Media and Trading Frenzies at Earnings Announcements

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We investigate whether market-wide demand shifts for financial information produce media and trading frenzies that concentrate at earnings announcements. We focus on the level of macroeconomic uncertainty as a common demand shift for financial information, as demand by market participants should grow when there is greater uncertainty about firms' expected future payoffs. Consistent with the business press responding to greater information demands, we find that market-wide business press coverage dramatically increases for earnings announcements during periods of high macroeconomic uncertainty. In addition, consistent with the business press being an information intermediary that specializes in low fixed cost information, we find that their increased coverage of freely available earnings disclosures is in sharp contrast to their coverage of non-earnings announcement period news. Further, we find that the shift in coverage of earnings announcements leads to the appearance of trading frenzies when macroeconomic uncertainty is high, producing elevated trading levels for announcing firms and greater cross-sectional return dispersion due to the increased disparity in coverage.

Keywords: *business press coverage, macroeconomic uncertainty, earnings announcements, trading volume*

Data Availability: *All data are publicly available from the sources identified in the text.*

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Abstract

We investigate whether market-wide demand shifts for financial information produce media and trading frenzies that concentrate at earnings announcements. We focus on the level of macroeconomic uncertainty as a common demand shift for financial information, as demand by market participants should grow when there is greater uncertainty about firms' expected future payoffs. Consistent with the business press responding to greater information demands, we find that market-wide business press coverage dramatically increases for earnings announcements during periods of high macroeconomic uncertainty. In addition, consistent with the business press being an information intermediary that specializes in low fixed cost information, we find that their increased coverage of freely available earnings disclosures is in sharp contrast to their coverage of non-earnings announcement period news. Further, we find that the shift in coverage of earnings announcements leads to the appearance of trading frenzies when macroeconomic uncertainty is high, producing elevated trading levels for announcing firms and greater cross-sectional return dispersion due to the increased disparity in coverage.

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1 Introduction

Investors face significant challenges in gathering information about firms' expected future payoffs. As evidence of these challenges, recent research demonstrates that investors are affected by the coverage of earnings information through the business press, social networks, equity and debt analyst reports, and other intermediaries (e.g., Blankespoor et al., 2017, 2013; Bradshaw et al., 2016; Bushee et al., 2010; Bushman et al., 2016; Drake et al., 2014, 2017; Fang and Peress, 2009; Miller, 2006; Tetlock, 2010).[1] These studies find evidence of important capital market benefits of greater coverage of earnings information—e.g., lower spreads, increased liquidity, and less mispricing. Underlying these studies is the notion that investors are constrained in their ability to obtain news.[2] Such constraints can arise because investors do not pay to be directly informed, as it is costly, or because investors have limited cognitive resources to pay attention (e.g., Barber and Odean, 2008; Grossman and Stiglitz, 1980; Hirshleifer and Teoh, 2003; Hong and Stein, 1999; Merton, 1987; Peng and Xiong, 2006). Information intermediaries can mitigate these constraints.

We examine whether the level of aggregate investor uncertainty leads to media frenzies—temporary clusterings of business press coverage—at earnings announcements. Specifically, relying on the framework developed by Veldkamp (2006b), we investigate whether higher market-wide investor uncertainty leads to an outward shift in investor demand for financial information that manifests itself through a market-wide increase in the coverage of earnings announcements. We intentionally focus on the business press, as it is an information intermediary with extensive readership and broad market coverage and one that specializes in relatively low fixed cost news stories.[3] Extensive readership is important as fixed production costs from stories can readily be spread across subscribers, leading to lower average costs for producing stories and potential greater profitability. Broad market coverage with relatively low fixed costs are important as they can lead to incentives to increase the supply of market-wide coverage when increased demand arises. Further, we focus on media frenzies at earnings announcements, relative to non-earnings announcement time peri-

[1] Miller and Skinner (2015) provides a recent discussion of developments in this line of research.

[2] Another possibility is that information intermediaries provide additional information beyond firms' earnings releases.

[3] See for examples: Ahern and Sosyura (2014); Blankespoor et al. (2017); Bushee et al. (2010); Bushman et al. (2016); Drake et al. (2014, 2017); Engelberg and Parsons (2011); Fang and Peress (2009); Fang et al. (2014); Griffin et al. (2011); Hillert et al. (2014); Klibanoff et al. (1998); Miller (2006); Peress (2014); Solomon (2012); Solomon et al. (2014); Soltes (2011); Tetlock (2007, 2010); Tetlock et al. (2008); Thompson et al. (1987); Twedt (2015).

ods, due to such releases of information being of low acquisition cost, predictable, and typically containing value relevant information. Finally, we examine the level of macroeconomic uncertainty, as measured by the Chicago Board Options Exchange's Volatility Index (VIX),[4] to capture the level of common investor uncertainty.[5] Because of investor aversion to uncertainty (e.g., Bansal and Yaron, 2004; Drechsler, 2013), investors' aggregate demand for financial information can grow when macroeconomic uncertainty increases. Whether the business press engages in such temporary expansions and contractions of coverage is unclear, as such actions involve the costly reallocation of resources.[6]

In addition, we examine whether the increased press coverage in turn leads to apparent trading frenzies—temporary increases in aggregate trading and price dispersion. That is, the greater temporary coverage by the business press can increasingly induce investors to update their conditional variance of expected future payoffs. This can lead to the observation of greater abnormal trading volume at earnings announcements during periods of heightened macroeconomic uncertainty. In addition, on days when earnings releases are relatively frequent, cross-sectional return dispersion can grow as more firm-specific information is available to investors (Veldkamp, 2006a), especially as greater business press coverage can lead to an increasing number of investors being aware of firm-specific information (Peng and Xiong, 2006). These forces can produce higher observed aggregate volatility during periods of heightened macroeconomic uncertainty.

Relying on business press stories from the RavenPack database during 2000–2013, we find evidence supporting the emergence of media and trading frenzies at earnings announcements. Specifically, we find that business press coverage is approximately nine percent higher at earnings announcements for moderate increases in the level of macroeconomic uncertainty (i.e., an interquartile

[4]We focus on the VIX because it captures investors' expectations about future volatility and is widely followed by market participants, especially the business press. For instance, the index is often colloquially referred to as "Wall Street's fear gauge" and as "a staple of the financial press" Loder and Banerji (2017). The focus on the market's expectation differs from alternative measures of expected future macroeconomic uncertainty (Jurado et al., 2015; Rossi and Sekhposyan, 2015).

[5]Other types of common uncertainty (e.g., industry uncertainty) can lead to higher levels uncertainty about firms' expected future payoffs. We focus on macroeconomic uncertainty as it affects the broadest set of firms and is not diversifiable.

[6]The notion that the press is constrained in its provision of news stories is pervasive in practice. Randall (2000)describes the constraints in this way: "Every daily newspaper ought to print a disclaimer in each issue. It would read something like this: 'This paper, and the hundreds of thousands of words it contains, have been produced in about 15 hours by a group of fallible human beings working out of cramped offices while trying to find out what happened in the world from people who are sometimes reluctant to tell us and at other times, positively obstructive.' There are limits to the process of journalism. Shortage of time and information are two which are endemic."

range increase in the VIX). In addition, we find that coverage grows by approximately seventeen percent for large increases in the level of macroeconomic uncertainty (i.e., a bottom to top decile increase in the VIX). These increases are averages for all listed firms. Aggregating across firms, for a typical two-day earnings announcement this implies an increase of approximately thirty-five and sixty-five additional news stories for moderate and large increases in the level of macroeconomic uncertainty, respectively. In sharp contrast, when we examine non-earnings announcement periods, we find that business press coverage declines with macroeconomic uncertainty. This could reflect that the business press faces constraints because of their increased coverage of earnings announcements.

We further find that the increased media coverage explains higher trading volume at earnings announcements when macroeconomic uncertainty is higher. Specifically, we observe that abnormal trading volume is 15 percent higher for moderate increases in the level of macroeconomic uncertainty. Because pre-disclosure information across traders should have lower precision when greater macroeconomic uncertainty exists leading to higher trading volume, we estimate a mediation model to separate out how much of the relationship between abnormal trading volume and macroeconomic uncertainty is attributable to the amount of business press coverage. Using our mediation model, which adds business press coverage as an explanatory variable, we find that approximately two-thirds of the increase in trading volume is attributable to the greater coverage of earnings information by the business press when macroeconomic uncertainty is higher. In addition, we find that cross-sectional return dispersion (i.e., the standard deviation of returns for all firms on a trading day) due to the disparity in firm-specific information being released through earnings announcements is 64 percent higher for a moderate increase in the level of macroeconomic uncertainty. Again, because investors likely have higher variance priors during periods of heightened macroeconomic uncertainty, we estimate a mediation model to investigate the extent to which business press coverage is responsible for the increase in return dispersion during periods of more frequent earnings announcements. Using our mediation model, we find that nearly 60 percent of the increase is driven by the increased dispersion in the coverage of earnings information by the business press. Together, these findings provide evidence that media frenzies around earnings announcements lead to trading frenzies during periods of elevated macroeconomic uncertainty.

We conduct two additional analyses to strengthen our inferences. First, we separately focus

on bellwether firms to examine if our media frenzy findings are attributable to the business press focusing on the provision of stories that can resolve macroeconomic uncertainty. Anilowski, Feng, and Skinner (2007), Aobdia, Caskey, and Ozel (2014), and Bonsall, Bozanic, and Fischer (2013) provide evidence that such "bellwether" firms convey information about the macroeconomy through their firm-level disclosures. Consistent with the business press shifting their coverage towards such information, we find that business press coverage during times of elevated macroeconomic uncertainty is more focused on bellwether firms. In addition, we find that the decline in coverage during non-earnings announcement periods is less pronounced for bellwether firms. Second, we separately focus on whether constraints in the ability of the business press to expand coverage during times of heightened macroeconomic uncertainty lead to the expansion of stories into low cost news flashes, which typically just rebroadcast a disclosure, rather than full articles, which typically add reporter generated information to a disclosure or are original stories (see Drake et al., 2014; Soltes, 2011). During earnings announcements, we find that news flash coverage grows with the level of macroeconomic uncertainty; however, full article coverage declines with the level of macroeconomic uncertainty. During non-earnings announcement periods, we find that full article coverage again declines with the level of macroeconomic uncertainty but that news flash coverage is insensitive to the level of macroeconomic uncertainty. This evidence is consistent with the expansion of news flash coverage at earnings announcements crowding out longer, more costly full articles.

These findings offer several important contributions. First, our findings show how temporary market-wide shifts in media coverage can arise at earnings announcements and lead to temporary market-wide shifts in trading activity and return volatility. Prior empirical evidence of media and trading frenzies is restricted to Veldkamp (2006b). Examining twenty-three emerging markets from 1989 to 2002, Veldkamp (2006b) provides empirical evidence that when emerging markets have higher market risk and prices that they receive greater coverage by the *Financial Times*, leading to greater price dispersion across markets. This evidence is consistent with shifting coverage across countries depending on relative levels of uncertainty. In contrast to these findings, we demonstrate how market-wide uncertainty and the resulting demand by investors leads the business press to strategically shift their market-wide supply of information to freely available and predictable earnings releases rather than a general expansion in their supply in coverage. We also provide evidence that the expansion of coverage of earnings releases appears to come at the cost of coverage of non-

earnings announcement period news. In addition, expansion of coverage is accomplished through greater dissemination of information using news flashes of disclosures, which appears to come at the cost of more detailed news stories.

Second, our findings provide new insight into how the business press determines coverage. Prior studies (e.g., Bushee et al., 2010; Drake et al., 2014, 2017; Fang and Peress, 2009; Hillert et al., 2014) show that business press coverage is determined by cross-sectional demand for coverage, finding that firm-specific factors such as size, analyst following, and growth explain coverage decisions. We contribute to these studies by showing how the level of market-wide investor uncertainty can produce large swings in the coverage of earnings announcements and how such coverage changes can lead to important shifts in market-wide trading behavior. We also show that changing coverage at such times can lead to systematic changes in the types of firms covered (i.e., bellwether firms) and lead to the expansion and contraction of certain types of coverage. The dynamic nature of these coverage decisions is interesting in its own right as it speaks to market-wide expansions and contractions in coverage by the business press, which are costly given the temporary changes in infrastructure needed to respond to these coverage changes. We further contribute to these studies and other related studies (e.g., Blankespoor et al., 2017; Engelberg and Parsons, 2011; Soltes, 2011) by showing that the significant supply changes by the business press can lead to temporary but important changes in market-wide trading and return volatility.

Third, our findings caution that market-wide volatility at earnings announcements can be increasingly problematic in the future. As Veldkamp (2006b) indicates, innovations in the marginal cost of information provision can lead to higher future volatility in asset markets. In the case of earnings announcements, recent innovations in the dissemination of earnings releases, such as Twitter (Blankespoor et al., 2013) and robo-journalists (Blankespoor et al., 2017), likely can lead to even more pronounced market-wide volatility when macroeconomic uncertainty returns again to the U.S. stock market.

We discuss in the next section prior research on business press coverage of earnings announcements and develop research hypotheses. Section 3 discusses our research designs used to investigate media and trading frenzies at earnings announcements. Section 4 discusses our data and provides descriptive statistics. Section 5 provides our empirical findings. Section 6 describes our supplemental analyses related to the asymmetric response of the business press in the types of firms they

cover and articles they disseminate in response to changes in macroeconomic uncertainty. Section 7 summarizes and concludes.

2 Background and research hypotheses

2.1 Prior research on the business press and earnings announcements

The business press plays an influential role as an information intermediary in financial markets. Coverage by the business press tends to concentrate on firms that are of greater interest to its readers, individuals, and institutional investors. This leads to larger firms, value stocks, firms with more analyst coverage, firms more widely held by individuals and institutions, greater idiosyncratic volatility stocks, indexed firms, firms with more employees, more heavily traded stocks, and momentum stocks receiving greater coverage (e.g., Bushee et al., 2010; Drake et al., 2014, 2017; Fang and Peress, 2009; Hillert et al., 2014). Importantly, coverage by the business press also tends to concentrate during earnings announcements (e.g., Drake et al., 2014; Tetlock et al., 2008; Thompson et al., 1987). The days surrounding the earnings announcement are typically the time period most widely-covered by the business press (Tetlock et al., 2008). Accordingly, the business press appears to respond to the demands of individual and institutional investors to follow certain types of firms and to cover earnings releases to meet investor demands.

Business press coverage of earnings announcements has important capital market consequences. For instance, Bushee et al. (2010) finds that business press coverage of earnings announcements assists in narrowing bid-ask spreads and increasing depth. Soltes (2011) also finds that greater coverage of earnings information increases trading volume and lowers idiosyncratic volatility. Engelberg and Parsons (2011) shows that local coverage of earnings announcements leads to greater trading by local investors. Drake et al. (2014) demonstrates that cash flow mispricing is lower for firms with greater coverage of their earnings announcements. Blankespoor et al. (2017) provides evidence that algorithmic articles of firms' earnings announcements produced by the Associated Press and disseminated by large media outlets lead to higher trading volume and liquidity.

Most relevant to our study, Veldkamp (2006b) models how media and trading frenzies can develop and provides empirical evidence of such behavior in emerging markets during 1989–2002. In

Veldkamp (2006b), because complementarity in information that is important for pricing assets can arise, higher demand for information can lead to both media and trading frenzies. The predictions of the model can help explain the forces underlying why clustered periods of high news coverage, combined with increased trading and price dispersion, can arise. Below we expand on this framework, developing predictions regarding how the level of macroeconomic uncertainty can lead the business press to systematically change its market-wide coverage of earnings releases and how that can lead to systematic changes in market-wide volume and return volatility.

2.2 Research hypotheses

2.2.1 Market-wide increases in the coverage of earnings releases

Coverage of earnings releases of firms by business press outlets is a function of the demand for such information and the amount actually supplied. Regarding the determinants of coverage supply at a point in time, following Veldkamp (2006b), suppliers of information, such as the business press, can maximize profit as follows:

$$\begin{aligned} max \quad & d_{it} \left(c_{it} I(c_{it}, c_{-it}) - \chi \right) \\ d_{it}, c_{it} & \end{aligned}$$

where $d_{it} = 1$ if the information supplier chooses to discover information in period t and $d_{it} = 0$ otherwise; $I((c, c_{-it})$ is the per capita demand for the information with price c_{it} conditional on all other posted prices c_{-it}; and χ is the per capita fixed cost of discovering the information. The fixed cost investment represents, for instance, the cost of paying a journalist to prepare a story or the cost of obtaining non-public information. As the number of purchasers of the information increases the fixed cost is spread out, making the investment in information more profitable. The types of suppliers of information can be segmented into those that obtain information by incurring large fixed cost investments (e.g., private newsletters) to those incurring relatively low fixed costs (e.g., the mass media). The relative value of the information obtained will dictate the price that the individual supplier can charge and, accordingly, the expected cost they are willing to incur.

Regarding the determinants of the demand for coverage, higher demand arises from greater expected volatility of asset payoffs. In a single market, important shifts in the aggregate demand

for information can occur when the variance of expected future payoffs grows. This can occur because shocks to payoffs are multiplicative and time varying, leading to changes in demand for information. Specifically, following Veldkamp (2006b), the payoff for a risky asset, u_{t+1}, is:

$$u_{t+1} = \theta_{t+1} + \varepsilon_{t+1}$$

where $\varepsilon_{t+1} \sim N\left(0, \sigma_{\varepsilon}^2\right)$. The persistent component of the payoff is $\theta_{t+1} = (1-\rho)\mu + \rho\theta_t(1+\eta_{t+1})$ and can increase or decrease with shocks $\eta_{t+1} \sim N\left(0, \sigma_{\eta}^2\right)$. These shocks can also lead to changes in the variance of expected payoff innovations. As the unconditional variance of expected future payoffs increases, suppliers of information can respond to the outward shift in demand by increasing their supply of stories. Similar to Veldkamp (2006b), Jensen (1979) earlier argues that consumer preferences shape the demand for news—particularly their aversion to ambiguity. Prior research supports the argument that investors dislike uncertainty, as they typically require a premium for holding assets with high uncertainty risk (Bansal and Yaron, 2004; Drechsler, 2013; Kumar, 2009; Ozoguz, 2009; Segal et al., 2015).

With these forces in mind, times of heightened macroeconomic uncertainty can lead to greater demand for information in general, due to the greater uncertainty about payoffs for firms in the economy. This should include any information that has the potential to resolve such uncertainty, including information obtained through costly acquisition activities during non-earnings announcement periods and low cost information obtained at the release of earnings. For the business press, however, we expect that the change in the supply of information in response to the demand shifts toward coverage of earnings releases. It would be difficult for the business press to ramp up the production of news stories outside of earnings announcements by reporters in response to such a demand shift. Increasing the supply of stories, particularly original stories, would require costly investment in hiring and training journalists, as well as private information acquisition. Instead, the easiest way for a low fixed cost supplier like the business press to respond to higher demand is to increase coverage of stories with lower fixed cost, especially those that are predictable and contain relevant information. Earnings announcements possess both attributes. The business press can readily anticipate the disclosure of earnings releases. In addition, the dissemination of earnings information by the business press has been shown to serve an important role in financial mar-

kets (e.g., Bushee et al., 2010), despite the fact that the acquisition cost of earnings information should be relatively low for investors, and firms' earnings disclosures contain information about the macroeconomy (Anilowski et al., 2007; Aobdia et al., 2014; Bonsall et al., 2013). This can lead to multiple business press outlets producing similar stories that reach a different set of readers. Further, despite their higher fixed cost to produce, the cost of original stories during times of high macroeconomic uncertainty could be relatively lower at earnings announcements as stories could build off of or follow up the information contained in earnings announcements. The readers of these stories can include those following the firm about which the story is written and those who are trying to learn about macroeconomic uncertainty through multiple noisy signals from a wide number of firms. This discussion leads us to state our first research hypothesis (in alternative form):

H1: Business press coverage of firms' earnings announcements grows relatively larger with macroeconomic uncertainty.

Changes in the aggregate supply of coverage by the business press during such times can face significant frictions. Unlike the demand for greater coverage of specific types of firms (e.g., larger firms), demand shifts brought about by heightened macroeconomic uncertainty can be relatively unpredictable. The outlay of expenditures to increase the resources to acquire, process, interpret, and disseminate earnings information could preclude significant coverage changes by the business press during times of high macroeconomic uncertainty. Accordingly, whether the business press responds to greater demand for coverage by increasing its capacity to supply coverage depends on the net benefit to the business press.

2.2.2 Abnormal trading volume at earnings announcements

The fraction of investors who are informed (denoted λ_t) is expected to increase with $Var\left[\theta_{t+1}\right]$, due to news being more valuable when the variance of the persistent component of the payoff for the risky asset is higher. This prediction follows from the condition that $Var\left[\theta_{t+1}\right] = \rho^2\theta^2\sigma_\eta^2$. When larger shocks occur (i.e., σ_η^2 is higher) more news will be demanded. More formally, following Veldkamp (2006b), the net benefit of purchasing a story for an investor is given by:

$$B(\lambda) = \left[\frac{Var\left(u_{t+1}|P_t\right)}{Var\left(u_{t+1}|\theta_{t+1}\right)}\right]^{1/2} - e^{ac(\lambda_t)}$$

The first term shows that the benefit is higher when the payoff variance conditional on price is large relative to that conditional on the information. The second shows the utility cost of information, where $c(\lambda_t)$ is the endogenous price of a story and a is the level of absolute risk aversion. When information demand grows, the average cost of producing a story falls, as λ_t is higher, leading to more investors seeking the information. In addition, as more investors become informed, price becomes more informative, which lowers the benefit of information. Accordingly, the fraction of investors who are informed grows until the net benefit of purchasing a story becomes zero. This can lead to a larger fraction of investors purchasing a given news story when larger shocks occur.

The larger number of investors demanding coverage can lead to the business press having a more important role as an information intermediary when macroeconomic uncertainty increases. Specifically, in times of elevated uncertainty, the business press can shift resources to provide a greater supply of earnings information to investors for reasons discussed above. The greater dissemination and interpretation of earnings information by the business press during such times should lead to a greater number of traders receiving the information and updating their beliefs. In addition, firms in the news tend to experience greater trading, especially purchases, by retail investors, consistent with limited investor attention (e.g., Barber and Odean, 2008). This can lead to increased trading volume and have the appearance of a trading frenzy. This prediction leads to the following hypothesis:

H2: Higher coverage of earnings announcements during periods of greater macroeconomic uncertainty leads to greater abnormal trading volume.

2.2.3 Cross-sectional return dispersion

Now, consider all firms in the market on a given trading day. Because earnings releases occur only once per quarter, market participants are constrained in obtaining earnings information for particular firms. If only one firm were to announce its earnings (ignoring other information releases that may randomly occur), return comovement should be relatively high as the availability of firm-specific information is low. In contrast, on days when multiple firms announce earnings, the comovement in returns should be lower. The mechanism for this is that price changes for announcing firms should reflect information in the earnings releases, and, as there are a larger number of

announcing firms, return comovement is lower. Additionally, price changes for non-announcing firms are based on information from a larger number of announcing firms (see Veldkamp, 2006a, for greater discussion of the causes of comovement in asset prices). Accordingly, we expect cross-sectional return dispersion to vary positively with the number of firms reporting earnings.

When macroeconomic uncertainty is higher, on days with more earnings announcements, cross-sectional return dispersion should be even more pronounced. This can occur for two reasons. First, when investors have higher-variance priors, the release of earnings information should have a greater effect on beliefs and greater variation in pricing (Veldkamp, 2006b). Consistent with this reason, Williams (2014) finds that investors respond more strongly to bad earnings news when macroeconomic uncertainty increases than when macroeconomic uncertainty decreases. Second, and more importantly, the greater coverage of earnings releases during such times arising from greater investor demand can produce greater cross-sectional volatility in returns. As Peress (2014) shows in the context of newspaper strikes, cross-sectional return dispersion falls when media coverage is constrained by strikes. The decline is consistent with attention constraints on investors leading them to focus on aggregate information sources. In addition, as Peng and Xiong (2006) demonstrates, category-learning behavior is efficient when investor attention is limited. Accordingly, when the cost of collecting firm-specific information is relatively high, constrained investors will collect and trade on market, industry, or other aggregate information rather than firm-specific information. In contrast, when the cost of firm-specific information declines through the the greater coverage of information by the financial press, investors tend to trade on more firm-specific information, which can make prices incorporate information more rapidly. Consistent with this, Twedt (2015) finds that the market reaction to management earnings guidance is larger and more timely when there is greater business press dissemination of the guidance. For these reasons, on days when more firms are releasing earnings, we expect that when macroeconomic uncertainty grows aggregate return dispersion will be higher. More formally, our last research hypothesis is as follows:

H3: Higher coverage of earnings announcements during periods of greater macroeconomic uncertainty leads to greater cross-sectional return dispersion.

3 Research design

3.1 Market-wide increases in the coverage of earnings releases

Our first set of empirical tests examines how macroeconomic uncertainty leads to systematic increases in the business press coverage of earnings announcements. We begin by investigating whether business press coverage of earnings announcements grows with macroeconomic uncertainty using the following OLS regression model:

$$LCoverage_X = \alpha_0 + \alpha_1 VIX + \sum \alpha_i Control_i + \epsilon \quad (1)$$

where $LCoverage_{EA}$ is the natural logarithm of one plus the number of news stories for a firm on the day of or the day after a quarterly earnings announcement ($X = EA$); and VIX is the average level of the Chicago Board Options Exchange Volatility Index over the month prior to the earnings announcement period. Our first hypothesis predicts that business press coverage of earnings announcements will grow with macroeconomic uncertainty. This leads to the prediction that $\alpha_1 > 0$. We test whether media frenzies during times of increased macroeconomic uncertainty are concentrated at earnings announcements, as our first hypothesis further predicts, or are, alternatively, attributable to increased demand for all types of information. Our approach, similar to that adopted by Bushee et al. (2010), uses non-earnings announcement periods as a benchmark to evaluate the effect of macroeconomic uncertainty on the coverage of earnings announcements relative to the coverage of other news. Our approach differs from that of Bushee et al. (2010) in that we estimate the earnings announcement and non-earnings announcement periods separately and test for a difference in the VIX coefficients. The dependent variable for the non-earnings announcement periods, $LCoverage_{NonEA}$, is the natural logarithm of one plus the number of stories written about firm i on the day of and the day following a randomly selected non-earnings announcement trading day ($X = NonEA$) that falls between the current and prior earnings announcement. This leads to a matched sample of non-announcing firms for the same quarter. The use of a two-day window allows a direct comparison with coverage during the two-day earnings announcement periods. We expect that α_1 when $LCoverage_{EA}$ is the dependent variable will be greater than when we use $LCoverage_{NonEA}$.

Importantly, certain types of firms are more likely to receive business press attention than others—e.g., large and growing firms. Our control variables are intended to capture the determinants of firms' normal level of business press coverage. Specifically, similar to prior related research (e.g., Fang and Peress, 2009; Bushee et al., 2010; Drake et al., 2014, 2017; Hillert et al., 2014; Bonsall et al., 2017) our control variables include $AbsEarnSurp$, the absolute value of the seasonally adjusted change in earnings before extraordinary items scaled by market capitalization at the beginning of the fiscal quarter; $NegSurp$, an indicator variable equal to one if the seasonally adjusted change in earnings before extraordinary items is negative and zero otherwise; $LMktCap$, the natural logarithm of the market value of equity; BM, the book value of stockholders' equity divided by market capitalization; $LFollow$, the natural logarithm of one plus the number of equity analysts following the firm during the fiscal quarter; $InstHold$, the proportion of shares outstanding held by institutional investors; $IVol$, the annualized standard deviation of weekly residual stock returns following the model from Bandarchuk and Hilscher (2013); Ret, the buy-and-hold return of the firm's equity over the previous twelve months; $SP500Member$, an indicator variable equal to one if a firm is a member of the S&P 500 market index and zero otherwise; $LEmployee$, the natural logarithm of the number of employees; $LOwn$, the natural logarithm of the number of shareholders; $NasdaqTraded$, an indicator variable equal to one if a firm's common shares trade on the NASDAQ exchange and zero otherwise; $Turnover$, the average share volume divided by shares outstanding using daily stock market data over the prior six months; and $MomStrength$, the absolute value of the difference between the firm's stock return over the previous six months and the median stock return over the same period (Bandarchuk and Hilscher, 2013).

Despite our extensive controls, our causal interpretation of the findings could be threatened if other (unobservable) factors are correlated with our variable of interest, VIX, and $LCoverage_{EA}$. This should not be a significant concern, however, as the level of macroeconomic uncertainty is likely not highly correlated with many firm-specific factors. In any event, to mitigate the influence of omitted firm characteristics, we also alternatively conduct our tests using a firm fixed effects model. This approach uses the firm as its own control during earnings announcement and non-earnings announcement periods, respectively, allowing us to examine how the level of macroeconomic uncertainty affects within firm business press coverage.

3.2 Abnormal trading volume at earnings announcements

Our next set of empirical tests investigates abnormal trading behavior and cross-sectional return dispersion around earnings announcements. We first examine whether abnormal trading volume is greater when macroeconomic uncertainty is higher using the following model:

$$AbnVol_{EA} = \beta_0 + \beta_1 VIX + \sum \beta_i Control_i + e \tag{2}$$

where $AbnVol_{EA}$ is share turnover during the earnings announcement (the day of and day following the announcement) less the median two-day share turnover of consecutive two-day periods during the non-announcement period, which is comprised of all dates between five trading days after the release date of quarter $t-1$ earnings and five trading days prior to the release date of quarter t earnings. Our measure of abnormal volume is similar to that used in Barron et al. (2017). We expect that abnormal trading volume surrounding earnings announcements will be higher when macroeconomic uncertainty is higher ($\beta_1 > 0$). We base this prediction on the notion that pre-disclosure precision of information should be lower when macroeconomic uncertainty is higher and that the release of earnings information should lead to greater belief revisions. In models of trading volume (Kim and Verrecchia, 1991a,b), greater differential precision of information before earnings announcements will lead to greater revisions to investors' beliefs when earnings are released. Empirical studies examining earnings announcements support this prediction (see Bamber et al., 2011, for a recent review). Given that the precision of pre-disclosure information across traders should be lower when there is greater macroeconomic uncertainty, trading volume around earnings announcements should be abnormally high.

More importantly, we investigate whether increased business press coverage during periods of greater macroeconomic uncertainty is responsible for the predicted higher volume in equation (2) using a mediation model (i.e., path analysis) (MacKinnon, 2008). Using a mediation model allows us to estimate what portion of the total effect that we document by estimating equation (2) is attributable to the increase in business press coverage of earnings announcements that we document in the estimation of equation (1). Prior accounting studies have used mediation analysis to formally test whether a relationship between X and Y arises through path Z (e.g., Bonsall et al.,

2017; Bonsall and Miller, 2017; Landsman et al., 2012; Lang et al., 2012). Our mediated version of equation (2) includes $Coverage_{EA}$ as follows:

$$AbnVol_{EA} = \beta_0^{'} + \beta_1^{'} VIX + \beta_2^{'} LCoverage_{EA} + \sum \beta_i Control_i + e \tag{3}$$

The mediated effect of business press coverage on abnormal trading volume is tested as $\beta_1 - \beta_1^{'}$ from equations (2) and (3), respectively (MacKinnon and Dwyer, 1993). That is, the inclusion of $LCoverage_{EA}$ allows us to test the extent to which the relationship between $AbnVol_{EA}$ and VIX earnings announcements is attributable to increased business press coverage during periods of greater macroeconomic uncertainty. The estimate of β_1 from equation (2) indicates the total effect of increased macroeconomic uncertainty on abnormal trading volume during earnings announcements; the estimate of the difference in coefficients of $\beta_1 - \beta_1^{'}$ indicates whether and the extent to which increased business press coverage is responsible for the elevated abnormal trading volume—the mediated effect. Thus, if $\beta_1^{'} < \beta_1$, then we can infer that increased business press coverage of earnings announcements during periods of heightened macroeconomic uncertainty is responsible for part of the association between macroeconomic uncertainty and earnings announcement trading volume. This is our test of H2.

Control variables included in the analysis are $AbsEarnSurp$, $NegSurp$, $LMktCap$, BM, $LFollow$, $InstHold$, $IVol$, Ret, $SP500Member$, $LEmployee$, $LOwn$, $NasdaqTraded$, $Turnover$, and $MomStrength$. The variables are consistent with those used in prior related research by Barron et al. (2017), Bonsall et al. (2017), Bushee et al. (2010), Drake et al. (2014, 2017), Fang and Peress (2009), and Hillert et al. (2014).

3.3 Cross-sectional return dispersion

Our last test explores whether earnings announcements, due to their greater coverage by the business press, lead to greater cross-sectional return dispersion during times of heightened macroeconomic uncertainty. We investigate this using the following model:

$$LReturnDispersion = \theta_0 + \theta_1 L\#EarnAnnouncers + \theta_2 VIX + \theta_3 L\#EarnAnnouncers \times VIX + \sum \delta_i Control_i + \eta \quad (4)$$

where $LReturnDispersion$ is the natural logarithm of the standard deviation of market-adjusted returns for all listed firms, similar to Veldkamp (2006b) and Peress (2014), and $L\#EarnAnnouncers$ is the natural logarithm of one plus the number of firms announcing earnings. Following Peress (2014), we expect that the comovement of returns will be lower when greater amounts of firm specific information, such as earnings, becomes increasingly available. Thus, we expect that cross-sectional return dispersion will grow as the number of firms releasing earnings grows and accordingly, $\theta_1 > 0$. When macroeconomic uncertainty is greater, the effect of the release of earnings on return dispersion should be higher because earnings information can have a greater effect on investors' beliefs and because the coverage of earnings information is greater at such times. Accordingly, we also predict that $\theta_3 > 0$.

Similar to our trading volume analysis, we examine whether observed higher cross-sectional return dispersion is attributable to increased business press coverage. We accomplish this by estimating a mediated version of equation (4), which adds variables for the dispersion in media coverage and the dispersion in media coverage interacted with VIX:

$$\begin{aligned} LReturnDispersion = {} & \theta_0' + \theta_1' L\#EarnAnnouncers + \theta_2' VIX + \theta_3' L\#EarnAnnouncers \times VIX \\ & + \theta_4' LCoverageDispersion + \theta_5' LCoverageDispersion \times VIX \\ & + \sum \theta_i' Control_i + \eta' \end{aligned} \quad (5)$$

where $LCoverageDispersion$ is the natural logarithm of the standard deviation of business press coverage for all listed firms. We expect that greater dispersion in coverage, which measures the cross-sectional difference in the availability of low cost information to investors, will result in greater return dispersion. In addition, due to information being potentially more valuable when macroeconomic uncertainty is higher, we also expect that dispersion in coverage by the business press will lead to greater return dispersion when macroeconomic uncertainty is higher. Together, this

leads to the predictions that $\theta_4^{'} > 0$ and $\theta_5^{'} > 0$. If cross-sectional differences in media coverage are partially responsible for the higher dispersion in returns observed when more firms release their earnings (i.e., if cross-sectional differences in media coverage mediate the relationship between the number of firms announcing earnings earnings and cross-sectional dispersion in stock returns), then the mediated effect of $\theta_3 - \theta_3^{'}$ should be positive. Such evidence would be consistent with media frenzies leading to aggregate return volatility. Our control variables include market-wide measures for $LMktCap$, the natural logarithm of daily total market capitalization, and BM, the aggregate version of BM (i.e., the daily sum of all companies' book value of equity divided by the daily sum of the market value of equity).

4 Data and sample description

We begin our sample construction by selecting the intersection of the CRSP database and all quarterly earnings announcements in Compustat during the 2000–2013 period, which yields 291,449 observations. The availability of control variables for our regression analyses reduce the sample further to 140,667 firm-quarter (earnings announcement) observations. We collect news stories from the Dow Jones edition of the RavenPack news database with news stories beginning in January 2000 and ending in December 2013. During our sample period, the RavenPack database covers approximately 8,000 companies and tracks nearly 10 million unique new stories. For each story, RavenPack records a score to indicate the prominence of a company within the story, called Relevance, with higher values corresponding to greater prominence of a company within the story. We count news stories each day as the number of full articles or news flashes with a relevance score of at least 90 from the Dow Jones news service. As discussed by Drake et al. (2014), RavenPack's relevance score allows us to isolate our analysis of press coverage on articles that focus on the companies in our sample. In addition, RavenPack's identification of articles as full articles or news flashes allows us to examine the possible asymmetric supply of news flashes relative to full articles. News stories that relate to stock prices or trade imbalances are dropped because a large number of these stories are automatically generated and stories that relate to insider trading are dropped because of changes in their coverage during the sample period (Rogers et al., 2016).We winsorize all continuous variables in our sample at the 1st and 99th percentile sample values, respectively.

Panel A of Table 1 presents descriptive statistics for variables used in our earnings announcement analyses. During the two-day window starting on the earnings announcement date, there are, on average, 9.4 news articles. Of these articles, approximately 4.7 are news flashes and 2.1 are original news stories. The average news flashes and original news stories do not sum to the average total articles because Ravenpack also includes press releases and tabular material (e.g., a firm's income statement) in its news coverage. On average, sample firms have a market capitalization of $3.8 billion, are followed by approximately nine analysts, have over 8,000 employees, and have over 12,400 shareholders. Almost 14 percent of sample firms are members of the S&P 500 Index and over 50 percent of them have their common equity traded on the NASDAQ exchange. Nearly 60 percent of shares outstanding are owned by institutional investors for the average firm-quarter in our sample. We provide additional variable descriptive statistics in Panel A.

For our matched non-earnings announcement sample, we measure business press coverage as the two-day sum of articles for a randomly selected two-day window during the period beginning two days following the prior quarter's earnings announcement and ending two days prior to the current period's earnings announcement such that we do not overlap with the measurement of business press coverage in our earnings announcement sample. As shown in Panel B of Table 1, many of the descriptives for our control variables are quite similar to those for the earnings announcement sample; this is not surprising as we examine the same firm-quarters in both samples. One notable item from the descriptive statistics is that business press coverage is significantly lower, on average, during non-earnings announcement periods. This pattern exists for total coverage, news flashes, and original news articles, and indicates that the nature of the demand for and supply of information at earnings announcements differs from other days during the fiscal quarter.

Panel C of Table 1 provides descriptive statistics for the return dispersion tests. As the panel shows, return dispersion and coverage dispersion varies considerably in the sample—e.g., the interquartile-range for return dispersion is 0.020 relative to an average of 0.038. In addition, the number of firms announcing earnings on a given trading day varies considerably—i.e., the interquartile-range is 111 relative to an average of 90 firms.

5 Empirical results

5.1 Market-wide increases in the coverage of earnings releases

In Table 2, we present the results from estimating our initial model of business press coverage. Column (1) presents the findings for $LCoverage_{EA}$ using OLS. Consistent with H1, we find that the estimated coefficient for VIX is significantly positive. This indicates that business press coverage of earnings announcements grows with macroeconomic uncertainty. The coefficient of 0.0085 indicates that during an average earnings announcement a moderate increase in VIX from the first to third quartile leads to a 9.23 percent increase in the average number of stories (i.e., $\{e^{[0.0085\times(24.378-14.564)]}-1\}\times\left[\frac{1+9.382}{9.382}\right]$).[7] As the average number of news stories during earnings announcements is 9.382, the increase in coverage from low to high uncertainty periods is 0.903 additional stories for announcing firms. The number of sample firms announcing earnings on the same day has a median near forty,[8] implying that thirty-five additional stories are generated by the business press at earnings announcements when macroeconomic uncertainty is relatively high. For a more extreme change in macroeconomic uncertainty, the effect is considerably higher. A large change in VIX from the bottom decile (12.627) to the top decile (31.014) leads to the average number of stories increasing by 17.29 percent (i.e., $\{e^{[0.0085\times(31.014-12.627)]}-1\}\times\left[\frac{1+9.382}{9.382}\right]$) and an aggregate increase of sixty-five news stories for a typical earnings announcement.

For the control variables, we find that coverage at earnings announcements is significantly higher for firms with greater analyst following ($LFollow$), greater institutional holdings ($InstHold$), indexed in the S&P 500 ($SP500Member$), with more employees ($LEmployee$), more dispersed ownership ($LOwn$), and with greater share turnover ($Turnover$). In addition, we find that coverage is significantly lower for firms with higher market capitalization ($LMktCap$), lower growth (BM), greater idiosyncratic volatility ($IVol$), and listed on Nasdaq ($NasdaqTraded$).[9] This evidence is consistent with demand by shareholders, employees, and others determining business press coverage of earnings announcements.

Column (2) of Table 2 presents the results of estimating equation (1) for non-earnings announce-

[7] The calculation adjusts for $LCoverage_{EA}$ being measured as the natural logarithm of one plus the number of news stories.

[8] That is, 140,667 observations / 14 years / 251 two-day trading periods per year.

[9] The finding of lower coverage for firms with greater idiosyncratic volatility is consistent with the evidence in Soltes (2011) of market benefits for firms with greater business press coverage.

ment trading days using OLS. As the findings show, using $LCoverage_{NonEA}$, the coefficient for VIX is significantly negative, indicating that business press coverage of non-earnings information declines during periods of elevated macroeconomic uncertainty. This evidence suggests that the business press finds it relatively less profitable to generate non-earnings announcement related news stories during times of macroeconomic uncertainty, in contrast to our findings for earnings announcements. In addition, as column (3) shows, the difference between earnings and non-earnings time periods is statistically significant (t-statistic = 19.85). The difference in coverage of non-earnings announcement period news could be the result of constraints faced by the business press. In particular, the business press may be shifting resources to covering firms' earnings announcements rather than providing coverage of news about firms outside of earnings announcements.

Similar results are found in analyses with firm fixed effects reported in columns (4)–(6).[10] Using $LCoverage_{EA}$, the coefficient estimate of 0.0066 for VIX remains significantly positive. This indicates that during an average earnings announcement an interquartile-range increase in VIX leads to a 7.40 percent increase in the average number of stories. Using $LCoverage_{NonEA}$, the coefficient estimate of -0.0005 for VIX remains significantly negative. As shown in column (6), the difference is again statistically significant (t-statistic = 19.70). Together, the findings support H1.

The results for the control variables using $LCoverage_{EA}$ are similar to the OLS estimation; however, we now find that coverage is higher for firms with greater absolute changes in earnings ($AbsEarnSurp$), lower returns (Ret), and less momentum ($MomStrength$). Not surprisingly, variables with little variation over time for firms become insignificant: BM, $SP500Member$, and $NasdaqTraded$. Similar to our findings for earnings announcements, we find using $LCoverage_{NonEA}$ evidence of greater business press coverage for firms with more employees ($LEmployee$), disperse ownership ($LOwn$), share turnover ($Turnover$), and lower returns (Ret). We find, however, greater business press coverage for firms with higher market capitalization ($LMktCap$), greater idiosyncratic volatility ($IVol$), greater momentum ($MomStrength$), and lower institutional holdings ($InstHold$). These differences across the earnings and non-earnings periods likely reflect differential demands and supply for coverage of earnings and non-earnings information—e.g., insti-

[10]The adjusted R^2 for the firm fixed effects estimation is much lower than that for the baseline OLS estimation because it captures the within firm explanatory power of the model.

tutional investors could have greater demand for the dissemination of earnings information versus non-earnings information.

5.2 Abnormal trading volume at earnings announcements

Having established that the supply of business press stories increases when there is greater macroeconomic uncertainty, we next turn to whether trading volume at earnings announcements is more pronounced when VIX increases. As discussed in Section 3.2, we use a mediation model to test whether increased business press coverage is responsible for any documented association between $AbnVol_{EA}$ and VIX.

Table 3 presents the results from estimating the non-mediated and mediated analyses, equations (2) and (3), respectively. In the non-mediated analysis in column (1), the coefficient for VIX, which captures the total effect of the relationship between macroeconomic uncertainty and earnings announcement trading volume, is significantly positive providing evidence that trading volume increases as the level of uncertainty increases. Our point estimate implies that an increase in VIX from its first to third quartile value leads to a 15 percent $(0.0003 \times (24.378 - 14.564) \div 0.020)$ increase in abnormal trading volume at earnings announcements relative to the mean level in our sample. This increase in trading during periods of higher uncertainty resembles herding behavior during periods of high uncertainty. This behavior, however, is consistent with rational behavior predicted within the Veldkamp (2006a,b) frameworks. The coefficients for the control variables are consistent with those observed in prior related research. To emphasize a few of the results, the negative coefficient for $LMktCap$ indicates that larger firms have lower abnormal trading volume at earnings announcements and the positive coefficient for $AbsEarnSurp$ indicates that earnings announcements with more information content have more abnormal trading volume.

Column (2) presents the mediated regression results and shows the magnitude of the total effect documented in column (1) that is attributable to the increase in business coverage of earnings announcements when macroeconomic uncertainty is higher. Consistent with greater business press coverage of earnings releases leading to greater abnormal trading volume, the coefficient for $LCoverage_{EA}$ is significantly positive. More importantly, the coefficient estimate for VIX drops from 0.0003 to 0.0001—which provides evidence of what portion of the total effect of macroeconomic uncertainty on trading volume arises indirectly through the channel of business press

coverage. Based on the results in column (2) of Table 3, approximately two-thirds of the total effect of macroeconomic uncertainty on earnings announcement trading volume appears to flow through the indirect path mediated by business press coverage. The results of the formal mediation test, provided at the bottom of the table, indicate that the difference is statistically significant (F-statistic = 126.73). The coefficient estimates for the controls are largely unchanged from the non-mediated regression, indicating that their effect on trading volume is distinct from that of business press coverage.

Columns (3) and (4) provide parallel analyses that include firm fixed effects. Our inferences remain unchanged; the coefficient estimates, however, differ somewhat. For VIX, in the non-mediated analysis, the estimated coefficient, capturing the total effect, is 0.0002. This coefficient suggests that an interquartile change in VIX leads to a nearly 10 percent increase in abnormal trading volume at earnings announcements ($0.0002 \times (24.378 - 14.564) \div 0.020$) relative to the mean level in our sample. In the mediated analysis, the coefficient declines to 0.0001, suggesting that the indirect path through business press coverage is responsible for a large portion of the total effect of macroeconomic uncertainty on earnings announcement trading volume shown in column (3). The mediated difference is statistically significant (F-statistic = 88.27). For some of the control variables, especially those that are relatively time invariant (e.g., $NasdaqTraded$), the statistical significance declines relative to the original OLS analysis.

Table 4 provides a more formal test of our path analysis using a structural equation framework. We report bootstrapped standard errors clustered by firm (MacKinnon et al., 2004). The path analysis shown in Table 4 separates the total effect of VIX on $AbnVol_{EA}$ into a direct effect and indirect effect through the path of $LCoverage_{EA}$. In model (1), which excludes firm fixed effects, the path analysis reveals a positive and significant direct path from VIX to $AbnVol_{EA}$. Model (1) also reveals a positive and statistically significant indirect path from VIX to $AbnVol_{EA}$ through $LCoverage_{EA}$. The indirect path of 0.000192 captures 66.9 percent of the total effect, mirroring the regression analysis in columns (1) and (2) of Table 3. Model (2) in Table 4 tells a similar story while including firm fixed effects. Both the direct and indirect effects in model (2) are positive and statistically significant with the indirect effect capturing 48.1 percent of the total effect, mirroring the regression results in columns (3) and (4) of Table 3.

Taken together, the evidence in Tables 3 and 4 support H2. During times of high macroeconomic

uncertainty, abnormal volume grows during earnings announcements. An important reason for the increase is that the business press is responding to investors' demand for greater coverage of earnings information. The greater provision of information then explains a significant portion of the greater observed trading activity.

5.3 Aggregate return volatility

We next turn to how greater variation in business press coverage of earnings releases, can lead to greater cross-sectional return volatility when macroeconomic uncertainty is high. Table 5 presents the results from estimating equations (4) and (5). Column (1) presents the results for the non-mediated analysis—which captures the total effect of earnings announcement intensity during periods of heightened macroeconomic uncertainty on cross-sectional return dispersion. The coefficient for $L\#EarnAnnouncers$ is significantly positive, consistent with greater return dispersion on days when more firms report their earnings. In terms of magnitude, an interquartile range increase in the number of firms announcing earnings $(130 - 19)$ implies a 12.9 percent increase in cross-sectional return volatility when VIX is at its sample median value. The coefficient for VIX is also significantly positive, consistent with greater return dispersion during times of higher macroeconomic uncertainty. In addition, the coefficient on the interaction $L\#EarnAnnouncers \times VIX$ is significantly positive. This suggests that the greater release of firm-specific information at earnings announcements leads to greater return dispersion when macroeconomic uncertainty is high. For an interquartile change in VIX $(25.010 - 15.050)$, the estimated coefficient on the interaction between $L\#EarnAnnouncers$ and VIX implies that the marginal increase in cross-sectional price dispersion resulting from the release of firms' earnings information grows by over 64.1 percent relative to when VIX is at its median sample value $((0.0232 + 0.0015 \times (25.010 - 15.050)) \times 5.55 \div 0.129 - 1)$. The aggregate size of the market, $LMktCap$, and aggregate book-to-market ratio, BM, are also significant determinants of the cross-section of price dispersion.

Column (2) reports the results for the mediated analysis, which includes a measure of aggregate earnings announcement news coverage, $LCoverageDispersion$, and the interaction with VIX. The analysis provides evidence of magnitude of the indirect effect of earnings announcement intensity during periods of heightened macroeconomic uncertainty on cross-sectional return dispersion through cross-sectional dispersion in business press coverage of those earnings announce-

ments. The coefficients for $LCoverageDispersion$ and the interaction of $LCoverageDispersion$ with VIX are both significantly positive. Combined, this evidence indicates that differences in the coverage of firm-specific information across firms leads to greater return dispersion in the market, especially when macroeconomic uncertainty is higher. In terms of magnitude, the marginal impact of differences in business press coverage on price dispersion increases by nearly 21 percent for an interquartile range increase in VIX relative to its impact when VIX is at its sample median value $((0.0691 + 0.0015 \times (25.010 - 15.050)) \times 0.56 \div 0.039 - 1)$. We also find that while the coefficient on the interaction $L\#EarnAnnouncers \times VIX$ remains significantly positive, the coefficient estimate declines nearly 60 percent from 0.0015 to 0.0006. This evidence indicates that the total effect of earnings announcement intensity during periods of heightened macroeconomic uncertainty on cross-sectional return dispersion that we document in column (1) is primarily driven by the indirect (mediated) path of greater variation in business press coverage across firms. This difference is statistically significant (F-statistic = 10.35) and provides support for H3 that endogenous information dissemination leads to greater observed return volatility during periods of elevated macroeconomic uncertainty.

Similar to our analysis of earnings announcement trading volume, we conduct a formal path analysis of the moderation effect of heightened macroeconomic uncertainty on the relationship between earnings announcement intensity and cross-sectional return dispersion. Our structural equation framework examines how cross-sectional dispersion in media coverage during periods of heightened macroeconomic uncertainty mediates that moderation effect. We present the results of our path analysis in Table 6. The direct path of the moderation effect ($L\#EarnAnnouncers \times VIX$) is positive and statistically significant at the 0.10 level. The indirect path of the moderation effect through the mediator ($LCoverageDispersion \times VIX$) is also positive and statistically significant ($p < 0.01$). Of the total moderation effect of 0.00148, 58.1 percent is explained by the indirect path, suggesting that greater variation in business press coverage of firms' earnings announcements during periods of heightened macroeconomic uncertainty is a significant channel through which earnings announcements affect cross-sectional price dispersion during these more uncertain periods. Overall, our formal path analysis reinforces the regression based results in Table 5.

6 Supplemental analyses

In this section, we conduct more refined analyses regarding how the business press changes its coverage during times of elevated macroeconomic uncertainty. First, we provide evidence that the shift in business press coverage of earnings announcements is related to how closely specific firms' earnings are related to macroeconomic uncertainty. We do this by investigating whether firms with closer ties to the macroeconomy have a more pronounced shift in coverage. Second, we provide more direct evidence that the business press is constrained in its ability to respond to expansions in the demand for coverage. We do this by investigating whether the business press moves to increasingly low-cost news flashes rather than the production of full articles.

6.1 Asymmetric supply of earnings information for bellwether stocks

An assumption underlying our interpretation of the results from estimating equation (1) is that the shift in business press coverage is attributable to changes in macroeconomic uncertainty and earnings information is demanded by market participants in response to the increase in uncertainty. We further investigate this assumption by testing whether the media increasingly shifts its coverage towards bellwether firms—i.e., firms in the economy with the strongest link to the performance of the aggregate economy. As Anilowski et al. (2007), Aobdia et al. (2014), and Bonsall et al. (2013) show, bellwether firms' disclosures can be a source of important information about macroeconomic activity, as evidenced by significant aggregate stock market responses to the release of management earnings forecasts by these bellwether firms. By focusing on the news regarding bellwether firms, the business press can provide answers to investors regarding a bellwether firm's uncertainty but, more importantly, provide information to investors about macroeconomic uncertainty in general. We test whether the expansion of coverage during earnings announcements is more pronounced for bellwether firms using the following modified equation that interacts VIX with $Bellwether$:

$$LCoverage_{EA} = \vartheta_0 + \vartheta_1 VIX + \vartheta_2 Bellwether + \vartheta_3 VIX \times Bellwether + \sum \vartheta_i Control_i + \zeta \quad (6)$$

where $Bellwether$ is an indicator variable with a value of one if the explanatory power of various

macroeconomic indices for a firm's earnings is in the upper quartile of the sample distribution (Bonsall et al., 2013), and zero otherwise. We expect $\vartheta_3 > 0$. We include the same control variables as included for equation (1).

The results from the estimation of equation (6) are shown in Table 7, with columns (1) and (4) presenting the OLS and firm fixed effect estimations, respectively. For non-bellwether firms, as indicated by the coefficient for VIX, our coefficient estimates are 0.0076 and 0.0058 in columns (1) and (4), which are are lower than for the full sample. More importantly, for bellwether firms, we find that the coefficient estimates for the interaction $VIX \times Bellwether$ are significantly positive. The coefficient estimates of 0.0040 and 0.0036 in the two columns indicate that the coverage of bellwether firms at earnings announcements is much more sensitive to an increase in macroeconomic uncertainty—being about 34 and 38 percent higher, respectively. For the OLS estimate, this suggests that an interquartile range increase in VIX leads to a 13.34 percent increase in the average number of stories (i.e., $\{e^{[(0.0076+0.0040)\times(24.378-14.564)]} - 1\} \times \left[\frac{1+9.382}{9.382}\right]$); for the firm fixed effect estimate, a 10.69 percent increase.

In columns (2) and (5), we report the results of our analysis focused on bellwether versus non-bellwether firms for non-earnings announcement trading days excluding and including firm fixed effects, respectively. For non-earnings announcement days, we find the coefficient for VIX is significantly negative but the coefficient for the interaction of VIX and $Bellwether$ is significantly positive. This is consistent with a decline in coverage for non-bellwether firms when macroeconomic uncertainty grows, but less of a decline for bellwether firms. Across the earnings and non-earnings trading days, coefficient differences for VIX and the interaction of VIX with $Bellwether$ are significantly positive, as shown in columns (3) and (6). The evidence is similar when firm fixed effects are included; however, the coefficient for the interaction of VIX with $Bellwether$ on non-earnings announcement days is insignificant. The sign and significance of the control variables are similar to those in Table 2. Together, this evidence is consistent with the demand for information related to the macroeconomy being an important driver of the increase in business press coverage around earnings announcements.

6.2 Asymmetric supply of news flashes

We also assume that the business press faces constraints in expanding its coverage. We pursue this issue more directly by investigating how the business press shifts the type of stories used to release news during times of elevated macroeconomic uncertainty. The business press can communicate earnings information to investors in two principal ways. First, news stories can disseminate earnings information that firms provide through press releases or earnings announcements. This is primarily done through news flashes. As Drake et al. (2014) shows, these stories typically only rebroadcast a disclosure and are much shorter articles, containing on average 42 words. Second, news stories can be "full articles." As Drake et al. (2014) discusses, these stories can rebroadcast a disclosure but also include reporter generated information. In contrast to news flashes, full articles are much more extensive stories, averaging 248 words. Given limited resources and the increasing cost of acquiring, processing, and interpreting information that is incremental to what firms disclose in their earnings releases when macroeconomic uncertainty is greater, we expect the business press to increasingly shift to lower fixed cost news flash articles that can quickly be issued to response to investors' higher demand[11]. Whether this occurs is, of course, conditional on investors' demand for full articles not increasing more than for news flashes when macroeconomic uncertainty is higher. Assuming that the relative demand for the types of stories is similar, we predict that increases in coverage of earnings announcements during periods of greater macroeconomic uncertainty is more pronounced for news flashes.[12] We investigate this prediction by estimating equation (1) separately for news flashes, $LCoverage_{EA,Flash}$, and original articles, $LCoverage_{EA,Orig}$. This leads to the estimation of the following two modified equations:

$$LCoverage_{X,Flash} = \alpha_{0,N} + \alpha_{1,F} VIX + \sum \alpha_{i,F} Control_i + \epsilon_F \tag{7}$$

[11] Our sample period ending in 2013 avoids the dramatic increase in robo-journalism started by the Associated Press in 2014 (Blankespoor et al., 2017). However, other automated news flashes occur during our sample period to some extent during earnings releases (e.g., Dow Jones Newswire on February 12, 2013, "Clearwire Corp 4Q Loss/Shr 29c"). This would affect our tests if earnings announcement and non-earnings announcement news flashes are automated in systematic ways that occur in tandem with changes in macroeconomic uncertainty.

[12] When macroeconomic uncertainty is higher, the fixed cost of acquiring original information for the business press may be higher due to greater overall uncertainty about firms, leading to us finding a decrease in original article coverage. This leads to the same prediction, however, as it will lead to an even greater disparity in the fixed cost of producing news flash articles relative to original articles.

$$LCoverage_{X,Orig} = \alpha_{0,O} + \alpha_{1,O}VIX + \sum \alpha_{i,O}Control_i + \epsilon_O \quad (8)$$

where $LCoverage_{X,Flash}$, is the natural logarithm of one plus the number of news flashes for a firm on the day of or the day after a quarterly earnings announcement ($X = EA$) or during a randomly selected two-day window during the matched non-earnings announcement period ($X = NonEA$). The test of our prediction is $\alpha_{1,F} > \alpha_{1,O}$. The formal test for the difference in coefficients is conducted by stacking equations (7) and (8).

Table 8 provides the results from estimating equations (7) and (8). In columns (1) and (4), we present the OLS regression results. The results indicate that news flash coverage is more sensitive to increases in macroeconomic uncertainty than original articles. For news flash stories during earnings announcements, the coefficient estimate for VIX of 0.0102 is significantly positive.[13] For original articles during earnings announcements, the coefficient estimate of -0.0049 is significantly negative. The negative coefficient indicates that original article coverage is relatively *less* profitable for the business press to produce when macroeconomic uncertainty is higher. In untabulated tests, the difference in the VIX coefficients of 0.0151 for the two types of stories is significantly positive. In columns (7) and (10), we present the firm fixed effects regression results. The coefficient estimates for VIX of 0.0087 and -0.0052 for news flash and original articles give rise to similar inferences, with the (untabulated) difference of 0.0138 being significantly positive.

For news flashes during non-earnings announcement trading days, we find that the coefficients for VIX are insignificant for the OLS and firm fixed effects specifications in columns (2) and (8). In addition, we find that the positive coefficients for VIX during earnings announcement periods are significantly greater than during non-earnings announcement periods (t-statistics = 27.87 and 30.92). This evidence indicates that news flash coverage during earnings announcements grows with macroeconomic uncertainty but is relatively unaffected during non-earnings announcement periods. For original articles during non-earnings announcement trading days, the estimated coefficients for VIX are significantly negative for both specifications in columns (5) and (11). In addition, the VIX coefficients during earnings announcement periods are more negative than those during non-

[13]This finding could reflect that managers increasingly release information during earnings announcements that is disseminated by the business press when macroeconomic uncertainty increases, rather than the business press changing how they generate news flashes . Contrary to this possibility, Kim et al. (2015)finds that managers are less likely to issue earnings forecasts when macroeconomic uncertainty increases.

earnings announcement periods (t-statistics = -12.78 and -15.53). This evidence goes beyond our prediction of the business press using lower fixed cost news flashes when macroeconomic uncertainty is greater, suggesting that original articles are crowded out by the increase in news flash coverage during periods of greater macroeconomic uncertainty. The crowding out of original stories occurs for the same firm during an earnings announcement and for non-earnings announcement periods. This could be attributable to the business press shifting resources to increase their dissemination of earnings releases for other firms. The other determinants of news flash and original stories are similar (e.g., firms with greater analyst coverage have greater business press coverage). However, some differences are observed. For instance, larger firms have more original stories but fewer news flashes at earnings announcements, consistent with the findings in Drake et al. (2014).

7 Conclusion

In this study, we examine whether the level of aggregate investor uncertainty lead to media and trading frenzies at earnings announcements. Relying of the framework of Veldkamp (2006b), which demonstrates how uncertainty about expected future payoffs can lead investors to demand similar types of information, we examine whether heightened macroeconomic uncertainty leads to an outward shift in investor demand for financial information that manifests itself through a market-wide increase in the business press coverage of earnings announcements. During periods of heightened macroeconomic uncertainty, we expect greater coverage of earnings announcements relative to coverage of non-earnings news because earnings announcements are predictable and typically contain value relevant information, making them a relatively low cost source of information for the business press. Given the relatively low fixed cost nature of its news stories and its broad market coverage, the business press face incentives to respond to shifts in the demand for financial information during periods of heightened macroeconomic uncertainty by increasing the coverage of earnings announcements.

In our empirical tests, we find that business press coverage of earnings announcements increases with the level of macroeconomic uncertainty. In contrast, we find a decline in the business press coverage of non-earnings announcement periods during periods of heightened macroeconomic uncertainty, consistent with the relatively greater costs of acquiring information during those non-

announcement times. Further, we find that the documented increase in business coverage of earnings announcements mediates an observed increase in trading volume at earnings announcements during periods of heightened macroeconomic uncertainty. Finally, business press coverage of earnings announcements during periods of greater macroeconomic uncertainty also appear to mediate the greater cross-sectional return dispersion observed on days with more earnings announcements when macroeconomic uncertainty is higher. Together our results show evidence of media frenzies at earnings announcement during periods of heightened macroeconomic uncertainty then lead to trading frenzies.

We strengthen our primary inferences by examining the mechanisms through which the apparent media frenzies occur. First, we examine whether the business press concentrates its expansion of earnings announcement coverage on bellwether firms, as these firms are those whose fundamentals are relatively more informative about aggregate economic activity. We find that the increased business press coverage of earnings announcements during periods of greater macroeconomic uncertainty is more pronounced for bellwether firms. Second, we examine the types of news articles disseminated by the business press during periods of greater macroeconomic uncertainty. We find that the expansion of earnings announcement coverage during such periods comes in the form of more news flashes, which are lower cost articles, while the number of full articles contract. This evidence suggests that greater macroeconomic uncertainty crowds out more costly types of news coverage such as full articles or original stories with significant reported generated content.

These findings provide important new insights into how common shifts in investor uncertainty can lead to media and trading frenzies around earnings announcements. In addition, these findings show that business press coverage is determined not only by cross-sectional demand but also by market-wide uncertainty induced demand and that this coverage can lead to important shifts in market-wide trading behavior. Lastly, our findings also suggest that market-wide volatility at earnings announcements can be increasingly problematic in the future as recent innovations in low margin cost methods of news dissemination (e.g., Twitter, robo-journalism) of earnings releases can lead to greater market-wide volatility when the U.S. stock market faces future shocks to aggregate uncertainty.

Appendix

The variables for each empirical analysis are described in detail below.

Variable	Description
$LCoverage_{EA}$	The natural logarithm of one plus the number of news articles with relevance scores greater than or equal to 90 captured by Ravenpack on days $[0, +1]$ relative to the quarterly earnings announcements
$LCoverage_{EA,Flash}$	The natural logarithm of one plus the number of new flashes with relevance scores greater than or equal to 90 captured by Ravenpack on days $[0, +1]$ relative to the quarterly earnings announcements
$LCoverage_{EA,Orig}$	The natural logarithm of one plus the number of original news stories with relevance scores greater than or equal to 90 captured by Ravenpack on days $[0, +1]$ relative to the quarterly earnings announcement
$AbnVol_{EA}$	The share turnover during the earnings announcement period $[0, +1]$ less the median two-day share turnover of consecutive two-day periods during the non-announcement period, which is comprised of all dates between five trading days after the release date of quarter $t-1$ earnings and five trading days prior to the release of quarter t earnings
VIX	The average level of the Chicago Board Options Exchange Volatility Index during the period from five days following the announcement of quarter $t-1$ earnings to five days prior to the announcement of quarter t earnings
$AbsEarnSurp$	The absolute value of the seasonally adjusted change in earnings before extraordinary items scaled by market capitalization at the beginning of the fiscal quarter
$NegSurp$	An indicator variable equal to one if the seasonally adjusted change in earnings before extraordinary items is negative and zero otherwise
$LMktCap$	The natural logarithm of market value of equity
BM	Book value of stockholders' equity divided by market capitalization
$LFollow$	The natural logarithm of one plus the number of equity analysts following the firm during the most recent fiscal quarter
$InstHold$	Percentage of shares held by institutional investors
$IVol$	Annualized standard deviation of weekly residual returns based on the following model from Bandarchuk and Hilscher (2013): $r_{it} = a_i + b_i r_{mt} + \gamma_i r_{It} + e_{it}$
Ret	Buy-and-hold equity return during the previous twelve months
$SP500Member$	Indicator variable set equal to one if a firm is a member of the S&P 500 market index and zero otherwise
$LEmployee$	The natural logarithm of the number of employees
$LOwn$	The natural logarithm of the number of shareholders

Continued on next page

Appendix continued

Variable	Description
$NasdaqTraded$	Indicator variable set equal to one if a firm's common shares trade on the NASDAQ and zero otherwise
$Turnover$	Average share volume divided by shares outstanding using daily stock market data over the last six months
$MomStrength$	Absolute value of the difference between the firm's stock return over the previous six months and the median stock return over the same period (Bandarchuk and Hilscher, 2013)
$LReturnDispersion$	The natural logarithm of the standard deviation of the market-adjusted stock returns for all listed firms on day t (Peress, 2014; Veldkamp, 2006a)
$L\#EarnAnnouncers$	The natural logarithm of one plus the number of firms announcing earnings on day t
$LCoverageDispersion$	The natural logarithm of the standard deviation of business press coverage for all listed firms on day t
$LCoverage_{NonEA}$	The natural logarithm of one plus the number of news articles with relevance scores greater than or equal to 90 captured by Ravenpack during a randomly selected two-day window during the matched non-earnings announcement period
$LCoverage_{NonEA,Flash}$	The natural logarithm of one plus the number of new flashes with relevance scores greater than or equal to 90 captured by Ravenpack during a randomly selected two-day window during the matched non-earnings announcement period
$LCoverage_{NonEA,Orig}$	The natural logarithm of one plus the number of original news stories with relevance scores greater than or equal to 90 captured by Ravenpack during a randomly selected two-day window during the matched non-earnings announcement period

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Table 1: Descriptive statistics

Panel A: Earnings announcement period sample

	Mean	Std. Dev.	Q1	Median	Q3
$Coverage_{EA}$	9.382	9.497	3.000	7.000	12.000
$Coverage_{EA,Flash}$	4.654	4.694	2.000	4.000	6.000
$Coverage_{EA,Orig}$	2.098	3.855	0.000	1.000	2.000
$AbnVol_{EA}$	0.020	0.036	0.001	0.008	0.024
VIX	20.532	8.449	14.564	18.154	24.378
$AbsEarnSurp$	0.007	0.089	-0.007	0.001	0.011
$NegSurp$	0.430	0.495	0.000	0.000	1.000
$MktCap$ ($ millions)	3765.790	10835.711	108.249	509.309	2197.211
BM	0.633	0.595	0.287	0.503	0.812
$Follow$	9.069	8.416	2.000	7.000	13.000
$InstHold$	0.575	0.312	0.311	0.637	0.846
$IVol$	0.422	0.267	0.228	0.352	0.538
Ret	0.020	0.529	-0.218	0.075	0.312
$SP500Member$	0.138	0.345	0.000	0.000	0.000
$Employee$	8.230	20.685	0.253	1.252	5.500
Own	12.476	40.796	0.309	1.272	5.837
$NasdaqTraded$	0.515	0.500	0.000	1.000	1.000
$Turnover$	0.008	0.008	0.003	0.006	0.011
$MomStrength$	0.298	0.393	0.071	0.167	0.355

Panel B: Non-earnings announcement period sample

	Mean	Std. Dev.	Q1	Median	Q3
$Coverage_{NonEA}$	0.588	1.785	0.000	0.000	0.000
$Coverage_{NonEA,Flash}$	0.219	0.797	0.000	0.000	0.000
$Coverage_{NonEA,Orig}$	0.163	0.695	0.000	0.000	0.000
VIX	20.564	8.595	14.292	18.269	24.146
$MktCap$	3749.315	10721.302	108.249	509.309	2197.211
BM	0.633	0.596	0.287	0.503	0.812
$Follow$	9.069	8.416	2.000	7.000	13.000
$InstHold$	0.575	0.312	0.311	0.637	0.846
$IVol$	0.420	0.269	0.226	0.349	0.536
Ret	0.017	0.527	-0.214	0.077	0.308
$SP500Member$	0.138	0.345	0.000	0.000	0.000
$Employee$	8.220	20.621	0.253	1.252	5.500
Own	12.468	40.739	0.309	1.272	5.837
$NasdaqTraded$	0.515	0.500	0.000	1.000	1.000
$Turnover$	0.008	0.008	0.003	0.006	0.011
$MomStrength$	0.298	0.394	0.071	0.167	0.355

Table 1 – continued

Panel C: Cross-sectional dispersion sample

	Mean	Std. Dev.	Q1	Median	Q3
ReturnDispersion	0.038	0.015	0.027	0.033	0.047
#EarnAnnouncers	89.566	102.620	19.000	43.000	130.000
VIX	21.359	8.675	15.050	19.550	25.010
CoverageDispersion	1.855	0.699	1.414	1.774	2.205
MktCap ($ billions)	17141.350	3495.131	14585.031	17257.006	19700.564
BM	0.546	0.113	0.480	0.523	0.624

Table 1 presents descriptive statistics for the samples and variables used in the analysis. Panel A reports descriptive statistics for quarterly earnings announcements from 2000 through 2013 from Compustat, equity market information from CRSP, and news stories from RavenPack. Panel B reports descriptive statistics for matched non-earnings announcement period observations. Panel C reports descriptive statistics for the time-series analysis of cross-sectional return dispersion. Variables are defined in the Appendix.

Table 2: The comparative impact of macroeconomic uncertainty on business press coverage during non-earnings announcement periods relative to earnings announcement periods

	(1)	(2)	(3)	(4)	(5)	(6)
	$LCoverage_{EA}$	$LCoverage_{NonEA}$	Diff.	$LCoverage_{EA}$	$LCoverage_{NonEA}$	Diff.
VIX	0.0085***	-0.0009***	0.0094***	0.0066***	-0.0005***	0.0071***
	(19.66)	(-4.61)	(19.85)	(21.46)	(-2.60)	(19.70)
$AbsEarnSurp$	-0.0440			0.0745***		
	(-1.06)			(3.08)		
$NegSurp$	-0.0115			0.0074		
	(-1.63)			(1.49)		
$LMktCap$	-0.0723***	0.0375***		-0.0304**	0.0135***	
	(-5.37)	(8.19)		(-2.55)	(3.02)	
BM	-0.0742***	-0.0014		0.0088	-0.0013	
	(-4.81)	(-0.27)		(0.81)	(-0.30)	
$LFollow$	0.2172***	0.0362***		0.0585***	0.0026	
	(12.54)	(7.77)		(5.32)	(0.63)	
$InstHold$	0.6197***	-0.0811***		0.3439***	-0.0055	
	(13.40)	(-4.58)		(7.91)	(-0.35)	
$IVol$	-0.2100***	0.1317***		-0.1345***	0.0413***	
	(-6.04)	(10.81)		(-6.17)	(4.06)	
Ret	-0.0124	-0.0219***		-0.0480***	-0.0109***	
	(-1.18)	(-6.17)		(-6.20)	(-3.27)	
$S\&P500Member$	0.5370***	0.2384***		-0.0741	0.0090	
	(12.57)	(13.66)		(-1.31)	(0.40)	
$LEmployee$	0.0353***	0.0080***		0.0383***	0.0116***	
	(5.11)	(3.89)		(2.87)	(2.60)	
$LOwn$	0.0256***	0.0129***		0.0216***	0.0078***	
	(4.62)	(7.42)		(3.55)	(2.90)	
$NasdaqTraded$	-0.0446**	-0.0019		0.0322	-0.0086	
	(-2.11)	(-0.27)		(0.52)	(-0.49)	
$Turnover$	6.7901***	1.9159***		10.1677***	1.6788***	
	(4.97)	(3.47)		(11.22)	(4.16)	
$MomStrength$	-0.0016	0.0024		-0.0142**	0.0028	
	(-0.17)	(0.61)		(-2.25)	(0.71)	
Constant	1.4504***	-0.1073***				
	(20.09)	(-4.32)				
Firm Fixed Effects	No	No		Yes	Yes	
Observations	140,667	140,667		140,667	140,667	
Adjusted R^2	0.225	0.108		0.025	0.001	

Table 2 presents results from estimating equation (1) using ordinary least squares for a non-earnings announcement period sample (as well as for the earnings announcement period sample for comparison). The dependent variable, $LCoverage_X$, is the natural logarithm of one plus the number of news stories for a firm on the day of or the day after a quarterly earnings announcement ($X = EA$) or during a randomly selected two-day window during the matched non-earnings announcement period ($X = NonEA$). The sample period covers quarterly earnings announcements from 2000 through 2013 and corresponding non-earnings announcement periods. All variables are defined in the Appendix. Columns (1) and (2) report results without firm fixed effects and columns (4) and (5) report results with firm fixed effects. Columns (3) and (6) report the statistical tests of differences between the estimated coefficients on VIX in columns (1) and (2), and (4) and (5), using a stacked regression model. T-statistics are shown in parentheses below estimated coefficients and use standard errors that are clustered two-way by firm and year-quarter. ** and *** indicate two-sided statistical significance at the 0.05 and 0.01 levels, respectively.

Table 3: The effect of macroeconomic uncertainty on earnings announcement trading volume: The mediating influence of business press coverage

	DV = $AbnVol_{EA}$			
	(1)	(2)	(3)	(4)
	Non-Mediated	Mediated	Non-Mediated	Mediated
VIX	0.0003***	0.0001***	0.0002***	0.0001***
	(20.23)	(15.18)	(17.44)	(18.58)
$LCoverage_{EA}$		0.0225***		0.0135***
		(10.14)		(15.27)
$AbsEarnSurp$	0.0053***	0.0054***	0.0074***	0.0072***
	(3.51)	(3.57)	(4.94)	(4.83)
$NegSurp$	-0.0019***	-0.0018***	-0.0013***	-0.0013***
	(-8.67)	(-8.60)	(-6.59)	(-6.69)
$LMktCap$	-0.0034***	-0.0033***	-0.0012**	-0.0011**
	(-17.70)	(-17.00)	(-3.24)	(-3.05)
BM	-0.0015***	-0.0014***	-0.0009*	-0.0009*
	(-5.88)	(-5.44)	(-2.24)	(-2.29)
$LFollow$	0.0037***	0.0034***	0.0022***	0.0020***
	(15.47)	(13.83)	(6.82)	(6.37)
$InstHold$	0.0072***	0.0062***	0.0135***	0.0127***
	(9.53)	(8.33)	(10.59)	(10.03)
$IVol$	-0.0032***	-0.0029***	-0.0017	-0.0014
	(-3.98)	(-3.58)	(-1.90)	(-1.54)
Ret	0.0045***	0.0045***	0.0028***	0.0029***
	(14.38)	(14.44)	(8.97)	(9.34)
$SP500Member$	-0.0013*	-0.0021**	-0.0023	-0.0021
	(-1.97)	(-3.27)	(-1.82)	(-1.70)
$LEmployee$	0.0017***	0.0017***	0.0007	0.0006
	(15.04)	(14.55)	(1.83)	(1.58)
$LOwn$	-0.0004***	-0.0004***	-0.0000	-0.0001
	(-3.97)	(-4.33)	(-0.03)	(-0.27)
$NasdaqTraded$	0.0034***	0.0035***	0.0000	-0.0000
	(9.28)	(9.47)	(0.03)	(-0.05)
$Turnover$	2.0070***	1.9966***	1.3913***	1.3672***
	(38.33)	(38.13)	(28.19)	(27.72)
$MomStrength$	0.0032***	0.0032***	0.0040***	0.0040***
	(8.46)	(8.48)	(10.72)	(10.84)
Constant	0.0200***	0.0177***	0.0102***	0.0064**
	(15.95)	(13.92)	(4.38)	(2.74)
Firm Fixed Effects	No	No	Yes	Yes
Observations	140,667	140,667	140,667	140,667
Adjusted R^2	0.239	0.240	0.068	0.071
F-test: $VIX_{\text{Non-Mediated}} = VIX_{\text{Mediated}}$		126.73***		88.27***

Table 3 presents results from estimating equations (2) and (3) using ordinary least squares. The dependent variable, $AbnVol_{EA}$, is abnormal trading volume for a firm on the day of and the day after a quarterly earnings announcement.

The sample period covers quarterly earnings announcements from 2000 through 2013. All variables are defined in the Appendix. Columns (1) and (2) report results without firm fixed effects and columns (3) and (4) report results with firm fixed effects. The F-statistics reported in the last row of the table tests whether business press coverage ($LCoverage_{EA}$) mediates the effect of macroeconomic uncertainty (VIX) on abnormal trading volume ($AbnVol_{EA}$). T-statistics are shown in parentheses below estimated coefficients and use standard errors that are clustered two-way by firm and year-quarter. *, **, and *** indicate two-sided statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 4: The Role of Macroeconomic Uncertainty in Shaping Earnings Announcement Trading Volume: Path Analysis

	(1)		(2)	
	Coef.	Bootstrap z	Coef.	Bootstrap z
Direct path:				
$VIX \rightarrow AbnVol_{EA}$	0.0000945***	15.64	0.0000974***	18.61
Mediated path:				
I. $VIX \rightarrow LCoverage_{EA}$	0.00854***	19.76	0.00667***	22.01
II. $LCoverage_{EA} \rightarrow AbnVol_{EA}$	0.0225***	10.72	0.0135***	21.28
Indirect effect (I×II)	0.000192***	9.55	0.0000900***	15.97
Total effect	0.000287***	20.75	0.000187***	17.07
Controls	Yes		Yes	
Firm Fixed Effects	No		Yes	

Table 4 presents results from the estimation of a structural equation mediation analysis of the effect of macroeconomic uncertainty on earnings announcement trading volume through business press coverage of earnings announcements. *LCover* is the natural logarithm of one plus the number of news articles with relevance scores greater than or equal to 90 captured by Ravenpack on days $[0, +1]$ relative to a quarterly earnings announcement. Variable definitions are presented in the Appendix. We bootstrap all mediation effect statistics. *** denotes statistical significance at the 0.01 level.

Table 5: The amplifying effect of macroeconomic uncertainty on the relation between earnings announcements and cross-sectional return dispersion: The mediating influence of business press coverage

	DV = $LReturnDispersion$	
	(1)	(2)
	Non-Mediated	Mediated
$L\#EarnAnnouncers$	0.0232***	0.0344***
	(8.36)	(10.06)
VIX	0.0299***	0.0292***
	(58.25)	(55.46)
$L\#EarnAnnouncers \times VIX$	0.0015***	0.0006*
	(4.85)	(1.74)
$LCoverageDispersion$		0.0691***
		(5.77)
$LCoverageDispersion \times VIX$		0.0015***
		(3.49)
$LMktCap$	-0.3400***	-0.3090***
	(-17.75)	(-15.82)
BM	-1.3418***	-1.1783***
	(-41.46)	(-29.71)
Constant	3.0113***	2.4044***
	(9.51)	(7.37)
Observations	3,506	3,506
Adjusted R^2	0.692	0.696
F-test: $(VIX \times L\#EarnAnnouncers)_{Non-Mediated} = (VIX \times L\#EarnAnnouncers)_{Mediated}$		10.35***

Table 5 presents results from estimating equations (4) and (5) using ordinary least squares on a time-series sample of calendar quarters from 2000 through 2013. The dependent variable, $LReturnDispersion$, is the natural log of the cross-sectional standard deviation of returns each trading day. Variables are defined in the Appendix. The F-statistic reported in the last row of the table tests whether cross-sectional dispersion in business coverage, especially during heightened macroeconomic uncertainty, ($LCoverageDispersion$ and $LCoverageDispersion \times VIX$) mediates the effect of earnings announcement intensity during heightened macroeconomic uncertainty ($L\#EarnAnnouncers \times VIX$) on cross-section stock return dispersion ($LReturnDispersion$). T-statistics are shown in parentheses below estimated coefficients and use Newey and West (1987) standard errors with four lags to correct for autocorrelation in the regression error term. * and *** indicate two-sided statistical significance at the 0.10 and 0.01 levels, respectively.

Table 6: The Role of Earnings Announcement Intensity during Heightened Macroeconomic Uncertainty on Cross-Sectional Return Dispersion: Path Analysis

	(1)	
	Coef.	Bootstrap z
Direct path:		
$L\#EarnAnnouncers \times VIX \rightarrow LReturnDispersion$	0.000620*	1.88
Mediated path:		
I. $L\#EarnAnnouncers \times VIX \rightarrow LCoverageDispersion \times VIX$	0.585***	15.35
II. $LCoverageDispersion \times VIX \rightarrow LReturnDispersion$	0.00147***	3.63
Indirect effect (I×II)	0.000860***	6.05
Total effect	0.00148***	3.80
Controls	Yes	

Table 6 presents results from the estimation of a structural equation mediation analysis of the moderating influence of macroeconomic uncertainty on the relationship between earnings announcement intensity and cross-sectional return dispersion. Variable definitions are presented in the Appendix. We bootstrap all mediation effect statistics. * and *** denote statistical significance at the 0.10 and 0.01 levels, respectively.

Table 7: Supplemental analysis: The comparative amplifying effect of bellwether firms on the relation between macroeconomic uncertainty and business press coverage during non-earnings announcement periods relative to earnings announcement periods

	(1) $LCoverage_{EA}$	(2) $LCoverage_{NonEA}$	(3) Diff.	(4) $LCoverage_{EA}$	(5) $LCoverage_{NonEA}$	(6) Diff.
VIX	0.0076***	-0.0010***	0.0086***	0.0058***	-0.0006***	0.0064***
	(16.02)	(-4.86)	(16.62)	(18.09)	(-2.99)	(16.90)
$Bellwether$	-0.0266	0.0062	-0.0328*	-0.0516***	-0.0087*	-0.0429***
	(-1.63)	(1.28)	(-1.93)	(-4.27)	(-1.91)	(-3.33)
$VIX \times Bellwether$	0.0040***	0.0007*	0.0033***	0.0036***	0.0005	0.0031***
	(4.06)	(1.78)	(3.07)	(5.64)	(1.44)	(4.15)
$AbsEarnSurp$	-0.0319			0.0832***		
	(-0.77)			(3.42)		
$NegSurp$	-0.0109			0.0079		
	(-1.55)			(1.59)		
$LMktCap$	-0.0724***	0.0376***		-0.0290**	0.0136***	
	(-5.39)	(8.21)		(-2.44)	(3.06)	
BM	-0.0762***	-0.0014		0.0081	-0.0014	
	(-4.94)	(-0.27)		(0.75)	(-0.32)	
$LFollow$	0.2176***	0.0359***		0.0579***	0.0025	
	(12.56)	(7.71)		(5.26)	(0.61)	
$InstHold$	0.6176***	-0.0815***		0.3404***	-0.0061	
	(13.36)	(-4.59)		(7.83)	(-0.38)	
$IVol$	-0.2068***	0.1289***		-0.1346***	0.0413***	
	(-5.96)	(10.57)		(-6.18)	(4.06)	
Ret	-0.0109	-0.0214***		-0.0475***	-0.0108***	
	(-1.03)	(-6.04)		(-6.13)	(-3.22)	
$S\&P500Member$	0.5371***	0.2383***		-0.0753	0.0088	
	(12.58)	(13.66)		(-1.33)	(0.39)	
$LEmployee$	0.0348***	0.0079***		0.0362***	0.0113**	
	(5.02)	(3.89)		(2.71)	(2.53)	
$LOwn$	0.0254***	0.0129***		0.0212***	0.0078***	
	(4.57)	(7.43)		(3.48)	(2.88)	
$NasdaqTraded$	-0.0427**	-0.0020		0.0313	-0.0088	
	(-2.02)	(-0.29)		(0.50)	(-0.50)	
$Turnover$	7.0268***	1.9196***		10.5612***	1.7438***	
	(5.13)	(3.47)		(11.59)	(4.31)	
$MomStrength$	-0.0023	0.0022		-0.0149**	0.0027	
	(-0.25)	(0.55)		(-2.36)	(0.69)	
Constant	1.6294***	-0.1258***				
	(22.68)	(-5.05)				
Firm Fixed Effects	No	No		Yes	Yes	
Observations	140,667	140,667		140,667	140,667	
Adjusted R^2	0.225	0.108		0.026	0.001	

Table 7 presents results from estimating equation (6) using ordinary least squares for a non-earnings announcement period sample (as well as for the earnings announcement period sample for comparison). The dependent variable, $LCoverage_X$, is the natural logarithm of one plus the number of news stories for a firm on the day of or the day after a quarterly earnings announcement ($X = EA$) or during a randomly selected two-day window during the matched non-earnings announcement period ($X = NonEA$). The sample period covers quarterly earnings announcements from 2000 through 2013 and corresponding non-earnings announcement periods. All variables are defined in the Appendix. Columns (1) and (2) report results without firm fixed effects and columns (4) and (5) report results with firm fixed effects. Columns (3) and (6) report the statistical tests of differences between the estimated coefficients on VIX, $Bellwether$, and $VIX \times Bellwether$ in columns (1) and (2), and (4) and (5), using a stacked regression model. T-statistics are shown in parentheses below estimated coefficients and use standard errors that are clustered two-way by firm and year-quarter. *, **, and *** indicate two-sided statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 8: Supplemental analysis: The comparative impact of macroeconomic uncertainty on the types of business press coverage during non-earnings announcement periods relative to earnings announcement periods

	News Flashes			Original Stories			News Flashes			Original Stories		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$LCoverage_{EA,Flash}$	$LCoverage_{NonEA,Flash}$	Diff.	$LCoverage_{EA,Orig}$	$LCoverage_{NonEA,Orig}$	Diff.	$LCoverage_{EA,Flash}$	$LCoverage_{NonEA,Flash}$	Diff.	$LCoverage_{EA,Orig}$	$LCoverage_{NonEA,Orig}$	Diff.
VIX	0.0102***	-0.0001	0.0103***	-0.0049***	-0.0012***	-0.0037***	0.0087***	0.0000	0.0087***	-0.0052***	-0.0011***	-0.0041***
	(28.54)	(-1.06)	(27.87)	(-18.30)	(-10.91)	(-12.78)	(31.30)	(0.23)	(30.92)	(-21.43)	(-10.58)	(-15.53)
$AbsEarnSurp$	-0.0511			0.0023			0.0545**			0.0493***		
	(-1.58)			(0.10)			(2.57)			(2.93)		
$NegSurp$	-0.0054			-0.0164***			0.0115***			-0.0069*		
	(-0.93)			(-3.62)			(2.71)			(-1.89)		
$LMktCap$	-0.0714***	0.0202***		0.0150*	0.0258***		-0.0193**	0.0075***		-0.0093	0.0034	
	(-7.11)	(8.22)		(1.94)	(8.40)		(-2.04)	(2.77)		(-1.09)	(1.32)	
BM	-0.0671***	0.0018		-0.0197**	0.0090***		0.0225**	0.0000		0.0166**	0.0026	
	(-5.62)	(0.60)		(-2.51)	(2.67)		(2.50)	(0.02)		(2.30)	(1.08)	
$LFollow$	0.1562***	0.0145***		0.1573***	0.0067**		0.0368***	-0.0016		0.0963***	0.0033	
	(12.05)	(5.95)		(18.24)	(2.42)		(4.14)	(-0.64)		(13.27)	(1.41)	
$InstHold$	0.5216***	-0.0412***		0.0419	-0.0815***		0.2735***	-0.0189**		0.1321***	-0.0051	
	(14.56)	(-4.31)		(1.51)	(-6.87)		(7.86)	(-1.96)		(4.55)	(-0.55)	
$IVol$	-0.2036***	0.0765***		0.0125	0.0733***		-0.1478***	0.0367***		-0.0823***	0.0280***	
	(-7.57)	(10.74)		(0.66)	(9.52)		(-8.11)	(5.32)		(-5.65)	(4.91)	
Ret	-0.0069	-0.0155***		-0.0063	-0.0124***		-0.0386***	-0.0104***		0.0090	-0.0042**	
	(-0.85)	(-7.01)		(-1.07)	(-5.86)		(-6.11)	(-4.75)		(1.62)	(-2.28)	
$S\&P500Member$	0.4164***	0.1125***		0.7055***	0.1309***		-0.0465	0.0054		0.0330	0.0099	
	(12.71)	(11.57)		(23.19)	(12.08)		(-1.07)	(0.44)		(0.76)	(0.66)	
$LEmployee$	0.0360***	0.0038***		0.0438***	0.0060***		0.0390***	0.0052*		0.0203**	0.0071***	
	(6.62)	(3.36)		(11.96)	(4.92)		(3.75)	(1.88)		(2.45)	(2.75)	
$LOwn$	0.0154***	0.0064***		0.0184***	0.0065***		0.0070	0.0038**		0.0201***	0.0037***	
	(3.52)	(6.68)		(5.87)	(6.20)		(1.42)	(2.34)		(4.61)	(2.65)	
$NasdaqTraded$	-0.0152	-0.0101***		-0.0558***	0.0041		0.0284	-0.0042		-0.0136	-0.0142	
	(-0.91)	(-2.80)		(-4.68)	(0.92)		(0.60)	(-0.40)		(-0.42)	(-1.54)	
$Turnover$	5.3910***	0.7563***		10.4447***	1.1809***		9.5028***	0.7590***		8.2993***	0.9474***	
	(4.99)	(2.63)		(10.99)	(3.22)		(12.15)	(2.92)		(12.48)	(3.96)	
$MomStrength$	0.0013	0.0007		-0.0021	0.0021		-0.0056	0.0009		0.0010	0.0021	
	(0.18)	(0.28)		(-0.41)	(0.98)		(-1.03)	(0.33)		(0.22)	(1.01)	
Constant	1.0873***	-0.0700***		0.2847***	-0.0911***							
	(19.70)	(-5.23)		(6.97)	(-5.44)							
Firm Fixed Effects	No	No		No	No		Yes	Yes		Yes	Yes	
Observations	140,667	140,667		140,667	140,667		140,667	140,667		140,667	140,667	
Adjusted R^2	0.197	0.061		0.404	0.094		0.034	0.001		0.025	0.002	

Table 8 presents results from estimating equations (7) and (8) using ordinary least squares for a non-earnings announcement period sample (as well as for the earnings announcement period sample for comparison). The dependent variable in columns (1), (2), (7), and (8), $LCoverage_{X,Flash}$, is the natural logarithm of one plus the number of news flashes for a firm on the day of or the day after a quarterly earnings announcement ($X = EA$) or during a randomly selected two-day window during the matched non-earnings announcement period ($X = NonEA$). The dependent variable in columns (4), (5), (10), and (11), $LCoverage_{X,Orig}$, is the natural logarithm of one plus the number of original news articles for a firm on the day of or the day after a quarterly earnings announcement ($X = EA$) or during a randomly selected two-day window during a matched non-earnings announcement period ($X = NonEA$). The sample period covers quarterly earnings announcements from 2000 through 2013 and corresponding non-earnings announcement periods. All variables are defined in the Appendix. Columns (1), (2), (4), and (5) report results without firm fixed effects and columns (7), (8), (10), and (11) report results with firm fixed effects. Columns (3), (6), (9), and (12) report the statistical tests of differences between the estimated coefficients on VIX in columns (1) and (2), (4) and (5), (7) and (8), and (10) and (11) using a stacked regression model. T-statistics are shown in parentheses below estimated coefficients and use standard errors that are clustered two-way by firm and year-quarter. *, **, and *** indicate two-sided statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.