preannouncements and less likely to issue traditional MFs when macroeconomic uncertainty is higher.

H2b (Forecast Horizon): Managers are more likely to issue shorter-horizon MFs when macroeconomic uncertainty is higher.

We also examine how macroeconomic uncertainty affects MF precision. The intuition for the prediction below is based on the premise that heightened macroeconomic uncertainty is associated with deterioration in the quality of managers' information, which in turn makes it more difficult and riskier for them to issue highly precise MFs. Since the likelihood, hence costs, of being inaccurate is higher when the precision of their information is lower, we expect managers to issue less-precise MFs during periods of higher macroeconomic uncertainty:

H3 (Forecast Precision): Managers are less likely to issue precise MFs when macroeconomic market uncertainty is higher.

Forecast News

Our final hypothesis relates to how macroeconomic uncertainty will affect the news content of the MFs managers choose to release. The intuition for the hypothesis builds on several papers. First, in Verrecchia (1990) disclosure decisions are driven by the anticipated market response. For example, in the case of bad news, a manager is likely to disclose when the market reaction to the news (net of proprietary costs) is at least equal to the market reaction to withholding the news. Supporting the theory, Skinner and Sloan (2002) and Clement, Frankel, and Miller (2003) find that investors respond more to bad news MFs, while Williams (2015) finds that the market response to good versus bad earnings announcements varies with market uncertainty. Building on these findings, we predict that managers will reduce the release of bad news MFs in periods of high macroeconomic certainty:

H4 (Forecast News): Managers are less likely to issue bad news MFs when macroeconomic uncertainty is high.

VARIABLES, SAMPLE SELECTION, AND RESEARCH DESIGN

Variable Measurement

Explanatory Variable—Macroeconomic Uncertainty

We measure macroeconomic uncertainty in two ways. Our first measure is the dispersion in the forecasts of gross domestic product (GDP) issued by the Society of Professional Forecasters (obtained from the Federal Reserve Bank of Philadelphia). GDP forecast data have been used in Anderson, Ghysels, and Juergens (2009) and Konchitchki and Patatoukas (2014a). We measure *GDP_DISP* as the average dispersion measured in quarter $t-1$ for the quarter-over-quarter nominal GDP growth rate forecasts for the following four quarters. A second measure of macroeconomic uncertainty is the Chicago Board Options Exchange Volatility Index (*VIX*), which captures the market's expectation of future volatility (Whaley 2009). We use the average daily *VIX* levels in quarter $t-1$ for MFs released in quarter t.[2]

Our use of GDP forecast dispersion and *VIX* to measure macroeconomic uncertainty is a key feature differentiating our study from earlier studies using earnings-based measures of firm-specific uncertainty. In prior studies, firm-specific uncertainty was typically measured as the standard deviation of historical earnings (i.e., earnings variability) and, as such, did not capture forward-looking macroeconomic uncertainty at the time managers were issuing MFs. Rather, it captured the firm characteristics driving past earnings variability, which means historical earnings-based volatility measures are unlikely to capture the level of macroeconomic uncertainty prevailing at the time managers are deciding whether to issue MFs. This limitation of historical earnings-based firm-specific uncertainty measures makes GDP forecast dispersion and *VIX* appealing choices as measures of macroeconomic uncertainty because both capture expectations of future uncertainty in economy.

Dependent Variables

The dependent variables measure MF frequency, timing, horizon, precision, and news:

1. *FREQ* and *ISSUE* are the quarterly frequency and the probability, respectively, of issuing an MF. *FREQ* is the number of MFs issued by a firm in fiscal quarter t, defined as the sum of preannouncements and traditional MFs (*FREQ* is 0 for firms with no MFs in a quarter). *ISSUE* is set to 1 if managers issue at least one MF in a given quarter, and 0 otherwise.

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[2] As a robustness test we also used the volatility of market returns (standard deviation of the daily value-weighted market return during quarter $t-1$ relative to an MF released in quarter t). Results using this variable lead to inferences similar to those based on GDP forecast dispersion and *VIX* (available upon request).

2. *PREANN* (forecast timing) is defined as an indicator variable that takes the value 1 if the firm issues a preannouncement, and 0 otherwise.

3. *HORIZON* (forecast horizon in days) is measured as the date of the fiscal period end minus the MF issuance date (scaled by 100 in regression analyses for ease of interpretation).

4. *IMPRECISE* is forecast precision, which takes the value 1 for point MFs, 2 for ranges, 3 for minimum or maximums, and 4 for qualitative MFs. Lower values of *IMPRECISE* indicate more precise MFs (*IMPRECISE* is defined this way for ease in interpreting the results).

5. *Forecast News.* We partition MFs into good, neutral, and bad news. *GOOD_NEWS* is the number of good news MFs (*GOOD_NEWS_N*) scaled by the total frequency of MFs (*FREQ*). *NEU_NEWS,* and *BAD_NEWS* are measured similarly.

Control Variables

We control for firm-specific uncertainty using *ABRETVOL* and *EARNVOL. ABRETVOL* is the standard deviation of daily market model residuals over the preceding 12 months (following Bergman and Roychowdhury 2008) and *EARNVOL* (earnings volatility) is the standard deviation of quarterly industry-adjusted ROA over the previous eight quarters (Waymire 1985). We also control for investor sentiment, *SENT,* defined as the mean level of the University of Michigan Monthly Consumer Confidence Index over quarter *t*−1 (Bergman and Roychowdhury 2008). Since macroeconomic uncertainty might be correlated with the level of market or firm returns we include *MKTRET* (average value-weighted daily return) and *FIRMRET* (average daily firm-level return), both measured over quarter *t*−1. To control for information environment factors we include the number of analyst earnings forecasts (*ANALYST*), institutional ownership in quarter *t*−1 (*INSTOWN*), litigation risk (*LITRISK*), and insider trading (*INSIDER*). We control for firm size (*MKTCAP,* the natural log of the market value of equity), growth (*MTB,* market-to-book ratio), and the change in operating performance prior to an MF (*DEL_ROA*). Since some firms adopt guidance policies, we include a lagged forecast variable (*L_FREQ*) (see Table 1 for detailed variable definitions; all variables are winsorized at the top and bottom 1 percent). Finally, we include year fixed effects in all regressions due to time-series trends in management forecasts.[3]

Data and Sample Selection Procedures

MFs and consensus analyst earnings forecasts are obtained from First Call. We start with a sample of 103,123 observations of quarterly and annual MFs (52,581 [51 percent] quarterly and 50,542 [49 percent] annual) for which we require (1) at least one consensus analyst earnings forecast be available prior to an MF, (2) the MF be issued before the corresponding earnings announcement, and (3) the MF be issued during 1996–2008. These filters reduce the sample to 88,711. Our unit of observation is a firm-fiscal quarter, which starts from each firm's initial MF fiscal quarter and ends with the last fiscal quarter of the sample period. This step yields 146,918 firm quarters, which include quarters in which a firm did not issue any MFs. We limit the sample to firms with data available on Compustat and CRSP, and institutional ownership and insider trading data available on Thomson Reuters. The final sample contains 61,764 firm-quarter observations.

Summary Descriptive Statistics

Table 2 reports summary statistics. For brevity, we focus on the main variables. The mean (median) *FREQ* is 0.719 (0) with a mean (median) forecast horizon of 118 (86) days. *ISSUE* has a mean (median) of 0.414 (0), indicating that managers issue MFs in about 41 percent of the fiscal quarters in the sample period. Mean and median values of *IMPRECISE* are near 2, suggesting the typical MF is a range. In terms of news, 51 percent of the MFs are bad news (*BAD_NEWS*), 30 percent are good news (*GOOD_NEWS*), and 18 percent are neutral news (*NEU_NEWS*). Turning to macroeconomic uncertainty variables, *GDP_DISP* has a mean (median) value of 1.175 (1.156), while the mean (median) *VIX* is 20.32 (21.46), evidence of a moderate macroeconomic uncertainty during the sample period (see Whaley 2009). The mean (median) value of the firm-specific uncertainty measure, *ABRETVOL,* is 0.029 (0.025), while the standard deviation of past industry-adjusted performance, *EARNVOL,* has a mean (median) value of 2.13 percent (1.25 percent).

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[3] Our inferences are robust to controls for future performance (Lang and Lundholm 1993; Miller 2002).

TABLE 1

Variable Definitions

Variable	Definition
ANALYST	The number of forecasts underlying a firm's last consensus analyst earnings forecast in quarter $t-1$ (relative to the MF release quarter).
BAD_NEWS (*GOOD_NEWS, NEU_NEWS*)	The number of bad news (good news, or neutral news) MFs scaled by *FREQ*. Bad news is defined as *NEWS_RAW* < -0.01. Good news (neutral news) is defined as *NEWS_RAW* > 0.01 ($-0.01 \leq NEWS\_RAW \leq 0.01$).
DEL_ROA	The difference between a firm's quarter t and quarter $t-1$ industry-adjusted *ROA*, where *ROA* is measured as income before extraordinary items/lagged total assets.
EARNVOL	The standard deviation of a firm's quarterly *ROA* less the industry median *ROA* over the period $t-7$ to t (relative to the MF release quarter). *EARNVOL* is coded as missing if the number of ROA values is less than six during the eight-quarter estimation period.
FIRMRET	A firm's average daily return in quarter t.
ABRETVOL	The standard deviation of the daily market model residual for the 12-month period from quarter $t-5$ to $t-1$ (relative to the MF release quarter).
FREQ	The number of MFs issued by a firm in quarter t.
GDP_DISP	Average dispersion for the quarter-over-quarter nominal GDP growth rate forecasts for the next four quarters. GDP forecast dispersion data are from the Survey of Professional Forecasters by Federal Reserve Bank of Philadelphia (http://www.philadelphiafed.org/research-and-data/real-time-center/spf-forecast-dispersion.cfm). The tests use *GDP_DISP* measured in quarter $t-1$ (relative to the MF release quarter).
HORIZON	Average forecast horizon in quarter t measured as the fiscal period end date minus the MF issuance date (scaled by 100 in the regressions).
IMPRECISE	Average management forecast precision in quarter t. *IMPRECISE* takes on a value 1 for a point MF, 2 for range MFs, 3 for minimum or maximum MFs, or 4 for qualitative MFs. Lower values of *IMPRECISE* indicate more precise MFs.
INSIDER	An indicator variable set to 1 (0) in firm quarters where one or more (no) MFs were issued in quarter t in connection with insider trading (see Li et al. 2015).
INSTOWN	The proportion of total shares owned by institutional investors in quarter $t-1$ (relative to the MF release quarter).
ISSUE	An indicator variable set to 1 (0) if the firm issues at least one MF during the quarter.
LITRISK	Firm-specific litigation risk measured as the probability of a shareholder lawsuit in quarter $t-1$ (relative to the MF release quarter) based on the model in Rogers and Stocken (2005).
LOSS	An indicator variable set to 1 (0) if a firm's income before extraordinary items is negative (non-negative) at least once during quarter $t-5$ to $t-1$ (relative to the MF release quarter).
MKTCAP	A firm's market value of equity ($ million) at the beginning of the period (the natural logarithm of *MKTCAP* is used in the empirical tests).
MKTRET	The average daily value-weighted market return during quarter $t-1$ (relative to the MF release quarter).
MTB	A firm's market-to-book ratio of equity at the beginning of the quarter.
NEWS	*NEWS_RAW* scaled by the firm's stock price at the beginning of quarter t.
NEWS_RAW	The difference between the amount of an MF and the last consensus analyst earnings forecast available before the MF's issuance.
PREANN	Earnings preannouncement is defined as an MF issued after the fiscal period end but before the actual earnings announcement. A "traditional" MF is defined as an MF issued prior to the fiscal period end. *PREANN* (forecast timing) is defined as an indicator variable that takes the value 1 if the firm issues a preannouncement, and 0 otherwise.
RegFD	An indicator set to 1 if an MF is issued after year 2000, and 0 otherwise.
SEGMENTS	The number of the firm's business segments in year $t-1$ (relative to the MF release quarter).
SENT	Investor sentiment defined as the mean level of University of Michigan Monthly Consumer Confidence Index over quarter $t-1$ (relative to the MF release quarter).
VIX	The average daily value of the CBOE Volatility Index (*VIX*) during quarter $t-1$ (relative to the MF release quarter).

TABLE 2
Summary Descriptive Statistics

	n	Mean	Median	25th	75th	Std. Dev.
Management Earnings Forecasts						
FREQ	61,764	0.719	0	0	1	1.102
ISSUE	61,764	0.414	0	0	1	0.493
PREANN	26,110	0.187	0	0	0	0.390
HORIZON (days)	26,110	118	86	52	173	101
IMPRECISE	26,097	1.992	2.000	2.000	2.000	0.639
GOOD_NEWS	24,098	0.298	0	0	0.500	0.410
BAD_NEWS	24,098	0.507	0.500	0	1	0.450
NEU_NEWS	24,098	0.184	0	0	0.250	0.338
Macroeconomic Uncertainty						
GDP_DISP	61,764	1.175	1.156	0.963	1.285	0.264
VIX	61,764	20.32	21.46	13.78	24.71	6.05
Firm-Specific Uncertainty						
ABRETVOL	61,764	0.029	0.025	0.018	0.037	0.016
EARNVOL (%)	61,764	2.134	1.253	0.755	2.343	2.715
Control Variables						
MKTRET (%)	61,764	0.034	0.048	−0.030	0.105	0.127
FIRMRET (%)	61,764	0.063	0.065	−0.144	0.269	0.430
L_FREQ	61,764	0.734	0	0	1	1.108
SENT	61,764	94.23	93.30	88.93	99.03	8.75
DEL_ROA (%)	61,764	−0.065	0.016	−0.644	0.599	3.701
MKTCAP ($ million)	61,764	3,648	734	247	2,372	9,537
SEGMENTS	61,764	2.542	2	1	4	1.966
MTB	61,764	3.320	2.295	1.462	3.862	4.115
ANALYST	61,764	6.291	4.800	2.500	8.600	5.165
INSTOWN (%)	61,764	60.80	63.99	41.49	82.01	26.26
LITRISK	61,764	0.010	0.008	0.005	0.012	0.009
INSIDER	61,764	0.088	0	0	0	0.283

The sample contains quarterly and annual management earnings forecasts (MFs) for the 1996–2008 time period from the First Call (CIG) database. The unit of analysis is a firm quarter. Financial (stock return) data are obtained from Compustat (CRSP) and litigation, institutional ownership, and insider-trading data are obtained from the sources listed in the text. Continuous variables are winsorized at the top and bottom 1 percent.
See Table 1 for variable definitions.

EMPIRICAL TESTS AND RESULTS

H1: Macroeconomic Uncertainty and Management Earnings Forecast Issuance

Preliminary (Univariate) Analysis

We begin with univariate evidence on the relation between macroeconomic uncertainty (*GDP_DISP* or *VIX*) and MF frequency (*FREQ* or *ISSUE*). As shown in Figure 1, *GDP_DISP* and *VIX* are positively related with each other (Pearson correlation = 0.36, p-value < 0.01) suggesting that they capture similar aspects of macroeconomic uncertainty. More importantly, as shown in Figure 2, Panels A and B, both are significantly negatively related with *FREQ* based on a Pearson correlation of −0.02 between *GDP_DISP* and *FREQ* and −0.07 between *VIX* and *FREQ* (p-value in both cases is < 0.01).

Regression Analysis

As noted above, we model the decision to issue MFs using *FREQ* (the number of MFs issued in a given quarter) and *ISSUE* (a binary variable equal to 1 if the firm issues an MF in a given quarter, and 0 otherwise). Empirically, we use a double-hurdle Tobit model for the regressions where *FREQ* is the dependent variable to allow for the possibility that the decision to issue an MF is decoupled from the quantity of MF disclosures (Cragg 1971; Wooldridge 2002; Garcia 2013) (inferences are unchanged if we use an ordinary Tobit model). When *ISSUE* is the dependent variable, we use a logit regression.

FIGURE 1
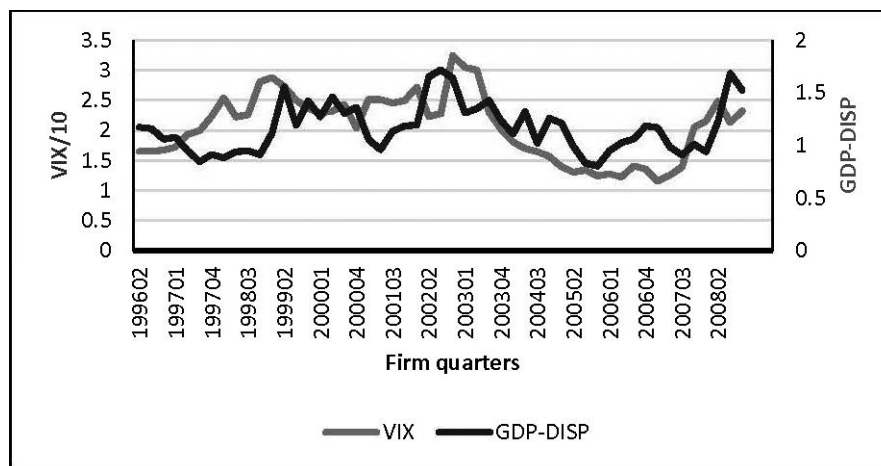**The Relation between *GDP_DISP* and *VIX***

Table 3 reports the results of regression tests of H1. For brevity we focus primarily on the results for the macroeconomic uncertainty variables (not the control variables). The regression model specifications are presented below:

Models 1 and 2 (raw and standardized variables):

$$FREQ = \beta_0 + \beta_1 GDP\_DISP/VIX + \beta_2 ABRETVOL + \beta_3 EARNVOL + \beta_4 L\_FREQ + \beta_5 MKTRET + \beta_6 FIRMRET$$
$$+ \beta_7 SENT + \beta_8 DEL\_ROA + \beta_9 MKTCAP + \beta_{10} ANALYST + \beta_{11} INSTOWN + \beta_{12} LITRISK + \beta_{13} INSIDER$$

Model 3:

$$ISSUE = G(\beta_0 + \beta_1 GDP\_DISP/VIX + \beta_2 ABRETVOL + \beta_3 EARNVOL + \beta_4 L\_FREQ + \beta_5 MKTRET + \beta_6 FIRMRET$$
$$+ \beta_7 SENT + \beta_8 DEL\_ROA + \beta_9 MKTCAP + \beta_{10} ANALYST + \beta_{11} INSTOWN + \beta_{12} LITRISK + \beta_{13} INSIDER)$$

In Model 1, *FREQ* is significantly negatively associated with *GDP_DISP* (coeff. $= -0.368$; $z = -7.41$), which leads to the inference that managers issue fewer MFs when the level of macroeconomic uncertainty is higher (consistent with H1). The same inference applies if we use *VIX* (coeff. $= -0.016$; $z = -6.53$). Turning to Model 3, where *ISSUE* is the dependent variable, the results are consistent with those for *FREQ,* in that both *GDP_DISP* (coeff. $= -0.381$; $z = -6.47$) and *VIX* (coeff. $= -0.024$; $z = -8.04$) are significantly negatively associated with MF issuance. Collectively, these findings provide evidence that managers issue fewer MFs when the level of macroeconomic uncertainty is higher, which supports H1.

Turning to the firm-level uncertainty variables, the coefficients on both measures are significantly negative. For example, in the Model 1 specification using *GDP_DISP, ABRETVOL*'s (*EARNVOL*'s) coefficient is -6.535 (-1.728) with a z-statistic of -5.21 (-3.28), evidence that managers of firms with higher levels of firm-specific uncertainty issue fewer MFs.

While Model 1's results show that both macroeconomic uncertainty and firm-level uncertainty are associated with a lower frequency of MF issuance, it is difficult to compare the relative magnitude of the effects using the estimated coefficients due to differences in how the variables are constructed. To facilitate a coefficient comparison we report standardized coefficients in Model 2.[4] The results reveal that the standardized measures of macroeconomic uncertainty have similar coefficients (-0.097 for *GDP_DISP* and -0.093 for *VIX*), which implies that a one standard deviation increase in macroeconomic uncertainty (roughly 0.264 for *GDP_DISP* and six percentage points for *VIX*) is associated with a decrease of approximately 0.09 in MF frequency. This decrease corresponds to a 13 percent decrease from the average forecast frequency and is economically significant. In contrast, the coefficients on the standardized measures of firm-level uncertainty (*ABRETVOL* and *EARNVOL*) in the version of Model 2 containing *GDP_DISP* are -0.104 and -0.047, respectively. Here, a one standard deviation increase in *ABRETVOL* (roughly 0.016) is associated with a decrease of 0.117 in MF frequency, while a one standard deviation increase in *EARNVOL* (approximately 2.715 percent) is associated with a decrease of 0.047 in MF frequency. Tests of coefficient equality are reported
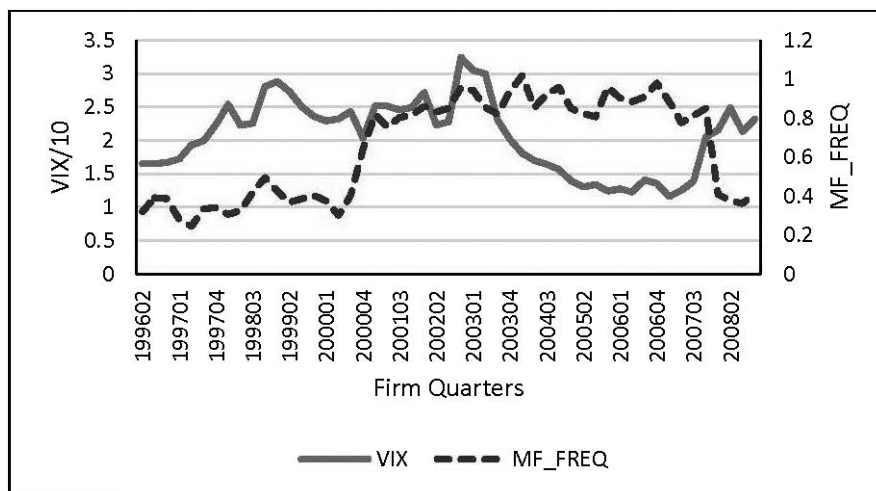
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[4] We re-estimate the model after standardizing all independent variables (except the indicator variables) by restricting each to have a mean of 0 and variance of 1.

FIGURE 2
The Relation Between Macroeconomic Uncertainty and MF Frequency

Panel A: The Relation between *GDP_DISP* and MF Frequency
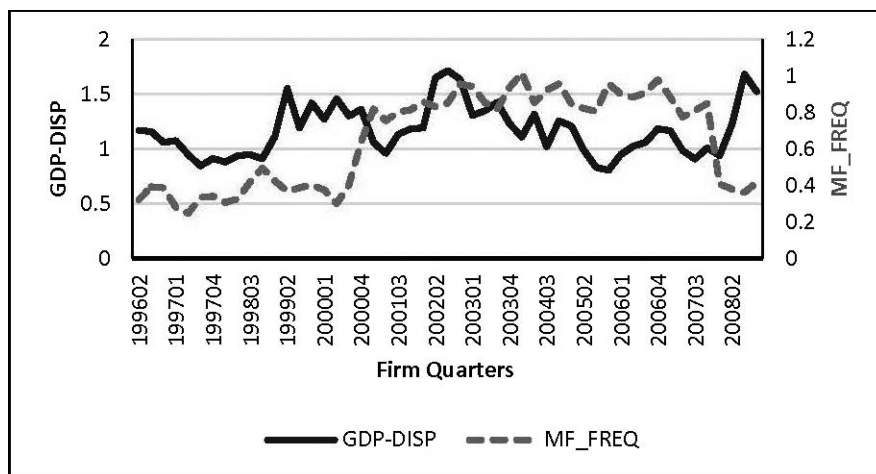
Panel B: The Relation between *VIX* and MF Frequency

at the bottom of Table 3 and reveal that the coefficient on *ABRETVOL* is statistically indistinguishable from the coefficients on either *GDP_DISP* or *VIX* (two-tailed p-value = 0.79 (0.35) for *GDP_DISP = ABRETVOL* (*VIX = ABRETVOL*)), while the coefficient on *EARNVOL* is significantly smaller than the coefficients on both *GDP_DISP* and *VIX* (two-tailed p-values are 0.01 and 0.02 for the test against *GDP_DISP* and *VIX,* respectively).

In summary, Table 3's results support the inference that macroeconomic uncertainty has a significant negative effect on managers' propensity to issue MFs, beyond the effect of firm-level uncertainty. Moreover, the economic effect of macroeconomic uncertainty on MF issuance is as large as the effect of firm-specific uncertainty measured as return volatility and twice as large as firm-specific uncertainty measured as the volatility of past earnings.

H2a and H2b: Macroeconomic Uncertainty and Forecast Timing and Horizon

As discussed in the "Prior Research and Hypothesis Development" section, we expect higher levels of macroeconomic uncertainty to reduce the quality of managers' information, making it more difficult and riskier for them to issue MFs. To test this empirically we divide MFs into two categories: "traditional" MFs defined as those issued before the fiscal period end, and

TABLE 3

Analysis of the Effect of Macroeconomic Uncertainty on the Frequency (*FREQ*) and Likelihood (*ISSUE*) of Management Earnings Forecast (MF) Issuance
Tests of H1

	Model 1 (Double-Hurdle Tobit) (Raw Variables) Dependent Variable: *FREQ*		Model 2 (Double-Hurdle Tobit) (Standardized Variables) Dependent Variable: *FREQ*		Model 3 (Logit) (Raw Variables) Dependent Variable: *ISSUE*	
GDP_DISP	−0.368*** (−7.41)		−0.097*** (−7.41)		−0.381*** (−6.47)	
VIX		−0.016*** (−6.53)		−0.093*** (−6.53)		−0.024*** (−8.04)
ABRETVOL	−6.535*** (−5.21)	−6.879*** (−5.49)	−0.104*** (−5.21)	−0.117*** (−5.49)	−6.005*** (−4.37)	−6.302*** (−4.59)
EARNVOL	−1.728*** (−3.28)	−1.730*** (−3.29)	−0.047*** (−3.28)	−0.047*** (−3.29)	−2.097*** (−3.53)	−2.102*** (−3.54)
L_FREQ	0.781*** (61.11)	0.782*** (61.21)	0.865*** (61.11)	0.863*** (61.21)	1.061*** (48.35)	1.064*** (48.35)
MKTRET	−25.400*** (−2.89)	−35.999*** (−3.98)	−0.032*** (−2.89)	−0.046*** (−3.98)	−26.787*** (−2.59)	−43.702*** (−4.09)
FIRMRET	9.272*** (3.94)	9.486*** (4.02)	0.040*** (3.94)	0.043*** (4.02)	9.930*** (3.71)	10.007*** (3.74)
SENT	0.018*** (3.89)	0.027*** (6.11)	0.154*** (3.89)	0.238*** (6.11)	0.024*** (4.24)	0.035*** (6.34)
DEL_ROA	−0.654** (−2.41)	−0.689** (−2.53)	−0.024** (−2.41)	−0.027** (−2.53)	−0.533* (−1.81)	−0.490* (−1.67)
MKTCAP	−0.024 (−1.62)	−0.029** (−1.97)	−0.040 (−1.62)	−0.049** (−1.97)	0.011 (0.71)	0.017 (1.10)
ANALYST	0.012*** (3.27)	0.013*** (3.42)	0.065*** (3.27)	0.066*** (3.42)	0.020*** (4.03)	0.019*** (3.84)
INSTOWN	0.004*** (6.25)	0.004*** (6.26)	0.099*** (6.25)	0.101*** (6.26)	0.005*** (7.51)	0.005*** (7.48)
LITRISK	1.994 (1.43)	2.516* (1.81)	0.018 (1.43)	0.024* (1.81)	4.335*** (2.93)	3.658** (2.46)
INSIDER	1.363*** (39.04)	1.363*** (38.99)	1.363*** (39.04)	1.363*** (38.99)	3.054*** (41.91)	3.055*** (41.89)
Constant	−2.229*** (−5.70)	−3.103*** (−8.50)	−0.489*** (−4.88)	−0.383*** (−3.74)	−4.273*** (−9.79)	−2.999*** (−3.06)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
n	61,764	61,764	61,764	61,764	61,764	61,764

Hypothesis Tests (Model 2 with standardized coefficients)
   GDP_DISP = *ABRETVOL*, Chi-square = 0.07, (p = 0.79)
   VIX = *ABRETVOL*, Chi-square = 0.88, (p = 0.35)
   GDP_DISP = *EARNVOL*, Chi-square = 6.80, (p = 0.01)
   VIX = *EARNVOL*, Chi-square = 5.24, (p = 0.02)

***, **, * Indicate $p < 0.01$, $p < 0.05$, and $p < 0.10$, respectively.
The table reports the relation between the issuance of MFs and macroeconomic uncertainty as measured by *GDP_DISP* or *VIX*. The dependent variable for the double-hurdle Tobit estimation (Models 1 and 2) is the number (frequency) of MFs issued by a firm in a quarter *t* (*FREQ*). In the Logit estimation (Model 3) the dependent variable is an indicator variable for the issuance of MFs that is coded as 1 if one or more MFs are issued during the quarter, and 0 otherwise. *GDP_DISP* and *VIX* are measured over quarter *t−1*. z-statistics (in parentheses) are based on standard errors clustered at the firm level (Rogers 1993; Petersen 2009).
See Table 1 for variable definitions.

"earnings preannouncements" defined as those issued after the fiscal period end. Our premise is that managers have more uncertain/less precise (less uncertain/more precise) earnings-related information early in (after the end of) the fiscal period. As a result, increased macroeconomic uncertainty is predicted to lead to a greater reduction in "traditional" MFs compared to earnings preannouncements, where, in fact, managers may shift to the latter as macroeconomic uncertainty increases. This intuition forms the basis for H2a and H2b, the results of which are reported in Table 4 (OLS, inferences are similar using a two-step Heckman model). The regression model specifications are presented below:

$$\text{Model 1: } PREANN = G(\beta_0 + \beta_1 GDP\_DISP/VIX + \beta_2 ABRETVOL + \beta_3 EARNVOL + \beta_4 MKTRET + \beta_5 FIRMRET \\ + \beta_6 SENT + \beta_7 DEL\_ROA + \beta_8 SEGMENTS + \beta_9 MTB)$$

$$\text{Model 2: } HORIZON = \beta_0 + \beta_1 GDP\_DISP/VIX + \beta_2 ABRETVOL + \beta_3 EARNVOL + \beta_4 MKTRET + \beta_5 FIRMRET \\ + \beta_6 SENT + \beta_7 DEL\_ROA + \beta_8 SEGMENTS + \beta_9 MTB$$

$$\text{Model 3: } IMPRECISE = \beta_0 + \beta_1 GDP\_DISP/VIX + \beta_2 ABRETVOL + \beta_3 EARNVOL + \beta_4 MKTRET + \beta_5 FIRMRET \\ + \beta_6 SENT + \beta_7 DEL\_ROA + \beta_8 SEGMENTS + \beta_9 MTB$$

In the model for the test of H2a, the indicator variable for MFs issued after the fiscal period, *PREANN,* is positively associated with both *GDP_DISP* and *VIX* as predicted, but the coefficient on *GDP_DISP* is insignificant at conventional levels. On the other hand, the coefficient on *VIX* (0.023) is significant at the 1 percent level ($z = 4.49$). Also, as predicted under H2b, *HORIZON* (the number of days between the fiscal period end and MF release date) is significantly negatively associated with macroeconomic uncertainty measured using both *GDP_DISP* and *VIX* (coeff. of *GDP_DISP* $= -0.313$; $t = -9.62$ and *VIX* $= -0.008$; $t = -4.44$). It is worth noting that these results are robust to the inclusion of controls for firm-specific uncertainty. For example, while the return-based firm-specific uncertainty measure, *ABRETVOL,* loads positively (negatively) in the *PREANN* (*HORIZON*) regression, it does not subsume the effect of macroeconomic uncertainty.

Collectively, the results for H2a and H2b indicate that during periods of higher macroeconomic uncertainty managers rely more on information that becomes available after the end of the fiscal period, which leads them to issue more earnings preannouncements and fewer "traditional" MFs. In a similar fashion, managers issue shorter-horizon MFs when the level of macroeconomic uncertainty is higher. Such findings are consistent with our basic premise that instead of ceasing MFs altogether, managers alter the frequency and timing of their MFs as a function of macroeconomic uncertainty.

H3: Macroeconomic Uncertainty and Management Earnings Forecast Precision

Under our premise that the quality of managers' earnings-related information deteriorates as macroeconomic uncertainty increases, H3 predicts a negative relationship between it and MF precision. We test this using *IMPRECISE,* which takes on a lower value for more precise MFs. Under H3, we expect positive coefficients on *GDP_DISP* and *VIX*.

Tests of H3 are reported in the last two columns of Table 4 where we find that the coefficient on *VIX* is significantly negative (-0.003; $t = -2.71$), evidence that when macroeconomic uncertainty is higher, managers tend to issue more precise MFs. On the other hand, using *GDP_DISP,* we find no relation. Since the negative coefficient on *VIX* is contrary to our prediction, we consider two non-mutually exclusive explanations. First, this finding might reflect a self-selection bias where managers with superior forecasting skills (or more precise earnings-related information) are more likely to issue precise MFs. Alternatively, it is consistent with the shift toward earnings preannouncements (made over shorter horizons) during periods of higher macroeconomic uncertainty that we documented above. Thus, one interpretation is that as managers get closer to the earnings announcement date the quality of their information improves enabling them to issue more precise MFs.[5]

H4: Macroeconomic Uncertainty and Management Earnings Forecast News

Table 5 reports on the relation between macroeconomic uncertainty and MF news (good, bad, and neutral). When performing this analysis, we deflate the frequency of each type of MFs by the total number of MFs issued in a given quarter to create the three variables, *GOOD_NEWS, BAD_NEWS,* and *NEU_NEWS* (we drop qualitative MFs because news type cannot be determined, resulting in a decrease in sample size from 26,110 to 24,908). The three variables are collectively exhaustive in terms of possible news outcomes, (e.g., more good or bad news implies less neutral news). Since the test design calls for the use of multiple proportions that are bounded by 0 and 1 and that sum to 1, we employ a fractional multinomial logit model estimated using a quasi-maximum likelihood approach (Papke and Wooldridge 1996). In this specification, *NEU_NEWS* is the

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[5] We note that *ABRETVOL* (firm-specific uncertainty) is significantly positive.

TABLE 4

Analysis of the Effect of Macroeconomic Uncertainty on the Timing and Precision of Management Earnings Forecasts (MFs)

Tests of H2a, H2b, and H3

	Model 1: H2a Dependent Variable: *PREANN* (Logit)		Model 2: H2b Dependent Variable: *HORIZON* (OLS)		Model 3: H3 Dependent Variable: *IMPRECISE* (OLS)	
GDP_DISP	0.085		−0.313***		0.014	
	(0.85)		(−9.62)		(0.60)	
VIX		0.023***		−0.008***		−0.003***
		(4.49)		(−4.44)		(−2.71)
ABRETVOL	21.570***	21.470***	−15.010***	−15.091***	1.238**	1.275**
	(11.22)	(11.15)	(−15.89)	(−15.96)	(2.16)	(2.23)
EARNVOL	−0.038	−0.012	0.147	0.147	0.651**	0.648**
	(−0.04)	(−0.01)	(0.31)	(0.31)	(1.98)	(1.97)
MKTRET	11.119	23.158	66.426***	62.926***	4.519	2.227
	(0.74)	(1.54)	(10.65)	(9.72)	(0.99)	(0.47)
FIRMRET	−38.434***	−38.320***	13.625***	13.975***	−4.557***	−4.677***
	(−8.70)	(−8.69)	(8.30)	(8.49)	(−3.50)	(−3.59)
SENT	−0.040***	−0.049***	−0.020***	−0.012***	0.003	0.003
	(−4.02)	(−4.90)	(−6.05)	(−3.75)	(1.11)	(1.41)
DEL_ROA	−3.711***	−3.689***	−0.193	−0.217	−0.223	−0.222
	(−6.99)	(−6.94)	(−0.94)	(−1.05)	(−1.45)	(−1.44)
SEGMENTS	−0.033**	−0.033**	0.034***	0.034***	0.004	0.004
	(−2.13)	(−2.14)	(5.57)	(5.56)	(1.46)	(1.47)
MTB	−0.034***	−0.033***	0.014***	0.013***	−0.003**	−0.003**
	(−6.06)	(−5.91)	(4.78)	(4.71)	(−2.11)	(−2.17)
Constant	0.515	0.799	3.004***	2.104***	1.992***	1.996***
	(0.64)	(1.06)	(6.48)	(4.62)	(4.68)	(4.70)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
n	26,110	26,110	26,110	26,110	26,097	26,097
Adjusted/Pseudo R^2	0.0851	0.0859	0.1200	0.1203	0.0392	0.0390

***, **, * Indicate $p < 0.01$, $p < 0.05$, and $p < 0.10$, respectively.

The table reports the relation between the timing and precision of MFs and macroeconomic uncertainty as measured by *GDP_DISP* and *VIX*. Variation in MF timing is defined under H2a as an indicator variable that takes the value 1 if the firm issues a preannouncement, and 0 otherwise, and under H2b as the number of days (forecast horizon) between the fiscal period end date and the date of MFs issued in a quarter. Earnings preannouncements are defined as MFs issued after the fiscal period end, while traditional MFs are those issued before the fiscal period end. Under H3, MF precision is measured by *IMPRECISE,* where lower values of *IMPRECISE* signify more precise MFs. t-statistics (in parentheses) are based on standard errors clustered at the firm level (Rogers 1993; Petersen 2009).

See Table 1 for variable definitions.

benchmark outcome against which the propensity to issue *GOOD_NEWS* and *BAD_NEWS* MFs is compared. The regression model specification is presented below:

$$\text{Model 1: } GOOD\_NEWS/BAD\_NEWS = \beta_0 + \beta_1 GDP\_DISP/VIX + \beta_2 ABRETVOL + \beta_3 EARNVOL + \beta_4 MKTRET$$
$$+ \beta_5 FIRMRET + \beta_6 SENT + \beta_7 DEL\_ROA + \beta_8 SEGMENTS + \beta_9 MTB$$
$$+ \beta_{10} RegFD$$

Results reported in Table 5 reveal that *GDP_DISP* is negatively associated with both *GOOD_NEWS* (coeff. = −0.170; z = −2.22) and *BAD_NEWS* (coeff. = −0.244; z = −3.47), as predicted under H4. Results based on *VIX* are similar (*GOOD_NEWS* coeff. = −0.015; z = −4.04 and *BAD_NEWS* coeff. = −0.013; z = −3.78). Collectively, these findings indicate that both good and bad news MFs are issued less frequently when macroeconomic uncertainty is higher. Since the three news classifications are exhaustive, a reduction in both good and bad news MFs means an increase in neutral news MFs (*NEU_NEWS*). This finding indicates that managers prefer increasing neutral news MFs to ceasing MFs, and is consistent with Clement et al. (2003), who report that confirming (neutral) MFs reduce uncertainty about future earnings.

TABLE 5

Analysis of the Effect of Macroeconomic Uncertainty on the Proportion of Management Earnings Forecasts (MFs)
Classified by News Type
Test of H4

	GOOD_NEWS	*BAD_NEWS*	*GOOD_NEWS*	*BAD_NEWS*
GDP_DISP	−0.170**	−0.244***		
	(−2.22)	(−3.47)		
VIX			−0.015***	−0.013***
			(−4.04)	(−3.78)
ABRETVOL	−5.956***	−2.770*	−4.447**	−2.065
	(−3.08)	(−1.73)	(−2.21)	(−1.23)
EARNVOL	−1.789	−2.503***	−1.877*	−2.531***
	(−1.63)	(−2.73)	(−1.70)	(−2.76)
MKTRET	−11.614	13.681	−34.851**	−4.321
	(−0.74)	(0.96)	(−2.13)	(−0.29)
FIRMRET	39.945***	−38.527***	40.613***	−38.055***
	(7.72)	(−8.62)	(7.84)	(−8.50)
SENT	0.006*	0.002	0.006**	0.003
	(1.94)	(0.50)	(1.98)	(0.98)
DEL_ROA	1.890***	−2.907***	1.862***	−2.944***
	(3.33)	(−5.62)	(3.29)	(−5.70)
SEGMENTS	0.031**	0.009	0.034***	0.01
	(2.41)	(0.77)	(2.61)	(0.87)
MTB	−0.017***	−0.020***	−0.017***	−0.021***
	(−2.93)	(−3.98)	(−3.07)	(−4.08)
RegFD	0.280***	−0.236***	0.203***	−0.286***
	(3.70)	(−3.43)	(2.63)	(−4.07)
Constant	−0.022	1.532***	0.126	1.404***
	(−0.06)	(4.37)	(0.35)	(4.26)
n	24,098	24,098	24,098	24,098

***, **, * Indicate p < 0.01, p < 0.05, and p < 0.10, respectively.
The table reports coefficient estimates (and robust z-statistics) for a fractional multinomial logit model using a quasi-maximum likelihood approach where the dependent variables are the proportion of good, neutral, and bad news MFs (*GOOD_NEWS, NEU_NEWS,* and *BAD_NEWS*). An MF is classified as good news (bad news) if the amount of the MF is greater (less than) than the last consensus analyst forecast available prior to the MF release date by $0.01. The base case is neutral news defined as the difference being within ±$0.01.
See Table 1 for variable definitions.

Additional Analyses and Robustness Tests

Passage of the Sarbanes-Oxley Act and Bundled Forecasts

We performed several additional analyses and robustness tests (results are included in the Online Appendix, see Appendix A for the link). First, we examined whether the passage of the Sarbanes-Oxley Act (SOX) affected our earlier results on the role of macroeconomic uncertainty in MF decisions, because SOX likely affected managers' cost-benefit trade-offs in issuing MFs. We find that after the passage of SOX there is greater sensitivity of MFs to macroeconomic uncertainty, which we attribute to the higher costs of disclosure imposed by SOX. Second, we examined whether macroeconomic uncertainty has an effect on the propensity to issue a "bundled" forecast, i.e., an MF issued concurrently with an earnings announcement (EA). We conducted this analysis because we suspect that during periods of greater macroeconomic uncertainty only those managers with access to more precise information or those possessing superior forecasting skill are likely to issue MFs, and that as a result of such self-selection their MFs would be more precise *ex post*. If so, we would expect those managers to issue more "standalone" MFs during periods of high macroeconomic uncertainty to draw investor attention to their ability. This implies a negative relationship between macroeconomic uncertainty and the propensity to issue bundled MFs (a result that would also be consistent with the results reported above for H3). Consistent with this, we find that higher macroeconomic uncertainty is associated with a lower probability of issuing a bundled MF.

Robustness Tests

Our first set of robustness tests was designed to address the concerns raised in Chuk, Matsumoto, and Miller (2013) regarding the coverage of First Call's CIG. A second robustness test was conducted by dropping observations from 2008 to address concerns that the financial crisis may be affecting our results. Finally, we examined alternative measurement windows and various regression specifications, such as excluding year fixed effects, including firm fixed effects, implementing a change regression specification, and clustering standard errors at both firm and fiscal quarter levels. Results of these additional analyses are available in the Online Appendix (see Appendix A for the link). None of the above robustness tests fundamentally affects our inferences about the effect of macroeconomic uncertainty on MF disclosure decisions.

CONCLUSIONS

This paper hypothesizes that macroeconomic uncertainty impacts managers' earnings forecasting (MF) decisions. While there is a vast literature on MFs, there is relatively little research on the effect of macroeconomic uncertainty on MF issuance and characteristics. Our study adds to the literature by testing hypotheses about the relation between macroeconomic uncertainty and managers' decisions to issue MFs, as well as the characteristics of the MFs they choose to issue (e.g., forecast horizon and precision).

Using a sample of MFs from 1996–2008, we find there is a significant decrease in the issuance and frequency of MFs when the level of macroeconomic uncertainty is higher. One interpretation of this finding is that macroeconomic uncertainty reduces the quality of managers' forward-looking earnings related information, which in turn leads them to reduce their release of MFs. We also find that, conditional on the decision to issue an MF, there is a higher (lower) probability of the MF (1) conveying neutral (bad or good) news, (2) being an earnings preannouncement rather than a traditional MF, (3) applying to a shorter forecast horizon, and (4) being of higher precision.

Collectively, the results indicate that macroeconomic uncertainty has a significant influence on the issuance and characteristics of MFs beyond the effect of firm-specific uncertainty and the traditional MF control variables. A limitation of our study relates to generalizability in that our inferences are limited to the firms covered by First Call's CIG database, which consists of relatively larger firms with higher levels of analyst following and institutional ownership (Chuk et al. 2013).

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APPENDIX A

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