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ABSTRACT

This study investigates the effect of managerial sentiment on corporate disclosure decisions. Using terrorist attacks in the United States as adverse shocks to managerial sentiment, we find that firms located in the metropolitan areas attacked issue more negatively biased earnings forecasts. The effect is stronger for firms with higher operating uncertainty and firms with younger, inexperienced, or less confident executives and it is weaker for firms located in states with increasing violent crime rates. A potential alternative explanation is that managers could strategically bias earnings forecasts downward and attribute the poor performance to terrorist attacks. To address this issue, we conduct a battery of additional analyses and the results are more consistent with managerial sentiment than strategic attribution. In addition, we show that our results are unlikely driven by any economic effects of terrorist attacks. Finally, firms in the attacked areas also exhibit a more pessimistic tone in 10-K/10-Q filings.

Keywords: disclosure, behavioral bias; management forecast; sentiment; terrorist attacks

JEL: D83; G14; M41

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I. INTRODUCTION

This study investigates the impact of managerial sentiment on corporate disclosure decisions. Traditional disclosure theory suggests that managers are rational, in that they choose optimal disclosure strategies by weighing the benefits and costs of disclosure to maximize firm value or personal gain (e.g., Wagenhofer 1990; Verrecchia 2001). However, a growing literature shows that managerial personal traits, experiences, and emotions have nontrivial effects on various corporate decisions (e.g., Bertrand and Schoar 2003; Malmendier, Tate, and Yan 2011; Bernile, Bhagwat, and Rau 2017). A few recent studies have examined the impact of the individual attributes of executives, such as demographic characteristics, personal backgrounds, and experiences, in determining corporate disclosure activities (e.g., Bamber, Jiang, and Wang 2010; Ge, Matsumoto, and Zhang 2011; Davis, Ge, Matsumoto, and Zhang 2015). We extend this bourgeoning line of disclosure research by focusing on the impact of managerial sentiment, defined as misbeliefs held by managers that cannot be justified by available information (Baker and Wurgler 2006).

The major challenge in analyzing the effect of managerial sentiment is the lack of an appropriate empirical measure, which could partially explain the slow development of this line of research. In this study, we use terrorist attacks and mass shootings (hereafter terrorist attacks), as exogenous forces that induce changes in managerial sentiment (e.g., Antoniou, Kumar, and Maligkris 2017, 2018). An advantage of using terrorist attacks is that they are generally unexpected and not correlated with firm performance but can have a nonnegligible impact on managerial emotions and feelings (e.g., Galea et al. 2002). Terrorist attacks generate negative sentiment among the affected by "instilling fear and terror, against individuals or property in an attempt to

coerce or intimidate governments or societies."[1] Prior psychology research suggests that people who experience fear, such as those who are exposed to terrorist attacks, exhibit more pessimistic sentiment and overestimate risk assessments (e.g., Lerner and Keltner 2001; Lerner, Gonzalez, Small, and Fischhoff 2003). Managers, as individuals, are subject to the same cognitive bias. This bias is likely to play a substantial role in disclosure decisions because these decisions often represent a forward-looking process involving significant estimation and judgment with little guidance and external monitoring. Moreover, the decisions normally lack arbitrage mechanisms and thus the impact of individual sentiment is possibly amplified.

We identify managers who are most likely influenced by terrorist attacks by using the distance between the location of firm headquarters and the locations of attacks. The psychology literature suggests that people located closer to attack locations are affected more by the attacks (e.g., Galea et al. 2002), since they have a greater chance of direct exposure to such negative events and interactions with people who are directly affected. Therefore, we conjecture that managers of firms with headquarters located closer to terrorist attacks (hereafter affected firms) are more likely to experience negative sentiment shocks. We compare affected managers with control managers, that is, managers who work for firms that are far away, to estimate the effect of managerial sentiment on firm disclosure decisions.[2]

Using a generalized difference-in-differences analysis (DiD), we find that, after terrorist attacks, affected firms issue more pessimistic earnings guidance compared to control firms far from the attacks. The impact of attacks on forecast bias is stronger when the number of fatalities

[1] See https://www.nato.int/cps/ic/natohq/topics_69482.htm.

[2] Corporate managers generally have large commercial and social networks and thus managers of firms located far away (i.e., control managers) could have exposure to the attacks via these networks. Moreover, some attacks, such as 9/11, likely have a large effect that transcends geographic distance. These measurement issues likely bias our results towards the null. In a robustness test, we show that our results continue to hold after the exclusion of 9/11.

increases, consistent with the conjecture that greater levels of fear lead to more pessimistic sentiment and lower expectations of future performance. In addition, the effect of terrorist attacks on pessimistic management forecast bias is more pronounced for firms with greater operating uncertainty and firms with younger or less experienced executives. The effect is weaker for firms with overconfident executives and firms located in states with increasing violent crime rates. In the dynamic analysis, we find no difference in management forecast bias between affected and control firms in the quarters prior to the attacks. Moreover, the effect of terrorist attacks on disclosure disappears after two quarters subsequent to the attacks, suggesting that the negative shock to managerial sentiment is short-lived (Antoniou et al. 2017, 2018). In additional analyses, we find that negative managerial sentiment also shortens forecast horizons, indicating an appraisal of uncertainty and plans for precautionary measures (Slovic 1987; Lerner et al. 2003). Finally, we find that the tone in subsequent 10-K/10-Q filings is more negative after terrorist attacks, suggesting that the impact of managerial sentiment on disclosure is generalizable to mandatory filings.

There are at least two potential alternative explanations for our main results. First, managers could intentionally bias earnings forecasts downward and strategically attribute the poor performance to terrorist attacks. For example, after the 9/11 attacks, many companies issued profit warnings and blamed the terrorists for their disappointing performance (e.g., Knight 2001). Second, terrorist attacks can cause real economic losses and managers simply issue lower earnings guidance to communicate this rational expectation with the market. Arguably, our cross-sectional results can lend some support to the managerial sentiment explanation, given that they are largely motivated by and consistent with psychology theories. However, some cross-sectional variables can also be associated with strategic disclosure (e.g., managerial age and experience) or economic

effects (e.g., operating uncertainty). To address the challenge of alternative explanations, we conduct a battery of additional analyses and the results appear to favor the managerial sentiment interpretation.

Regarding strategic attribution, we show that our results continue to hold after controlling for a proxy of managerial strategic behavior. They are also robust in an alternative DiD analysis, in which the treated and control firms likely have similar chances of engaging in strategic attribution. In addition, we observe a reduction in insider purchases immediately after the issuance of pessimistic forecasts, which, according to prior research, is less likely if managers act strategically (e.g., Cheng and Lo 2006). Finally, we find no evidence that the impact of terrorist attacks on forecast bias varies systematically with ex ante incentives to engage in strategic disclosure.

For the economic effects interpretation, we argue that terrorist attacks should have no effect on forecast bias, even if they affect the level of forecasted earnings. This is because both expected earnings and actual earnings will be similarly affected by the attacks if managers make their forecast decisions rationally. Nonetheless, we conduct the following analyses. First, we show that, on average, terrorist attacks do not affect the subsequent sales growth and earnings performance of our sample firms. Second, our results are robust to the exclusion of the 9/11 attacks and to the exclusion of industries that are likely affected by terrorist attacks. Third, our results continue to hold when we consider only attacks with noncommercial targets (e.g., the U.S. Capitol and churches). Last, we find no evidence that the impact of terrorist attacks on disclosure is stronger for domestic firms, whose actual performance is more likely to be affected by the attacks.

Our study contributes to the literature on financial reporting and disclosure. Traditional studies on corporate reporting and disclosure examine the role of managerial incentives and the trade-offs between benefits and costs in making disclosure decisions (e.g., Hirst, Koonce, and Venkataraman

2008; Beyer, Cohen, Lys, and Walther 2010). A growing body of research examines how factors other than rational economic determinants affect corporate reporting and disclosure decisions. The seminal paper by Bamber et al. (2010) discovers significant manager-specific effects on corporate disclosure. The authors also show that managerial career tracks, educational background, and military experience affect disclosure characteristics. Schrand and Zechman (2012) and Hribar and Yang (2016) examine the impact of managerial overconfidence on financial reporting and voluntary disclosure, respectively. While these studies generally examine long-lived managerial characteristics (e.g., career and education) or psychological biases (e.g., overconfidence), we focus on a short-lived and time-varying psychological bias: managerial sentiment.

Our study is closely related to the research of Brown, Christensen, Elliott, and Mergenthaler (2012) and Hribar, Melessa, Small, and Wilde (2017), who examine the effect of managerial sentiment on pro forma earnings disclosure and accrual estimation, respectively.[3] However, our study differs from theirs in several important aspects. First, both Brown et al. (2012) and Hribar et al. (2017) derive their measure of managerial sentiment from the survey data of managers' optimism about their firms' future prospects. In contrast, we use the natural experiment setting of terrorist attacks to generate variations in managerial sentiment. Arguably, our method suffers less from endogeneity problems. Second, both Brown et al. (2012) and Hribar et al. (2017) focus on the disclosure of actual earnings performance, whereas we examine management earnings forecast, which involves more uncertainty and thus is a more powerful setting for investigating the effect of

[3] Brown et al. (2012) examine the effect of investor sentiment on pro-forma earnings disclosure. In an additional analysis, they examine whether the relation between investor sentiment and pro-forma earnings disclosure is driven by managerial opportunism or managers' own sentiment.

managerial sentiment. Finally, while Hribar et al. (2017) and Brown et al. (2012) examine either mandatory or voluntary disclosure, our study examines both.[4]

Our study is also related to the broad literature on managerial attributes and corporate policies. Hambrick and Mason's (1984) upper echelon theory states that the individual characteristics of managers matter in corporate policies. Their study has spurred much empirical work on how managers' styles and characteristics affect various firm policies, including firm financing, tax planning, and financial reporting decisions (e.g., Bertrand and Schoar 2003; Bamber et al. 2010; Dyreng, Hanlon, and Maydew 2010; Ge et al. 2011; Davidson, Dey, and Smith 2013). We add to this literature by providing evidence that managerial sentiment, which is a time-varying behavioral factor rather than an individual attribute, also matters in forming firm disclosure practices.

Finally, we contribute to the behavioral finance literature on sentiment. Most prior studies on sentiment focus on aggregated investor sentiment (e.g., Brown and Cliff 2005; Baker and Wurgler 2006; Lemmon and Portniaguina 2006; Bergman and Roychowdhury 2008; Mian and Sankaraguruswamy 2012) and its influence on pricing efficiency, firm investment and strategic disclosure, and analyst forecasts. We add to the literature by studying the effects of individual-level managerial sentiment on corporate decisions (e.g., Antoniou et al. 2017, 2018).

II. LITERATURE REVIEW AND HYPOTHESES

Keynes (1936) was the first to propose the concept of sentiment, which he terms animal spirits. De Long, Shleifer, Summers, and Waldmann (1990) provide theoretical predictions of possible deviations of asset prices due to the sentiment of noise traders. Subsequent studies have provided empirical evidence on the relation between investor sentiment and equity market price dynamics,

[4] Hribar et al. (2017) focus on the banking industry. Our results are more generalizable by examining a broad sample of industries.

suggesting sentiment-driven mispricing (Brown and Cliff 2005; Baker and Wurgler 2006; Lemmon and Portniaguina 2006). Recent studies extend their investigation to whether and how corporate decisions and other market participants could be influenced by investor sentiment and find that *investor* sentiment has an impact on corporate investment (e.g., Arif and Lee 2014; McLean and Zhao 2014), voluntary disclosure (Bergman and Roychowdhury 2008; Brown et al. 2012), and analyst forecasts (Hribar and McInnis 2012).

This study focuses on *managerial* sentiment and explores its potential effect on corporate disclosure decisions. Specifically, we examine how managerial sentiment affects management earnings forecasts. We focus on management forecasts because they are a major source of accounting-based information to the equity market (e.g., Beyer et al. 2010). More importantly, the information collection and interpretation process of producing management forecasts involves a great deal of uncertainty, which leaves room for managerial sentiment to come into play. Forecast activities are also subject to fewer mandatory regulations and involve a great deal of forward-looking estimation compared to mandatory disclosure. Thus, managerial sentiment is more likely to exert a significant effect in the context of voluntary disclosure.

Cognitive psychology argues that the presence of emotions can bias expectations. For example, people experiencing negative emotional shocks tend to overweight the possibility of unrelated negative outcomes (e.g., Lerner and Keltner 2001; Lerner et al. 2003). Pyszczynski, Holt, and Greenberg (1987) investigate the relation between depression and individuals' expectations of future life events and find that depressed individuals are generally more pessimistic than nondepressed individuals are. Managers, as individuals, suffer emotional biases that could potentially undermine their estimation and judgment as well. Antoniou et al. (2017) examine whether managerial sentiment affects corporate financial and investment policies and find that

managers tend to adopt more conservative policies by holding more cash, cutting research and development (R&D) expenses, and lowering leverage. We follow the approach of Antoniou et al. (2017) to exploit terrorist attacks as exogenous negative shocks to individual sentiment. Psychology literature shows that the reported symptoms of post-traumatic stress disorder (PTSD), especially depression, are significantly higher among the individuals living close to the areas of attacks (e.g., Galea et al. 2002; Schlenger et al. 2002). We conjecture that, when managers are exposed to extreme negative events, that is, when their firms are located in the same areas as terrorist attacks, they are more likely to experience post-attack depression and are more likely to harbor more pessimistic feelings. Pessimistic feelings, in turn, make managers issue more negatively biased forecasts after terrorist attacks.

The psychology literature also suggests that people experienced anger along with fear after the 9/11 attacks (e.g., Lerner et al. 2003). In contrast to fear, anger is associated with an underestimation of risk (e.g., Lerner and Keltner 2001; Lerner et al. 2003) and may lead to more optimistic judgement after attacks. Back, Küfner, and Egloff (2010) find an increase of anger over an *18-hour* window immediately after the 9/11 attacks. However, using a nationally representative sample, Stein et al. (2004) find that, two to three months after the 9/11 attacks, only 4% of the respondents reported that they felt irritable or had angry outbursts, whereas emotional upset is the dominant psychological reaction. This result is consistent with the psychology literature, in that PTSD and depression are the two most commonly observed psychological sequelae of trauma and disasters (Galea et al. 2002). Furthermore, the finance literature suggests that the net effects of terrorism on investors, managers, and other equity market participants are more consistent with fear rather than anger. For example, Wang and Young (2020) investigate how the mutual fund flows are affected by terrorist attacks and find that more attacks lead to more capital reallocation

from equity funds to government bond funds. Antoniou et al. (2017, 2018) document that managers located close to attacks choose more conservative corporate policies and analysts located near attacks issue more pessimistic earnings forecasts. Therefore, we expect that depression rather than anger has a stronger influence on managers and we state our main hypothesis as follows.

H1: Management forecasts issued by affected firms are more pessimistic compared to forecasts issued by control firms after terrorist attacks.

We next develop several auxiliary hypotheses regarding the cross-sectional variations in the impact of terrorist attacks. First, we expect that the effect of managerial sentiment varies with the degree of uncertainty. The greater the uncertainty, the more judgment is needed in the forecasting process and thus a stronger effect of managerial sentiment is expected.

H2a: The impact of terrorist attacks on management forecasts is stronger for firms with high uncertainty.

Second, psychology studies show that younger individuals are less effective at regulating their emotions and thus tend to exhibit stronger emotional reactions (e.g., Scheibe and Blanchard-Fields 2009). Younger people also experience more negative emotions, on average, than older people (Carstensen, Pasupathi, Mayr, and Nesselroade 2000). In addition, people with less work experience are more likely to be influenced by behavioral biases (e.g., List 2003; Dhar and Zhu 2006). If terrorist attacks affect management forecasts by imposing negative sentiment shocks on managers, we hypothesize that younger and less experienced executives are affected more.

H2b: The impact of terrorist attacks on management forecasts is stronger for firms with younger or less experienced executives.

Third, prior literature finds that overconfident executives are generally more optimistic (e.g., Malmendier and Tate 2005; Hribar and Yang 2016). To the extent that overconfident executives are less likely to be influenced by negative sentiment, we expect the effect of terrorist attacks on forecast pessimism to be less pronounced for overconfident executives. We thus propose the following hypothesis.

H2c: The impact of terrorist attacks on management forecasts is weaker for firms with more confident executives.

Lastly, people exhibit stronger emotional reactions when they experience highly unexpected negative events and they tend to be desensitized to repeated violence (e.g., Wilson, Centerbar, Kermer, and Gilbert 2005; Krahé et al. 2011). Thus, we conjecture that the impact of terrorist attacks on individuals' emotions is less pronounced when the attacks occur in states with increasing rates of violent crime.

H2d: The impact of terrorist attacks on management forecasts is weaker for firms located in states with increasing rates of violent crime.

III. SAMPLE AND METHODOLOGY

3.1 Data and Sample

We obtain data on terrorist attacks and mass shootings in the United States from the Global Terrorism Database (GTD)[5] and *The Washington Post*.[6] These two data sources contain information on all terrorist attacks and mass shootings and we extract the date, location, and

[5] See http://www.start.umd.edu/gtd. We extract all attacks that are clearly classified as terrorist attacks. For attacks to be classified as terrorist attacks and differentiable from normal crimes, they need to satisfy certain major criteria. As defined by the GTD, "the act must be aimed at attaining a political, economic, religious, or social goal. In terms of economic goals, the exclusive pursuit of profit does not satisfy this criterion. It must involve the pursuit of more profound, systematic economic change." For details, see the GTD website.

[6] See http://www.washingtonpost.com/wp-srv/special/nation/deadliest-us-shootings.

number of fatalities for each attack. To focus on important attacks and enhance the power of our tests, we use only attacks with at least one civilian death. In addition, we remove six cases that are more appropriately classified as murders. We also drop the attack if it is preceded by another attack in the same metropolitan area in the previous month, since these should be considered accompanying attacks. These filtering requirements yield 37 terrorist attacks from 1995 to 2015. We use the geographical distance between a firm's historical headquarters and the locations of these terrorist attacks to capture the degree of negative shock on managerial sentiment. Specifically, we classify a firm as affected if it is located in the same metropolitan statistical area (MSA) as a terrorist attack. The definition of an MSA is obtained from the U.S. Census Bureau[7] and we match each firm to an MSA using the firm's headquarters' business zip code.[8]

Management earnings forecasts are obtained from the Institutional Brokers' Estimate System (IBES) and firm-level controls are constructed using Compustat, Center for Research in Security Prices (CRSP), IBES, and Thomson Reuters 13F data. Our sample starts with the IBES guidance database, including both annual and quarterly earnings per share forecasts to compute management forecast variables in each quarter. We exclude all the forecasts that are issued after the corresponding fiscal period end to eliminate earnings pre-announcements and firm-quarters with stock prices below $5 to avoid small denominator problem in estimating forecast bias. After requiring non-missing data for control variables, we are left with a final sample of 45,944 firm–quarter observations.

3.2 Empirical design

[7] See http://www.census.gov/population/metro/data/def.html.

[8] We obtain firm headquarters information from Professor Bill McDonald's website at http://www3.nd.edu/~mcdonald/10-K_Headers/10-K_Headers.html. The matching between zip codes and MSAs is obtained from the U.S. Department of Housing and Urban Development (https://www.huduser.gov/portal/datasets/usps_crosswalk.html).

To examine whether managerial sentiment affects management forecast biases (H1), we employ a DiD approach. Specifically, we add a terrorist attack variable to the standard voluntary disclosure regression:

$$MFBias_{i,q} = \alpha_0 + \beta_1 Attack_{s,q} + \gamma' X_{i,q} + f_i + \mu_t + \varepsilon_{i,q}, \quad (1)$$

for firm *i*, metropolitan area *s*, quarter *q*, and year *t*. The dependent variable, *MFBias*, is management forecast bias, computed as the difference between the management earnings forecast (point estimates or mid-point of range estimates) and actual earnings per share, deflated by the quarter-end stock price and averaged over each quarter.[9]

The variable *Attack* captures whether a firm is located in an MSA where a terrorist attack occurred, measured as either the occurrence of attacks (*Attack_Dummy*) or the number of civilian fatality (*Attack_#Death*). The variable *Attack_Dummy* equals one for firms located in the same MSA as the attack for the two fiscal quarters following the terrorist attacks and zero otherwise. The variable *Attack_#Death* is defined as the logged value of one plus the number of civilian deaths for the two fiscal quarters following the attacks and zero otherwise. We define the two post-attack fiscal quarters as those with a quarter-end falling in the first six months following terrorist attacks. We focus on the effect of attacks only in the first two quarters after the attacks because psychology studies show that post-disaster psychiatric symptoms can last for as long as six months and psychological resilience was observed six months after the 9/11 attacks (Mathewson 2004; Bonanno, Galea, Bucciarelli, and Vlahov 2006).

The panel regression includes firm and year fixed effects, f_i and μ_t, respectively, and thus represents a generalized DiD design that allows us to draw a causal inference (Bertrand and

[9] Ciconte, Kirk, and Tucker (2014) find that actual earnings per share are closer to the upper end of range forecasts. All of our results are robust if we use the upper end of range forecasts to calculate forecast bias.

Mullainathan 2003; Angrist and Pischke 2009). The coefficient β_1 in Eq. (1) captures any change in management forecast bias after terrorist attacks for affected firms relative to control firms. As predicted by H1, if managers become more pessimistic after terrorist attacks and are more likely to issue forecasts that fall short of actual earnings, we expect a negative coefficient estimate of β_1.

The vector X represents the set of control variables. We control for a firm's information environment by including firm size (*Size*), analyst following (*AnalystCov*), and institutional holdings (*InstHold*). We include return on assets (*ROA*) to control for firm fundamentals and return volatility (*SD_Ret*) to control for the difficulty in forecasting future earnings. We also include market-to-book ratio (*MTB*) and financial leverage (*Leverage*) as additional control variables. Firm and year fixed effects f_i and μ_t, respectively, are included to control for unobservable firm-level characteristics and economy-wide factors that could affect corporate disclosure decisions. In all the regressions, we cluster standard errors at the MSA level. Appendix A provides detailed definitions for all the variables used in our analysis.

Hypothesis H2 explores cross-sectional effects of managerial sentiment on voluntary disclosure due to firm uncertainty, executive individual attributes, and past exposures to violence. We test this set of hypotheses by modifying Eq. (1) as follows:

$$MFBias_{i,q} = \alpha_0 + \beta_1 Attack_{s,q} + \beta_2 Attack_{s,q} * Char_{i,t} + \beta_3 Char_{i,t}$$

$$+\gamma' X_{i,q} + f_i + \mu_t + \varepsilon_{i,q}, \qquad (2)$$

where *Char* is a dummy variable representing firm uncertainty, executive age, executive experience, executive overconfidence, and the change in the state crime rate, respectively. We measure firm uncertainty using cash flow volatility and analyst forecast dispersion. We construct two dummy variables, *SD_CF_D* and *AF_Dispersion_D,* by ranking cash flow volatility (*SD_CF*)

and analyst forecast dispersion (*AF_Dispersion*) into terciles and assigning a value of one to *SD_CF_D/AF_Dispersion_D* if cash flow volatility or analyst forecast dispersion falls in the highest tercile and zero otherwise.[10] If higher firm uncertainty indeed triggers more pessimistic expectations about the future after attacks, we expect β_2 to be significantly negative for H2a.

To test H2b and H2c, we measure executive attributes by focusing on CEOs and CFOs as prior literature suggests that both CEOs and CFOs exert significant influence over management forecast decisions.[11] For H2b, we rank the average of CEO age and CFO age into terciles and assign a value of one to the dummy variable *Age_D* if the average age is in the highest tercile and zero otherwise. We use the tenure (the number of years in office) to proxy for executive experience and rank the average of CEO tenure and CFO tenure into terciles and assign a value of one to the dummy variable *Tenure_D* if the average tenure is in the highest tercile and zero otherwise. We expect a mitigating effect of age and experience, that is, a positive β_2.

Following prior literature, we measure executive overconfidence by the duration of the CEO's and CFO's stock options holdings. If either CEO or CFO is classified as a long holder of stock options, we assign a value of one to the variable *Overconfidence* and zero otherwise. A CEO/CFO is considered a long holder if the CEO/CFO ever holds a stock option that is at least 40% in the money at least until the last year (e.g., Malmendier and Tate 2005, 2008; Malmendier et al. 2011). If executive overconfidence can reduce the impact of negative sentiment shock, we expect β_2 to be positive for H2c.

[10] In untabulated robustness checks, we use quintile rankings to construct the conditioning variables and the results are generally robust (with the exception of the age test, which has predicted but insignificant signs for the interaction terms).

[11] Our results are robust if we only use CEOs' attributes to construct the measures.

Finally, we use the average change of the state crime rate ($\Delta Crime\_Rate$) over the past five years, as a proxy for pre-attack exposure to negative events (Antoniou et al. 2018).[12] We rank the change of the state crime rate into terciles and assign the dummy variable $\Delta Crime\_Rate\_D$ a value of one for the highest group and zero otherwise. If prior exposure to increasing violent crimes mitigates individuals' reaction to terrorist attacks, we expect β_2 to be positive (H2d).

3.3 Descriptive statistics

Appendix B lists all the attacks in our sample. The first one is the 1995 Federal Building bombing in Oklahoma City and the last one is the 2015 Inland Regional Center attack in San Bernardino, CA. The attack with the most civilian deaths was the 9/11 attacks on the World Trade Center, followed by the 1995 Federal Building bombing in Oklahoma City. The years 2001, 2009, and 2015 experienced the most attacks and there were no attacks with civilian deaths between 2003 and 2006. Figure 1 displays the frequency and the number of fatality across states. Panel A of Figure 1 shows that New York and California dominate in terms of the number of attacks. In terms of death tolls, Panel B shows that New York, Virginia, and Oklahoma dominate.

Table 1 reports the descriptive statistics for the key dependent and independent variables. All the continuous variables are winsorized at the extreme top and bottom percentiles. The variable *MFBias* exhibits average optimism in management forecasts but the median shows a slightly pessimistic bias. On average, the forecasts included in our sample have a forecast horizon of 154 days. Of all the firm–quarter observations in our sample, about 1.8% are affected by terrorist attacks.

[12] State-level crime rates are obtained from the Uniform Crime Reporting database of the Federal Bureau of Investigation.

IV. MAIN RESULTS

4.1 Baseline results

Table 2 presents the results of estimating Eq. (1). In columns (1) and (2), we regress *MFBias* on the occurrence of terrorist attacks, *Attack_Dummy*, without and with control variables, respectively. Supporting H1, columns (1) and (2) show a negative association between *Attack_Dummy* and *MFBias*, respectively. For example, in column (2), the coefficient on *Attack_Dummy* is negative and significant (coefficient = -0.096, t = -3.201), suggesting that the occurrence of terrorist attacks is associated with a decrease in management forecast bias (or an increase in forecast pessimism) of 0.096, representing 8.5% of the standard deviation of forecast bias. In columns (3) and (4), we replace *Attack_Dummy* with *Attack_#Death*, the logarithm of one plus the number of fatalities. Again consistent with H1, the coefficients on *Attack_#Death* are negative and statistically significant. The coefficient in column (4) suggests that, if the number of fatalities increases by one from the mean of *Attack_#Death*, management forecast bias would decrease by 0.026. Overall, the results in Table 2 provide evidence that managerial sentiment has a significant influence on management forecasts and is robust after controlling for economy-level trends and firm-level factors.[13]

In columns (5) to (8) of Table 2, we examine what drives the attack-induced negative sentiment impact on management forecast bias, whether it is due to a decrease in positive bias, an increase in negative bias, or both. To do this, we separate positive and negative forecast bias by constructing two variables, *MFBias_P* and *MFBias_N*. The variable *MFBias_P* (*MFBias_N*) takes the value of

[13] We also test the impact of attack severity by restricting our sample to firms located in areas with terrorist attacks and regressing management forecast bias on *Attack_#Death.* We find that higher fatalities lead to significantly more pessimistic management forecasts in this restricted sample.

MFBias when it is positive (negative) and zero when negative (positive).[14] Columns (5) and (6) use *MFBias_P* (i.e., the degree of positive forecast bias) as the dependent variable. The coefficients on *Attack_Dummy* and *Attack_#Death* are both negative and statistically significant, suggesting that positive forecast bias is significantly reduced after terrorist attacks. In columns (7) and (8), we use *MFBias_N* (i.e., the degree of negative forecast bias) as the dependent variable and the coefficients are again negative in both columns but significant only in column (8). Finally, both *Attack_Dummy* and *Attack_#Death* exhibit higher loadings in columns (5) and (6) compared to columns (7) and (8), respectively, suggesting that the effect of terrorist attacks on forecast pessimism is driven more by its effect in reducing upward bias than in increasing downward bias.[15]

4.2 Cross-sectional results

Table 3 reports the results of our cross-sectional analyses. Panel A reports the results of the moderating effect of operating uncertainty (H2a). Columns (1) and (2) report the results when we partition the sample using cash flow volatility and columns (3) and (4) report those using analyst forecast dispersion. We find that the negative impact of terrorist attacks is stronger in the subgroup of firms operating in a more volatile environment or with higher analyst forecast dispersion, as shown by the negative coefficients of *Attack_Dummy*×*F_Chara* and *Attack_#Death*×*F_Chara*. These results suggest that operating and information uncertainty amplify the influence of managerial sentiment on management forecast bias.

[14] We do not use dummy variables to define positive and negative forecast bias, since positively (negatively) biased managers are likely to still remain positively (negatively) biased but the magnitude of the bias is different after terrorist attacks.

[15] In untabulated tests, we find that terrorist attacks are associated with more accurate management forecasts. This result is consistent with prior literature and our finding in columns (5) to (8) of Table 2. Roger and Stocken (2005) show that management forecasts tend to generally overestimate future earnings and we find that the attacks reduce the extent of positively biased forecasts and, to a lesser extent, exacerbate negatively biased forecasts. Therefore, attack-induced pessimistic sentiment neutralizes managerial optimism in earnings forecasting and increases overall forecast accuracy. Similarly, Antoniou et al. (2018) find that analyst forecast accuracy increases after terrorist attacks.

Panel B of Table 3 presents evidence for the differential effects for firms with older executives, executives with longer tenure, and overconfident executives. Columns (1), (3), and (5) present the results for the occurrence of terrorist attacks. The coefficients on the interaction *Attack_Dummy*×*M_Chara* are all positive and significant, except for the executive age test (with a *t*-value 1.645). We attribute this weak result to the lack of power, since *Attack_Dummy* only captures the occurrence of terrorist attacks but not their severity. When we replace *Attack_Dummy* with *Attack_#Death* in columns (2), (4), and (6), all three interaction items are positive and significant, indicating that executives who are older, experienced, or more confident are less affected by terrorist attacks, consistent with our expectations.

Panel C of Table 3 examines the effect of managers' past exposure to violence on the relation between terrorist attacks and management forecasts. We replace *Char* with the dummy variable Δ*Crime_Rate_D* in Eq. (2). In both columns, the coefficients on *Attack_Dummy* and *Attack_#Death* are negative and significant, confirming that attacks have a significantly negative impact on managerial sentiment when local individuals experience relatively less violence in the past. The coefficients of the interaction terms between the attack variables and Δ*Crime_Rate_D* are significantly positive, suggesting that emotional reactions to terrorist attacks are desensitized when the attacks occur in states with an increasing occurrence of violent crimes. Overall, the cross-sectional results lend further support for our interpretation that the impact of terrorist attacks on management forecast bias is driven by their effects on managerial sentiment.

4.3 Discussions and robustness checks

4.3.1 Managerial sentiment versus strategic actions

Our study uses terrorist attacks to identify the effect of managerial sentiment on forecast bias. Managerial sentiment suggests an unconscious and unintentional psychological bias. However,

prior literature suggests that managers often intentionally bias their forecasts to manage market expectations. In our setting, managers might not be affected by the negative events and could rationally forecast firm performance after terrorist attacks. However, to manage market expectations downward, managers can intentionally issue more pessimistic earnings forecasts and use terrorist attacks to justify the low expected earnings. Some of our cross-sectional results suggest that the impact of terrorist attacks varies with individual attributes (e.g., age, experience, and overconfidence), which appears to favor a psychological interpretation. However, executives' age and experience could also be related to their career concerns, although the evidence is largely inconclusive (e.g., Stein 1989; Verrecchia 2001). Thus, to further rule out the possibility that strategic attribution drives our results, we conduct several additional analyses.

First, strategic attribution requires that managers cite terrorist attacks in their discussions of corporate performance (Knight 2001). In contrast, the sentiment effect is largely unconscious and we do not expect to observe more discussions on terrorist attacks. Therefore, to capture the strategic attribution behavior, we construct a measure based on the fraction of terror-related words in the management discussion and analysis (MD&A) section of firms' 10-K/10-Qs filed in each quarter.[16] To mitigate the effect of boilerplate discussions of terrorist risks, we use the first-difference form of the measure in our tests. We find that the occurrence of terrorist attacks is not associated with but the severity of attacks is positively associated with the increased discussions on terrorist attacks, suggesting the existence of strategic attribution behavior.[17] Importantly, we find that our main results continue to hold after controlling for the measure of strategic attribution and the effect of terrorist attacks on management forecast bias does not vary with strategic

[16] We define terror-related words as all the variations of the word "terror", "massive shooting", and "mass shooting".
[17] We find, however, that the association between the severity of attacks and strategic attribution becomes insignificant after we remove the 9/11 attacks.

attribution (untabulated). These results suggest that strategic attribution is unlikely to be the major driver of the effect of terrorist attacks on forecast bias.[18]

Second, we conduct an alternative DiD analysis. The treated firms are the same as in our main tests (i.e., firms with headquarters close to attacked areas). The control firms are firms with headquarters far away from the attacked areas but with some subsidiaries or branches close to the attacked areas.[19] Arguably, firms with business activities in the attacked areas can use the attacks strategically but the managers of these firms are not subject to the sentiment shocks.[20] As a result, the strategic attribution effect can be largely differenced away in the alternative DiD analysis. Table 4 shows that the impact of terrorist attacks on forecast bias continues to hold.

Third, we examine the relation between terrorist attacks and insider trading behavior. According to prior literature (e.g., Frankel, McVay, and Soliman 2011; Brown et al. 2012), managerial strategic disclosures are likely associated with insider trading activities. If managers intentionally issue pessimistic earnings forecasts to lower market expectations and increase the likelihood of beating market expectations in the future, we would expect to observe an increase in insider purchases immediately after the issuance of earnings forecasts (Cheng and Lo 2006; Brown et al. 2012). On the other hand, if the negatively biased forecasts reflect managers' true pessimistic belief regarding firm performance, the managers should not purchase more shares and could even sell their existing shares.

To investigate insider trading activities around terrorist attacks, we replace the dependent variable in Eq. (1) with insider net purchases, *Insider_NBuy*, which is calculated as the number of

[18] In addition, the effect of strategic attribution on management forecast bias is largely insignificant.
[19] The subsidiaries and branches data are obtained from the National Establishment Time Series (NETS) database (e.g., Li, Lin, and Zhang 2018). We require the control firms to have at least 1% of total sales from the attacked area.
[20] Untabulated results suggest that there are no significant changes in forecast bias around attacks for this alternative "control" sample.

shares purchased minus the number of shares sold by executives within 30 days of the issuance of management forecasts, scaled by total shares outstanding. Columns (1) and (2) of Table 5 show that the coefficients on *Attack_Dummy* and *Attack_#Death* are negative and marginally significant, suggesting that managers tend to reduce their shareholdings, albeit marginally, after attacks, consistent with the conjecture that attacks induce negative sentiment. In columns (3) and (4), we include a dummy variable, *MFBias_Neg*, and interact it with the attack variables. The variable *MFBias_Neg* takes the value of one if the forecasted earnings are lower than actual earnings and zero otherwise. We would expect a positive coefficient on the interaction term if the negative forecast bias results from managers' strategic actions, whereas we expect an insignificant or negative coefficient if the biased forecasts reflect managers' true and pessimistic beliefs regarding firm prospects. Consistent with the negative sentiment explanation, we find that managers who issue negatively biased forecasts after attacks tend to reduce the holdings of their own firm shares.[21]

Finally, we conduct some falsification tests to rule out the strategic disclosure interpretation of our main findings. Specifically, we examine whether the impact of terrorist attacks on management forecasts bias varies with the ex-ante strength of managerial incentives to manage market expectations. We use the percentage of stocks and options in CEO total compensation and the number of times firms met or beat analyst consensus forecasts in the past 12 quarters, to capture managerial incentives. Prior literature suggests that managers with high equity incentives are more likely to manage market expectations and reported earnings to meet analysts' forecasts (e.g., Cheng and Warfield 2005). Prior research also suggests that firms that consistently meet or beat

[21] Admittedly, managers can also time the disclosure of overdue bad news strategically after the attacks and reduce their shareholdings. However, to maximize profits, they should reduce their holdings before rather than after the disclosure events (Cheng and Lo 2006). Nonetheless, to the extent that managers' trading is constrained before the disclosures, our insider-trading test should be interpreted with caution.

analysts' forecasts are more likely to walk down market expectations (e.g., Kross, Ro, and Suk 2011). Untabulated results show that the impact of terrorist attacks on management forecasts bias does not vary with ex ante incentives to manage market expectations.

Besides strategic voluntary disclosure, our results could also be driven by managerial manipulation of reported earnings. If managers believe that terrorist attacks have an adverse effect on firm future performance, they could engage in real or accounting actions to improve the reported performance. For example, Antoniou et al. (2017) show that affected managers reduce R&D investments after terrorist attacks. The reduction in R&D expenditures tends to increase reported earnings in the short term, leading us to observe more negatively biased forecasts relative to reported earnings.[22] Managers could also engage in accrual management to increase reported earnings and restore investor confidence. To make sure that our results are not driven by activities to increase reported earnings, we conduct a robustness check by including additional control variables such as R&D expenditures and abnormal accruals. Our results are not sensitive to these additional controls (untabulated).

Overall, while it is difficult to completely rule out the strategic action explanation of our main results because of the unobservable nature of managers' true beliefs, the findings of the additional analyses, taken together, lend more credence to the managerial sentiment interpretation of our results.

[22] This argument is only true if managers make the R&D investment decisions after the issuance of forecasts. Otherwise, the potential effect of R&D investments on reported earnings should also be incorporated in forecasted earnings.

4.3.2 Psychological versus economic effects

Terrorist attacks can have a direct economic effect on firm performance. For example, the 9/11 attacks should have had an impact on the performance of airlines or a firm in the hospitality industry if the firm had operations in New York City. Therefore, firm managers may revise the expected earnings of the firm downward. However, we argue that potential economic effects are unlikely to drive our findings, because we focus on forecast bias, which is the difference between forecasted and actual earnings. In other words, the potential economic effect of terrorist attacks could affect the level of forecasted earnings but not forecast bias, if managers make their forecast decisions rationally. In fact, prior literature suggests that the magnitude of the impact of terrorist attacks on the economy is small and the direction is unclear (Becker and Rubinstein 2004; Blomberg, Hess, and Orphanides 2004; Tavares 2004). In untabulated tests, we find no evidence that terrorist attacks affect the future sales growth or ROA of our sample firms. This result is consistent with those of Antoniou et al. (2017), who find that firm fundamentals do not change significantly around and after the occurrence of terrorist attacks.

To further address the concern of confounding economic effects, we conduct several additional robustness tests. First, we exclude the 9/11 attacks from our sample and repeat our main analysis. The 9/11 attacks are an extreme case that caused thousands of deaths and serious damage to the local economy and even global markets (e.g., Brounen and Derwall 2010). In contrast, the influence of terrorist attacks other than those of 9/11 is more likely to be psychological. Columns (1) and (2) of Table 6 show that the relation between terrorist attacks and management forecast bias remains negative and statistically significant after excluding the 9/11 attacks. Second, we exclude attacks targeting any commercial buildings and keep only attacks targeting government and other noncommercial buildings (e.g., the U.S. Capitol and churches). Such attacks should have

little economic effect on local firms but could create significant psychological effects. Columns (3) and (4) of Table 6 show that our results continue to hold. Last, we exclude firms in the air transportation, tourism, hotel and recreation, insurance, and defense industries, whose performance is more likely to be affected by terrorist attacks.[23] Columns (5) and (6) of Table 6 show that the results are robust.[24] Finally, we examine whether the effect of terrorist attacks on management forecast bias varies with the proportion of a firm's foreign sales. If the direct economic impact is driving our results, we expect the effect of terrorist attacks to be stronger for firms with operations more concentrated locally in the United States. We do not find such an effect (untabulated). Overall, the results of our robustness checks are more consistent with the psychology-based interpretation than the economic-effect interpretation of our main findings.

4.3.3 Dynamic effect of terrorist attacks

To examine whether the treatment and the control firms follow parallel trends absent of terrorist attacks and whether the effect of terrorist attacks is indeed short-lived, we next conduct a dynamic analysis. Specifically, we modify Eq. (1) by adding the several lead-lag terms to indicate different time periods surrounding the occurrence of terrorist attacks. The variable $Attack\_Dummy^{n}$ ($Attack\_\#Death^{n}$) equals one (the logged value of one plus the number of fatalities) for the affected firms for the two-quarter period starting 12 months before the terrorist attack (n = -2), the two-quarter period starting six months before the terrorist attack (n = -1), and the two-quarter period starting six months after the terrorist attack (n = +1), respectively, and zero otherwise. The variable $Attack\_Dummy^{2+}$ ($Attack\_\#Death^{2+}$) equals one (the logged value of one plus the number of fatalities) for affected firms starting one year after the terrorist attack and zero otherwise.[25] Table

[23] See https://en.wikipedia.org/wiki/Economic_effects_arising_from_the_September_11_attacks.
[24] In untabulated tests, we find that our results are not sensitive to the exclusion of any industry from the sample.
[25] For example, if a terrorist attack occurs January 1, 2017, we code the attack variables as follows. For all firms in the treatment group, $Attack\_Dummy^{-2}$ = 1 for the period from January 1 to June 30, 2016, and zero otherwise;

7 presents the results. The lead-lag terms are all insignificant, suggesting that the parallel-trends assumption likely holds and the impact of terrorist attacks is short-lived.

4.3.4 Alternative sampling analysis

In our main analysis, we employ a broad sample that includes all firms with available data throughout the sample period. To further alleviate concerns that the documented results are due to potential correlated omitted variables and improve the comparability between affected and control firms, we conduct alternative sampling analyses using nearest neighbor matching, coarsened exact matching (Iacus, King, and Porro 2011, 2012), and entropy balancing (Hainmueller 2012).[26] To obtain the nearest neighborhood matching sample, we first compute the Euclidean distance between treated firms and control candidates based on firm size, the market-to-book ratio, and the ROA in the year prior to an attack to control for any differential effects due to the firm's information environment, growth potential, and performance pressure. Each variable is first normalized by its standard deviation for comparability. Then we rank control candidates based on distance and select (up to) five matched control firms[27] in the same industry from non-attacked MSAs for each affected firm. We only include the four fiscal quarters before and the four fiscal quarters after the attacks in our analysis. To form the coarsened exact matching sample, we match firms based on the same set of covariates: firm size, the market-to-book ratio, and the ROA for

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Attack_Dummy^{-1} =1 for the period from July 1 to December 31, 2016, and zero otherwise; *Attack_Dummy*=1 for the period from January 1 to June 30, 2017, and zero otherwise; *Attack_Dummy*$^{+1}$ =1 for the period from July 1 to December 31, 2017, and zero otherwise; and *Attack_Dummy*$^{2+}$ =1 for the period after December 31, 2017, and zero otherwise.

[26] Nearest neighbor matching selects one or multiple matching partners that are closest in terms of the key features identified by the researchers. This matching technique might discard a large number of observations and lead to reduced power. Coarsened exact matching is an application of exact matching and less sensitive to measurement error (e.g., Iacus et al., 2012), to the extent that the coarsening is chosen appropriately. Entropy balancing matches exactly the specified moments of the covariate distributions (Hainmueller, 2012). This sampling helps to reduce model dependence for the subsequent analysis and it does not require that a unit is either matched or discarded by imposing certain weight constraints.

[27] We use a one to multiple matching method to enhance the power of the test.

firms in the same industry–year. Then we construct the matched regression sample from four quarters before to four quarters after the attack. Finally, to construct entropy-balancing sample, we obtain the entropy weights by requiring that the treatment and control groups have the same first and second moments (i.e., mean and variance) for the same set of covariates, that is, firm size, the market-to-book ratio, and the ROA. Then we repeat the regression using the original sample and incorporating the entropy weights.

We re-estimate Eq. (1) using these alternative samples and report the results in Table 8. The coefficients of *Attack_Dummy* and *Attack_#Death* are significantly negative across all the columns and the magnitudes are comparable to those in Table 2, confirming that our findings are robust to the different matching and sampling techniques and are unlikely driven by correlated omitted variables.

4.3.5 Managerial sentiment versus investor sentiment

Hurwitz (2018) finds that managers are susceptible to prevailing market sentiment and their earnings forecasts are more pessimistic during low-sentiment periods than during normal-sentiment periods. One may argue that terrorist attacks can affect management forecast bias indirectly through their effects on the market or investor sentiment. However, we argue that this effect is unlikely to be substantial in our setting because investors are not necessarily located near the attacked areas where the firms' headquarters are located. Nevertheless, we conduct a robustness check by including market or investor sentiment (Michigan Consumer Research Center Index) as an additional control variable in our regression (e.g., Hurwitz 2018; Bergman and Roychowdhury 2008).[28] Our results continue to hold.

[28] Our results are robust if we use Baker and Wurgler (2006) sentiment index as the proxy for market sentiment.

V. ADDITIONAL ANALYSES

5.1 Likelihood of issuing management forecasts

Our results can suffer from sample selection bias if terrorist attacks affect the likelihood of issuing earnings forecasts. In theory, terrorist attacks induce both pessimistic beliefs and higher uncertainty about the future. If managers believe the firm will underperform after a terrorist attack, they may issue more forecasts to provide timely updates to investors due to litigation risk. In contrast, the increase in perceived risk level can discourage voluntary disclosure. In untabulated tests, we find no evidence that terrorist attacks affect the likelihood of management forecast issuance, suggesting that our results are unlikely driven by selection bias.

5.2 Other properties of management forecasts

Prior psychology literature suggests that fear evokes the appraisal of uncertainty in addition to pessimistic emotion (e.g., Slovic 1987). Prior studies suggest that, as the level of uncertainty increases, managers tend to shorten forecast horizons and widen forecast ranges (e.g., Cheng, Luo, and Yue 2013). Thus, we expect that firms affected by terrorist attacks issue earnings guidance with shorter forecast horizons and wider ranges (i.e., less precise forecasts). To test this prediction, we replace the dependent variable in Eq. (1) with measures of forecast horizon and forecast range and report the results in Table 9. The results in columns (1) and (2) suggest that, on average, the forecast horizon is shortened by 16 days if a terrorist attack occurs and by five days if the number of deaths increases by one. Columns (3) and (4) report the results for the forecast range. Although the coefficient on *Attack_Dummy* is not significant, the coefficient on *Attack_#Death* is positive and significant, suggesting that managers tend to issue less precise management forecasts after the attacks.

5.3 Tone of firm mandatory filings

In this section, we explore the role of managerial sentiment in the context of firm mandatory disclosure. Specifically, we examine how managerial sentiment affects the tone of firms' 10-K/10-Q filings. Firms' 10-K/10-Q filings contain both historical and forward-looking information on firm performance, especially in the MD&A section (Li 2010). Managers are responsible for the presentation and integrity of firm filings and their subjective beliefs inevitably affect the final output of the forward-looking statements in corporate filings (e.g., Huang, Teoh, and Zhang 2014). We argue that the tone of firms' 10-K/10-Q filings is likely subjective and prone to cognitive bias. Thus, we expect that a negative shock to managerial sentiment should lead to more pessimistic tone of firm filings. Consistent with our main analysis, we focus on 10-Ks and 10-Qs filed during the two-quarter periods after the attacks.

We construct the tone measure of firms' 10-K/10-Q filings as the difference between unique negative and unique positive words divided by the sum of negative and positive words (*Nega_Posi*).[29] The variable *Nega_Posi* serves as a summary measure to capture the overall tone of the firm filing. Following Huang et al. (2014), we control for the following firm characteristics in the regression: firm size (*Size*), the market-to-book ratio (*MTB*), ROA, the change in ROA (ΔROA), monthly return volatility (*SD_MRet*), ROA volatility (*SD_ROA*), firm age (*Firm_Age*), logged number of business segments (*Log(#BUSSEG)*), logged number of geographic segments (*Log(#GEOSEG)*), negative earnings (*Loss*), analyst forecast error (*AFE*), and the analyst consensus forecast (*AF*). Table 10 shows that the overall firm filing tone becomes more negative after terrorist attacks, consistent with our expectations. The coefficients indicate that the net

[29] We obtained the counts of positive and negative words for firm 10-K/10-Q filings from Professor Bill McDonald's website at http://www3.nd.edu/~mcdonald/Word_Lists.html.

fraction of negative words increases by 0.7% after attacks and 0.2% if the fatality increases by one from the mean. Overall, these results suggest that managerial sentiment has an influence beyond the regime of voluntary disclosure.

VI. CONCLUSION

Using both the occurrence of terrorist attacks and the number of deaths during the attacks as exogenous shocks to managerial sentiment, we find that firms located within the same MSA as terrorist attacks issue more pessimistic forecasts within the two quarters after the attacks and the forecasts are more pessimistic as the death toll of the attacks increases. Moreover, we find that the effects of managerial sentiment are more pronounced for firms with higher operating uncertainty, younger executives and less experienced executives. On the other hand, the effects of managerial sentiment are weakened for firms with overconfident executives and for attacks happen in an area where there has been an increase in violent events. Finally, we find that managerial sentiment also influences management forecast horizon and the tone in firm 10-K/10-Q filings. Our study contributes to the literature by identifying the role of managerial sentiment in corporate reporting and disclosure. Our findings can help market participants to better interpret the information provided by firms.

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Appendix A. Variable Definitions

Dependent variables	
MFBias	Management forecast bias, computed as the difference between the management forecast, using point estimates or the mid-point of range estimates, and actual earnings per share, deflated by the quarter-end stock price and averaged over each quarter, multiplied by 100.
MFBias_P	Measure of positive forecast bias, defined as the value of *MFBias* if positive and zero otherwise.
MFBias_N	Measure of negative forecast bias, defined as the value of *MFBias* if negative and zero otherwise.
Log(Horizon)	Natural logarithm of the average horizon of all forecasts made by a firm in a quarter. For each forecast, the horizon is the number of calendar days between the forecast announcement date and the forecast period end date.
Range	Average range for all forecasts made by a firm in a quarter. For each forecast, the range is calculated as the difference between the upper and lower ends, divided by the quarter-end stock price and it is zero for the point estimate.
Nega_Posi	Difference between unique negative and unique positive words divided by the sum of negative and positive words in firm 10-K/10-Q filings issued in the quarter.
Insider_NBuy	Number of shares purchased minus the number sold by executives within 30 days after the issuance of management forecasts, divided by total shares outstanding.
Attack variables	
Attack_Dummy	Dummy variable that takes the value of one for firms located in the same MSA as the attack for the two fiscal quarters after the attacks, i.e., the quarters with a quarter-end falling in the first six months following the terrorist attack and zero otherwise.
Attack_#Death	Natural logarithm of one plus the number of civilian deaths in a terrorist attack for firms located in the same MSA as the attack for the two fiscal quarters after the occurrence of the attacks, i.e., quarters with a quarter-end falling in the first six months following a terrorist attack and zero otherwise.
Control variables	
Size	Natural logarithm of market value of equity, calculated as the stock price at the quarter-end multiplied by the number of shares outstanding.
MTB	Market value of assets divided by firm book assets.
Leverage	Long-term debt divided by the market value of assets.
ROA	Income before extraordinary items divided by total assets.
InstHold	Average percentage of shares owned by institutional investors in the year.

AnalystCov	The natural logarithm of one plus the number of unique analysts covering the firm in the year.
SD_Ret	Standard deviation of daily stock returns over the current quarter.
SD_ROA	Standard deviation of the ROA over the last five years.
Firm_Age	Logged value of one plus the number of years since the firm was first covered by the CRSP.
Log(#BUSSEG)	Logged value of the number of business segments or zero if the item is missing from Compustat.
Log(#GEOSEG)	Logged value of the number of geographic segments or zero if the item is missing from Compustat.
SD_MRet	Standard deviation of monthly returns over the year.
Loss	Dummy variable that is set to one when the ROA is negative and zero otherwise.
AFE	Analyst forecast error, calculated as IBES earnings per share minus the median of the most recent analysts' forecasts, deflated by the quarter-end stock price.
AF	Analyst consensus forecast for one-year-ahead earnings per share, scaled by the quarter-end stock price.
Cross-sectional variables	
SD_CF_D	Dummy variable that takes the value of one if a firm's standard deviation of cash flow (deflated by assets) over the last five years (*SD_CF*) is in the highest tercile and zero otherwise.
AF_Dispersion_D	Dummy variable that takes the value of one if analyst forecast dispersion over the last 12 months (*AF_Dispersion*) is in the highest tercile and zero otherwise.
Age_D	Dummy variable that takes the value of one if the average of CEO's age and CFO's age (*Age*) is in the highest tercile and zero otherwise.
Tenure_D	Dummy variable that takes the value of one if the average of CEO's and CFO's numbers of years in office (*Tenure*) is in the highest tercile and zero otherwise.
Overconfidence	Dummy variable that takes the value of one if the CEO/CFO is a long holder of stock options and zero otherwise. A CEO/CFO is considered a long holder if the CEO/CFO ever holds a stock option that is at least 40% in the money at least until the last year.
Δ*Crime_Rate_D*	Dummy variable that takes the value of one if the average annual change in the state-level crime rate over the last five years is in the highest tercile and zero otherwise.

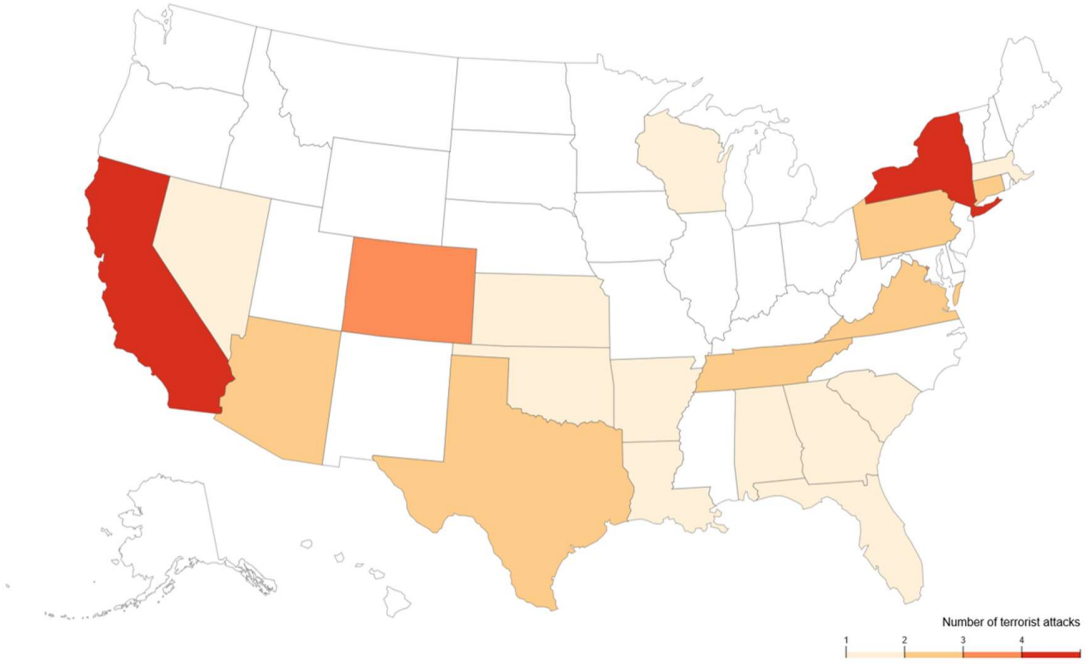
Appendix B. List of Terrorist Attacks

This table lists all terrorist attacks used in the study. Death refers to the total number of civilian deaths (excluding the deaths of terrorists).

Attack	Date	City	State	Death
Federal Building	04/19/1995	Oklahoma	OK	168
Sacramento	04/24/1995	Sacramento	CA	1
Armtrack	10/09/1995	Hyder	AZ	1
Olympic Games	07/27/1996	Atlanta	GA	1
Empire State Building	02/23/1997	New York	NY	1
Abortion Clinic Bombing	01/29/1998	Birmingham	AL	1
U.S. Capitol	07/24/1998	Washington	DC	2
Columbine High School	04/20/1999	Littleton	CO	13
9/11: World Trade Center	09/11/2001	New York	NY	2,755
9/11: Hijacked Plane Crash	09/11/2001	Arlington	VA	184
9/11: Hijacked Plane Crash	09/11/2001	Somerset County	PA	40
America Media Inc.	10/02/2001	Boca Raton	FL	1
Anthrax Attack	11/14/2001	Oxford	CT	1
LA International Airport	07/04/2002	Los Angeles	CA	2
Virginia Tech	04/16/2007	Blacksburg	VA	32
Knoxville Church	07/27/2008	Knoxville	TN	2
Immigration Center	04/03/2009	Binghamton	NY	13
Raul Flores Family	05/30/2009	Arivaca	AZ	2
Military Recruiting Station	06/01/2009	Little Rock	AR	1
Holocaust Museum	06/10/2009	Washington	DC	1
Fort Hood	11/05/2009	Killeen	TX	13
IRS Building	02/18/2010	Austin	TX	1
Century 16 Movie Theatre	07/20/2012	Aurora	CO	12
Sikh Temple	08/05/2012	Oak Creek	WI	6
Sandy Hook Elementary School	12/14/2012	Sandy Hook	CT	26
Boston Marathon	04/15/2013	Boston	MA	3
Navy Yard	09/16/2013	Washington	DC	12
LA International Airport	11/01/2013	Los Angeles	CA	1
Jewish Retirement Home	04/13/2014	Overland Park	KS	3
LV Restaurant and Walmart	06/08/2014	Las Vegas	NV	3
Blooming Grove Barracks	09/12/2014	Blooming Grove	PA	1
Police Vehicle	12/20/2014	New York	NY	2
Emanuel African Methodist Episcopal Church	06/17/2015	Charleston	SC	9
Navy Operational Support Center	07/16/2015	Chattanooga	TN	5
Johnston Street	07/23/2015	Lafayette	LA	2
Planned Parenthood Clinic	11/27/2015	Colorado Springs	CO	3
Inland Regional Center	12/02/2015	San Bernardino	CA	14

Figure 1. Geographic Dispersion of Terrorist Attacks

Panel A: The Frequency of Terrorist Attacks by States



Panel B: The Number of Fatality due to Terrorist Attacks by States

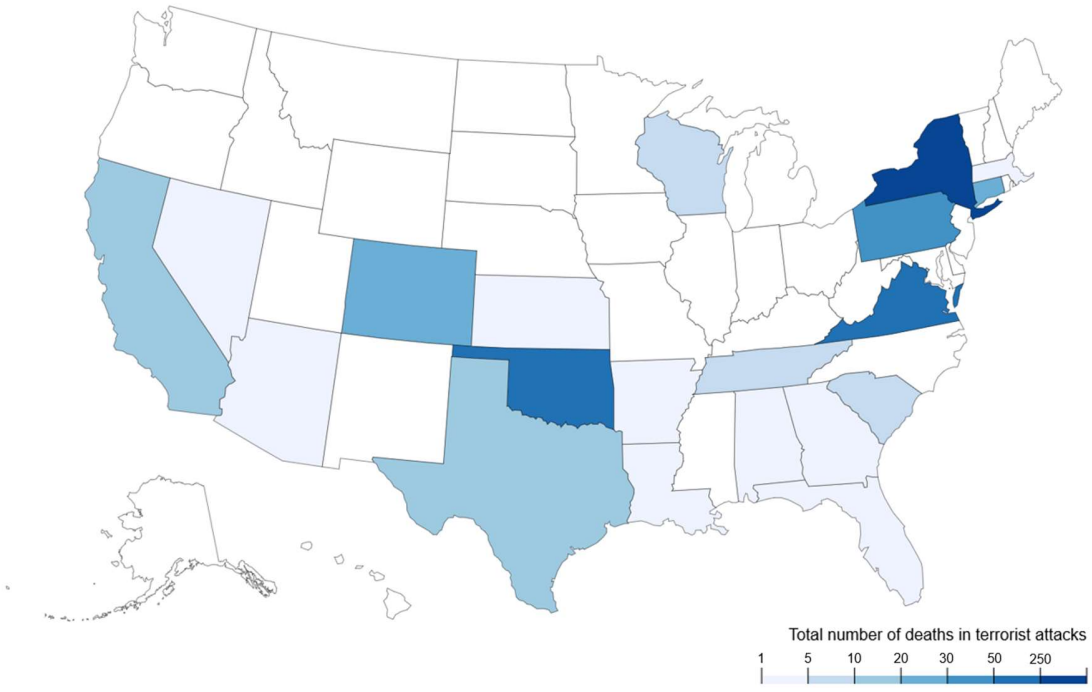


Table 1. Summary Statistics

This table presents descriptive statistics for the regression sample from 1995 to 2015. Detailed variable definitions are presented in Appendix A.

	Mean	SD	Q1	Median	Q3
MFBias	0.096	1.133	-0.277	-0.066	0.151
Horizon	154.010	102.413	66.000	147.000	229.500
Range	0.298	0.330	0.092	0.202	0.386
Nega_Posi	0.415	0.176	0.316	0.437	0.535
Attack_Dummy	0.018	0.132	0.000	0.000	0.000
Attack_#Death	0.041	0.449	0.000	0.000	0.000
Size	7.428	1.503	6.346	7.323	8.437
MTB	1.998	1.141	1.240	1.640	2.338
Leverage	0.117	0.119	0.007	0.086	0.186
ROA	0.013	0.020	0.005	0.013	0.023
InstHold	0.745	0.204	0.630	0.791	0.900
AnalystCov	2.460	0.653	2.079	2.485	2.944
SD_Ret	0.024	0.013	0.015	0.021	0.030
Δ*ROA*	-0.001	0.018	-0.005	0.000	0.004
SD_ROA	0.016	0.020	0.006	0.010	0.019
SD_RetM	0.107	0.057	0.067	0.093	0.131
Firm_Age	2.738	0.908	2.197	2.773	3.466
Log(#BUSSEG)	0.714	0.748	0.000	0.693	1.386
Log(#GEOSEG)	0.829	0.739	0.000	0.693	1.386
Loss	0.120	0.325	0.000	0.000	0.000
AFE	0.001	0.004	-0.000	0.001	0.002
AF	0.054	0.038	0.038	0.053	0.070
SD_CF	0.029	0.025	0.014	0.022	0.035
AF_Dispersion	0.119	0.156	0.037	0.069	0.138
Age	54.257	6.315	50.000	54.000	58.000
Tenure	7.032	6.795	2.000	5.000	10.000
Overconfidence	0.545	0.498	0.000	1.000	1.000

Table 2. Terrorist Attacks and Management Forecast Bias

This table presents the estimation results for the effects of managerial sentiment on management forecast bias. The dependent variable, *MFBias*, is the difference between the management forecast and actual earnings per share, deflated by the quarter-end stock price and averaged over each quarter, multiplied by 100. The variable *MFBias_P* (*MFBias_N)* measures positive (negative) management forecast bias and *Attack_Dummy* and *Attack_#Death* capture the occurrence and the death tolls of terrorist attacks, respectively. All other variables are as defined in Appendix A. Each regression contains a dummy variable for each firm and each year. MSA-clustered heteroskedasticity-robust *t*-statistics are reported in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent	Predicted Sign	*MFBias*		*MFBias*		*MFBias_P*		*MFBias_N*	
Attack_Dummy	-	-0.092***	-0.096***			-0.083***		-0.013	
		(-3.042)	(-3.201)			(-3.985)		(-0.901)	
Attack_#Death	-			-0.037***	-0.037***		-0.034***		-0.004**
				(-6.816)	(-5.850)		(-5.112)		(-2.151)
Size			-0.014		-0.014	-0.152***	-0.152***	0.138***	0.138***
			(-0.490)		(-0.490)	(-6.698)	(-6.688)	(11.187)	(11.177)
MTB			-0.004		-0.004	-0.008	-0.008	0.003	0.003
			(-0.421)		(-0.415)	(-0.884)	(-0.878)	(0.711)	(0.713)
Leverage			0.733***		0.730***	0.702***	0.699***	0.031	0.031
			(3.986)		(3.940)	(4.883)	(4.831)	(0.472)	(0.464)
ROA			-7.925***		-7.928***	-5.856***	-5.858***	-2.070***	-2.070***
			(-13.244)		(-13.229)	(-11.989)	(-11.978)	(-10.984)	(-10.983)
InstHold			0.484***		0.485***	0.268***	0.269***	0.216***	0.216***
			(4.907)		(4.900)	(3.403)	(3.401)	(5.952)	(5.953)
AnalystCov			0.290***		0.291***	0.203***	0.204***	0.087***	0.087***
			(9.489)		(9.491)	(8.166)	(8.173)	(6.301)	(6.301)
SD_Ret			3.250***		3.228***	4.327***	4.306***	-1.077***	-1.079***
			(3.087)		(3.074)	(4.901)	(4.902)	(-3.192)	(-3.193)
Constant		0.307***	-0.774***	0.307***	-0.774***	0.850***	0.850***	-1.624***	-1.624***
		(3.336)	(-3.126)	(3.342)	(-3.127)	(4.356)	(4.354)	(-16.974)	(-16.961)

Firm Fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	45,944	45,944	45,944	45,944	45,944	45,944	45,944	45,944
Adjusted R^2	0.191	0.214	0.191	0.215	0.251	0.251	0.223	0.223

Table 3. Terrorist Attacks and Management Forecast Bias: Cross-Sectional Tests

This table presents the cross-sectional results for the effects of managerial sentiment on management forecast bias. The dependent variable, *MFBias*, is the difference between the management forecast and actual earnings per share, deflated by the quarter-end stock price and averaged over each quarter, multiplied by 100. The variables *Attack_Dummy* and *Attack_#Death* capture the occurrence and the death tolls of terrorist attacks, respectively. In Panel A, *F_Chara* is a dummy variable to measure firm cash flow volatility (*SD_CF_D)* or analyst forecast dispersion (*AF_Dispersion_D*). It equals one for the highest tercile and zero otherwise. In Panel B, *M_Chara* is a dummy variable for managerial characteristics, including the average age of CEOs and CFOs (*Age*), the average tenure of CEOs and CFOs (*Tenure*), and degree of overconfidence (*Overconfidence*). The variables *Age_D* and *Tenure_D* equal one for the highest tercile and zero otherwise and *Overconfidence* equals one if either CEO or CFO is classified as a long holder of stock options and zero otherwise. In Panel C, the variable Δ*Crime_Rate_D* is a dummy variable for changes in the state crime rates over the last five years. It equals one for the highest tercile and zero otherwise. All other variables are as defined in Appendix A. Each regression contains a dummy variable for each firm and each year. MSA-clustered heteroskedasticity-robust *t*-statistics are reported in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Firm Characteristics

	Predicted Sign	(1)	(2)	(3)	(4)
F_Chara		*SD_CF_D*		*AF_Dispersion_D*	
Attack_Dummy	-	-0.016		0.004	
		(-0.821)		(0.285)	
Attack_Dummy× F_Chara	-	-0.234***		-0.258***	
		(-3.090)		(-5.004)	
Attack_#Death	-		-0.006		-0.021***
			(-1.144)		(-5.085)
Attack_#Death× F_Chara	-		-0.052***		-0.038***
			(-2.969)		(-4.309)
F_Chara		0.041	0.040	0.147***	0.144***
		(1.139)	(1.103)	(6.949)	(6.832)
Control Variables		Yes	Yes	Yes	Yes
Firm Fixed		Yes	Yes	Yes	Yes
Year Fixed		Yes	Yes	Yes	Yes
Observations		41,749	41,749	45,714	45,714
Adjusted R^2		0.221	0.221	0.211	0.211

Panel B: Manager Characteristics

	Predicted Sign	(1)	(2)	(3)	(4)	(5)	(6)
M_Chara		*Age_D*		*Tenure_D*		*Overconfidence*	
Attack_Dummy	-	-0.085*		-0.133***		-0.084	
		(-1.810)		(-3.072)		(-1.633)	
Attack_Dummy×M_Chara	+	0.088		0.168*		0.178*	
		(1.645)		(1.929)		(1.692)	
Attack_#Death	-		-0.031***		-0.031***		-0.043***
			(-4.201)		(-2.609)		(-2.707)
Attack_#Death×M_Chara	+		0.023**		0.081***		0.121***
			(2.332)		(3.544)		(3.213)
M_Chara		0.036	0.036	0.058	0.059	-0.025	-0.025
		(1.599)	(1.622)	(1.195)	(1.204)	(-0.303)	(-0.300)
Control Variables		Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed		Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed		Yes	Yes	Yes	Yes	Yes	Yes
Observations		39,845	39,845	18,985	18,985	15,938	15,938
Adjusted R^2		0.204	0.204	0.246	0.246	0.251	0.251

Panel C: Changes in State Crime Rates

	Predicted Sign	(1)	(2)
Dependent		*MFBias*	
Attack_Dummy	-	-0.112***	
		(-2.966)	
Attack_Dummy×ΔCrime_Rate_D	+	0.270***	
		(3.694)	
Attack_#Death	-		-0.038***
			(-4.790)
Attack_#Death×ΔCrime_Rate_D	+		0.092***
			(6.527)
ΔCrime_Rate_D		-0.017	-0.016
		(-0.462)	(-0.451)
Control Variables		Yes	Yes
Firm Fixed		Yes	Yes
Year Fixed		Yes	Yes
Observations		42,235	42,235
Adjusted R^2		0.216	0.216

Table 4. Terrorist Attacks and Management Forecast Bias: Alternative Difference-in-Differences Design

This table presents the estimation results for the effects of managerial sentiment on management forecast bias, controlling for the possible strategic action effect. We pool the firms located in the same metropolitan statistical area as a terrorist attack (treatment sample) with firms having at least 1% of sales from the same state as a terrorist attack (control sample). The dependent variable, *MFBias*, is the difference between the management forecast and actual earnings per share, deflated by the quarter-end stock price and averaged over each quarter, multiplied by 100. *Attack_Dummy* and *Attack_#Death* capture the occurrence and the death tolls of terrorist attacks, respectively. All other variables are as defined in Appendix A. Each regression contains a dummy variable for each firm and each year. MSA-clustered heteroskedasticity-robust *t*-statistics are reported in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Predicted Sign	(1)	(2)
Dependent		*MFBias*	*MFBias*
Attack_Dummy	-	-0.102***	
		(-3.416)	
Attack_#Death	-		-0.039***
			(-5.621)
Size		-0.029	-0.029
		(-0.918)	(-0.914)
MTB		-0.005	-0.005
		(-0.416)	(-0.414)
Leverage		0.719***	0.715***
		(3.528)	(3.474)
ROA		-7.937***	-7.940***
		(-10.643)	(-10.637)
InstHold		0.474***	0.475***
		(3.973)	(3.973)
AnalystCov		0.293***	0.293***
		(8.706)	(8.717)
SD_Ret		3.401***	3.367***
		(2.762)	(2.747)
Constant		-0.656**	-0.657**
		(-2.280)	(-2.278)
Firm Fixed		Yes	Yes
Year Fixed		Yes	Yes
Observations		31,949	31,949
Adjusted R^2		0.170	0.170

Table 5. Terrorist Attacks, Management Forecast Bias, and Insider Trading

This table presents the results for the effects of managerial sentiment on insider trading. The dependent variable, *Insider_NBuy,* is the number of shares purchased minus those sold by executives within 30 days after management forecasts, divided by total shares outstanding. The variables *Attack_Dummy* and *Attack_#Death* capture the occurrence and the death tolls of terrorist attacks, respectively. The variable *MFBias_Neg* is a dummy variable that takes the value of one if the forecasted earnings is lower than actual earnings and zero otherwise. All other variables are as defined in Appendix A. Each regression contains a dummy variable for each firm and each year. MSA-clustered heteroskedasticity-robust *t*-statistics are reported in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Predicted Sign	(1)	(2)	(3)	(4)
Dependent		*Insider_NBuy*	*Insider_NBuy*	*Insider_NBuy*	*Insider_NBuy*
Attack_Dummy	?	-0.059		0.030	
		(-1.628)		(1.190)	
Attack_ Dummy MFBias_Neg*	-			-0.125*	
				(-1.813)	
Attack_#Death	?		-0.015*		0.011***
			(-1.834)		(2.969)
Attack_#Death MFBias_Neg*	-				-0.040***
					(-3.441)
MFBias_Neg	-	-0.056*	-0.056*	-0.038**	-0.038**
		(-1.807)	(-1.805)	(-2.306)	(-2.251)
Size		-0.056*	-0.056*	-0.059*	-0.059*
		(-1.807)	(-1.805)	(-1.922)	(-1.919)
MTB		-0.100***	-0.100***	-0.099***	-0.099***
		(-4.797)	(-4.780)	(-4.822)	(-4.812)
ROA		-3.279***	-3.282***	-3.243***	-3.249***
		(-5.618)	(-5.633)	(-5.591)	(-5.617)
Ret		-3.098***	-3.099***	-3.067***	-3.067***
		(-20.042)	(-20.086)	(-20.336)	(-20.384)
SD_Ret		0.256	0.251	0.251	0.254
		(0.274)	(0.268)	(0.270)	(0.273)
Constant		1.876***	1.870***	1.905***	1.901***
		(6.788)	(6.805)	(6.980)	(6.988)
Firm Fixed		Yes	Yes	Yes	Yes
Year Fixed		Yes	Yes	Yes	Yes
Observations		51,263	51,263	51,263	51,263
Adjusted R^2		0.101	0.101	0.101	0.101

Table 6. Terrorist Attacks and Management Forecast Bias: Robustness Checks

This table presents the estimation results for the effects of managerial sentiment on management forecast bias, using different restricted samples. The dependent variable, *MFBias*, is the difference between the management forecast and actual earnings per share, deflated by the quarter-end stock price and averaged over each quarter, multiplied by 100. The variables *Attack_Dummy* and *Attack_#Death* capture the occurrence and the death tolls of terrorist attacks, respectively. All other variables are as defined in Appendix A. Columns (1) and (2) exclude the second half of 2001; columns (3) and (4) exclude all commercial targets; and columns (5) and (6) exclude all firms in the air transportation, tourism, hotel and recreation, insurance, and defense industries. Each regression contains a dummy variable for each firm and each year. MSA-clustered heteroskedasticity-robust *t*-statistics are reported in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Predicted Sign	(1)	(2)	(3)	(4)	(5)	(6)
		Excluding 9/11		Excluding Commercial Targets		Excluding Industries Likely Affected Economically	
Dependent		*MFBias*	*MFBias*	*MFBias*	*MFBias*	*MFBias*	*MFBias*
Attack_Dummy	-	-0.067**		-0.098***		-0.090**	
		(-1.973)		(-2.961)		(-2.428)	
Attack_#Death	-		-0.065**		-0.064***		-0.044***
			(-2.266)		(-3.082)		(-7.324)
Size		-0.011	-0.011	-0.012	-0.012	-0.009	-0.009
		(-0.395)	(-0.397)	(-0.433)	(-0.433)	(-0.293)	(-0.295)
MTB		-0.001	-0.001	-0.005	-0.005	-0.010	-0.010
		(-0.118)	(-0.114)	(-0.446)	(-0.442)	(-0.961)	(-0.950)
Leverage		0.725***	0.725***	0.744***	0.744***	0.741***	0.738***
		(4.130)	(4.127)	(4.066)	(4.065)	(4.083)	(4.033)
ROA		-8.246***	-8.244***	-7.955***	-7.958***	-7.793***	-7.794***
		(-13.598)	(-13.572)	(-13.351)	(-13.348)	(-13.101)	(-13.081)
InstHold		0.498***	0.498***	0.483***	0.483***	0.493***	0.494***
		(4.867)	(4.864)	(4.849)	(4.852)	(4.700)	(4.687)
AnalystCov		0.288***	0.288***	0.290***	0.290***	0.294***	0.294***
		(9.397)	(9.412)	(9.492)	(9.498)	(9.404)	(9.401)
SD_Ret		3.326***	3.312***	3.232***	3.229***	3.409***	3.380***
		(3.037)	(3.031)	(3.064)	(3.057)	(3.094)	(3.079)
Constant		-0.801***	-0.800***	-0.787***	-0.787***	-0.821***	-0.821***
		(-3.216)	(-3.215)	(-3.274)	(-3.269)	(-3.195)	(-3.201)
Firm Fixed		Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed		Yes	Yes	Yes	Yes	Yes	Yes
Observations		44,811	44,811	45,676	45,676	44,263	44,263
Adjusted R^2		0.218	0.218	0.215	0.215	0.217	0.217

Table 7. Terrorist Attacks and Management Forecast Bias: Dynamic Regressions

This table presents the results of dynamic estimation for the effects of managerial sentiment on management forecast bias. The dependent variable, *MFBias*, is the difference between the management forecast and actual earnings per share, deflated by the quarter-end stock price and averaged over each quarter, multiplied by 100. The variables *Attack_Dummy*$^{-2}$ (*Attack_#Death*$^{-2}$), *Attack_Dummy*$^{-1}$ (*Attack_#Death*$^{-1}$), *Attack_Dummy*$^{+1}$ (*Attack_#Death*$^{+1}$), and *Attack_Dummy*$^{2+}$ (*Attack_#Death*$^{2+}$) indicate different time periods surrounding the occurrence of terrorist attacks. The variables *Attack_Dummy*$^{-2}$ (*Attack_#Death*$^{-2}$), *Attack_Dummy*$^{-1}$ (*Attack_#Death*$^{-1}$), and *Attack_Dummy*$^{+1}$ (*Attack_#Death*$^{+1}$) equal one (the logged value of one plus the number of fatalities) for the affected firms for the two-quarter period starting 12 months before the terrorist attack, the two-quarter period starting six months before the terrorist attack, and the two-quarter period starting six months after the terrorist attack, respectively, and zero otherwise. The variable *Attack_Dummy*$^{2+}$ (*Attack_#Death*$^{2+}$) equals one (the logged value of one plus the number of fatalities) for affected firms starting one year after the terrorist attacks and zero otherwise. All other variables are as defined in Appendix A. Each regression contains a dummy variable for each firm and each year. MSA-clustered heteroskedasticity-robust *t*-statistics are reported in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent	Predicted Sign	(1) *MFBias*	(2) *MFBias*
Attack_Dummy^{-2}	Insignificant	-0.054 (-1.130)	
Attack_Dummy^{-1}	Insignificant	-0.042 (-0.802)	
Attack_Dummy	-	-0.108*** (-3.162)	
Attack_Dummy^{+1}	Insignificant	0.013 (0.299)	
Attack_Dummy^{2+}	Insignificant	-0.016 (-0.453)	
Attack_#Death^{-2}	Insignificant		-0.039 (-1.564)
Attack_#Death^{-1}	Insignificant		-0.009 (-0.270)
Attack_#Death	-		-0.038*** (-6.147)
Attack_#Death^{+1}	Insignificant		0.007 (0.654)
Attack_#Death^{2+}	Insignificant		-0.001 (-0.206)
Size		-0.014 (-0.492)	-0.014 (-0.497)
MTB		-0.005 (-0.431)	-0.004 (-0.419)
Leverage		0.735***	0.732***

	(3.981)	(3.952)
ROA	-7.916***	-7.920***
	(-13.162)	(-13.173)
InstHold	0.486***	0.486***
	(4.895)	(4.893)
AnalystCov	0.290***	0.291***
	(9.496)	(9.509)
SD_Ret	3.262***	3.238***
	(3.093)	(3.084)
Constant	-0.771***	-0.774***
	(-3.151)	(-3.143)
Firm Fixed	Yes	Yes
Year Fixed	Yes	Yes
Observations	45,944	45,944
Adjusted R^2	0.214	0.214

Table 8. Terrorist Attacks and Management Forecasts Bias: Alternative Samples

This table presents the estimation results for the effects of managerial sentiment on management forecast bias using alternative samples. Columns (1) and (2) use the nearest neighborhood matched sample. For each affected firm, we select (up to) five matched control firms from non-attacked MSAs in the year prior to an attack, based on industry, firm size, the market-to-book ratio, and the ROA. We keep the four fiscal quarters before and the four fiscal quarters after the attacks in the regression. Columns (3) and (4) use a coarsened exact matched sample based on industry, firm size, the market-to-book ratio, and the ROA and provide the estimates for the period four quarters before to four quarters after the attacks. Columns (5) and (6) use entropy balancing on the original sample. The dependent variable, *MFBias*, is the difference between the management forecast and actual earnings per share, deflated by the quarter-end stock price and averaged over each quarter, multiplied by 100. The variables *Attack_Dummy* and *Attack_#Death* capture the occurrence and the death tolls of terrorist attacks, respectively. All other variables are as defined in Appendix A. Each regression contains a dummy variable for each firm and each year. MSA-clustered heteroskedasticity-robust *t*-statistics are reported in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Predicted Sign	(1)	(2)	(3)	(4)	(5)	(6)
Sample		Nearest Neighborhood Matching		Coarsened Exact Matching		Entropy Balancing	
Attack_Dummy	-	-0.091*		-0.082*		-0.094***	
		(-1.709)		(-1.691)		(-3.692)	
Attack_#Death	-		-0.057***		-0.053***		-0.038***
			(-3.739)		(-3.737)		(-6.181)
Size		0.067	0.065	-0.021	-0.023	0.012	0.012
		(1.044)	(1.004)	(-0.368)	(-0.391)	(0.374)	(0.375)
MTB		-0.053*	-0.052	-0.011	-0.011	-0.017	-0.017
		(-1.678)	(-1.647)	(-0.375)	(-0.379)	(-1.472)	(-1.473)
Leverage		0.447	0.434	0.585	0.573	0.511**	0.505**
		(1.101)	(1.065)	(1.457)	(1.420)	(2.375)	(2.319)
ROA		-5.573***	-5.596***	-5.706***	-5.720***	-7.545***	-7.550***
		(-4.804)	(-4.816)	(-5.624)	(-5.619)	(-8.559)	(-8.554)
InstHold		0.010	0.016	0.230	0.236	0.487***	0.488***
		(0.041)	(0.064)	(1.160)	(1.189)	(5.923)	(5.943)
AnalystCov		0.292***	0.290***	0.252***	0.249***	0.276***	0.277***
		(3.982)	(3.943)	(4.211)	(4.170)	(7.674)	(7.685)
SD_Ret		1.046	1.028	1.552	1.520	4.810***	4.757***
		(0.591)	(0.583)	(1.041)	(1.028)	(4.054)	(4.017)
Constant		-0.853*	-0.832*	-0.236	-0.220	-0.986***	-0.988***
		(-1.794)	(-1.716)	(-0.549)	(-0.504)	(-2.971)	(-2.974)
Firm Fixed		Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed		Yes	Yes	Yes	Yes	Yes	Yes
Observations		17,460	17,460	13,861	13,861	45,944	45,944
Adjusted R^2		0.334	0.335	0.272	0.272	0.169	0.169

Table 9. Terrorist Attacks and Management Forecasts: Other Forecast Properties

This table presents the estimation results for the effects of managerial sentiment on management forecast horizon and forecast range. The dependent variables are the forecast horizon (*Log(Horizon)*) and the forecast range (*Range*). The variables *Attack_Dummy* and *Attack_#Death* capture the occurrence and the death tolls of terrorist attacks, respectively. All other variables are as defined in Appendix A. Each regression contains a dummy variable for each firm and each year. MSA-clustered heteroskedasticity-robust *t*-statistics are reported in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Predicted Sign	(1)	(2)	Predicted Sign	(3)	(4)
Dependent		*Log(Horizon)*			*Range*	
Attack_Dummy	-	-0.107***		+	0.001	
		(-3.450)			(0.090)	
Attack_#Death	-		-0.043***	+		0.002*
			(-7.293)			(1.958)
Size		-0.034**	-0.034**		-0.197***	-0.197***
		(-2.292)	(-2.289)		(-20.365)	(-20.366)
MTB		0.061***	0.061***		-0.005	-0.005
		(8.915)	(8.910)		(-1.079)	(-1.080)
Leverage		-0.158**	-0.162**		0.331***	0.331***
		(-2.309)	(-2.370)		(6.847)	(6.853)
ROA		0.388	0.385		-0.756***	-0.756***
		(1.010)	(1.005)		(-7.474)	(-7.469)
InstHold		-0.077	-0.075		0.031	0.031
		(-1.596)	(-1.556)		(0.975)	(0.973)
AnalystCov		-0.048***	-0.048***		0.041***	0.041***
		(-2.673)	(-2.656)		(4.530)	(4.525)
SD_Ret		-4.476***	-4.503***		2.284***	2.287***
		(-7.285)	(-7.354)		(9.311)	(9.291)
Constant		5.591***	5.591***		1.727***	1.727***
		(38.114)	(38.101)		(25.313)	(25.312)
Firm Fixed		Yes	Yes		Yes	Yes
Year Fixed		Yes	Yes		Yes	Yes
Observations		45,089	45,089		45,847	45,847
Adjusted R^2		0.360	0.360		0.537	0.537

Table 10. Terrorist Attacks and Disclosure Tone

This table presents the estimation results for the effects of managerial sentiment on financial reporting disclosure tone. The dependent variable is the difference between negative and positive words divided by the sum of negative and positive words (*Nega_Posi*) in firm 10-K/10-Q reports. The variables *Attack_Dummy* and *Attack_#Death* capture the occurrence and the death tolls of terrorist attacks, respectively. All other variables are as defined in Appendix A. Each regression contains a dummy variable for each firm and each year. MSA-clustered heteroskedasticity-robust *t*-statistics are reported in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Predicted Sign	(1)	(2)
Dependent		Nega_Posi	Nega_Posi
Attack_Dummy	+	0.007**	
		(1.983)	
Attack_#Death	+		0.003***
			(3.875)
Size		-0.010**	-0.010**
		(-2.044)	(-2.044)
MTB		-0.015***	-0.015***
		(-5.688)	(-5.688)
ROA		-0.113	-0.112
		(-0.983)	(-0.979)
Δ*ROA*		-0.027	-0.027
		(-0.423)	(-0.424)
SD_MRet		0.293***	0.292***
		(2.968)	(2.967)
SD_ROA		0.086***	0.087***
		(3.303)	(3.304)
Firm_Age		0.019	0.019
		(1.331)	(1.341)
Log(#BUSSEG)		-0.003	-0.003
		(-0.681)	(-0.679)
Log(#GEOSEG)		-0.002	-0.002
		(-0.366)	(-0.361)
Loss		0.012***	0.012***
		(2.988)	(2.997)
AFE		-0.179	-0.179
		(-0.745)	(-0.745)
AF		-0.144***	-0.144***
		(-2.976)	(-2.968)
Constant		0.465***	0.465***
		(7.771)	(7.775)

Firm Fixed	Yes	Yes
Year Fixed	Yes	Yes
Observations	35,323	35,323
Adjusted R^2	0.404	0.404