



Media-expressed negative tone and firm-level stock returns



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ABSTRACT

We build a corpus of over 5½ million news articles on 20 large US firms over the 10-year period from January 2001 to December 2010, and use it to study the time-varying nature of the relation between media-expressed firm-specific tone and firm-level returns. By estimating a series of separate rolling window vector autoregressive (VAR) models for each firm, we show how media-expressed negative tone impacts firm-level returns episodically in ways that vary across firms and over time. We find that firms experience prolonged periods during which media-expressed tone has no effect on returns, and occasional episodes when it has a significant impact. During the significant episodes, its impacts are sometimes quickly reversed and at other times they endure – implying that media comment and analysis can sometimes be *sentiment* (or noise), but it can also contain value-relevant information or *news*. Our findings are in general consistent with efficiently functioning markets in which the media assists with the processing of complex information.

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1. Introduction

A key question in the literature on the textual analysis of media content and how it relates to financial market outcomes is whether its ‘tone’ significantly affects stock returns, and if so whether the effects are transitory or persistent. Using a variety of text corpora, content analysis methods, model specifications and estimation techniques, most studies find that negative media-expressed tone leads to significantly negative next-day returns that are partially reversed (Tetlock, 2007; Groß-Klußmann and Hautsch, 2011; Loughran and McDonald, 2011; Boudoukh et al., 2013; Dzielinski and Hasseltoft, 2013; Ferguson et al., 2013; Garcia, 2013; Chen et al., 2014; Heston and Sinha, 2014). Drawing on the ‘noise trader risk’ theory of DeLong et al. (1990), Tetlock (2007) argues that persistent or enduring effects imply that media-expressed tone contains new information about fundamental value, whereas transitory effects that are quickly reversed suggest that media-expressed tone is *sentiment* – defined as the level of noise traders’ beliefs relative to Bayesian beliefs about the effect of information on stock prices.¹

Few studies have examined the media-expressed tone-return relation at the level of the firm. This constitutes a gap in the literature to the extent that the aggregation of media tone and return data in prior studies may conceal potentially illuminating firm-level effects. For example, time-varying effects of media tone on returns are possible; Garcia (2013) finds that media

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¹ Baker and Wurgler (2007) define investor sentiment as ‘...a belief about future cash flows and investment risks that is not justified by the facts at hand.’ (p. 129). More recent reviews of the literature are provided by Kearney and Liu (2014) and Tetlock (2014).

pessimism affects the Dow Jones index three times more strongly in recessions than in economic expansions. One reason why firm-level studies are scarce is that most firms appear infrequently in the media, and this has stymied the ability of researchers to construct reliable measures of firm-specific tone – particularly at short data intervals. A common response of researchers to this constraint has been to aggregate firm-level media tone into a single proxy measure, or to extract firm-specific tone for each firm and combine these in a panel regression framework.² The former creates a single representative ‘firm’, and implicitly assumes that media tone is identical across firms. The panel regression approach allows for different measures of firm-level tone, but its default specification constrains the estimated effects on returns to be similar across firms and over time.³

In this paper, we ask whether these aggregate and market-level findings hold at the level of the firm. We conduct a time-varying analysis of the relation between media-expressed firm-specific negative tone and firm-level returns. To do this, we use daily data over the 10-year period of 2001–2010 for 20 large non-financial US firms. Our corpus comprises more than 5½ million articles from newspapers, industry and trade magazines, newswires, financial blogs and other web-based publications, providing us with between 59,000 and 1.1 million articles for each firm. By focussing on a small number of large firms for which there are ample news stories, we are able to derive daily measures of firm-specific tone for each firm from a media corpus in which there are few days with no articles.

In addition to enabling a more detailed analysis of the firm-specific tone-return relation, our sample of large firms offers several advantages over studies that use firms of all sizes. *First*, our firms are unlikely to suffer from a lack of investor recognition or a scarcity of information that is associated with mispricing. An information-poor environment is associated with a slower speed of information diffusion that is more commonly observed amongst small firms (Hong and Stein, 1999; Hong, Lim and Stein, 2000). *Second*, our sample firms are not ‘extreme growth’ or ‘high uncertainty’ stocks that are difficult to value, so they should not be particularly vulnerable to sentiment (Zhang, 2006; Baker and Wurgler, 2007; Hillert et al., 2014). *Third*, our sample firms are unlikely to have binding constraints on arbitrage. The persistence of return autocorrelation is often explained by high trading costs and restrictions on short selling (Jegadeesh and Titman, 1993, 2001; Chan, 2003; Antoniou et al., 2013), and such barriers to arbitrage are more likely amongst small stocks (Baker and Wurgler, 2007). Our sample of large, liquid and information-rich firms allows us to draw conclusions about the effects of media-expressed tone on firm-level returns with confidence that our findings are not artefacts of information paucity or constraints on trading.

We begin by using a panel approach, and find that a rise in firm-specific negative media tone leads to a significant reduction in next-day firm-level returns. In contrast to prior studies, however, we find no evidence of return reversal – which suggests that the negative tone in media articles might contain new fundamental information about firm value. In the news arrival and volatility clustering literature, information events are considered to arrive sporadically – in short bursts followed by periods of relative quiet (Andersen, 1996; Andersen et al., 2010). Further, different types of news events can have dissimilar effects on returns (Engle et al., 2012; Boudoukh et al., 2013; Neuhierl et al., 2013).⁴ Using rolling VAR regressions with a one-year window moving forward a day at a time, we observe how media-expressed tone impacts returns in ways that differ for each firm and vary over time. We find that the negative tone-return relation is indeed episodic, with long interludes during which media tone has no effect on returns, interspersed by bursts of significance. Some of these episodes are transitory, and others are enduring or persistent. Our transitory episodes – involving initial overreaction followed by reversal – suggest that, consistent with the prior literature conducted at the market or aggregate level, media-expressed tone is *sentiment*. Our novel result that media-expressed negative tone can sometimes lead to persistently lower returns suggests, however, that negative media tone can sometimes contain news about fundamental firm value.

In order to further test our argument that the enduring episodes are indicative of news, we construct a corpus of newswire articles⁵; we call this the *newswire corpus*, and we refer to our main collection of media articles as the *full corpus*. Newswires are likely to be the best measure of genuine news available (Fang and Peress, 2009; Kelley and Tetlock, 2013; Hillert et al., 2014); they are widely disseminated electronically, and their systems are designed to get news out as fast as possible.⁶ If the tone extracted from our newswire corpus contains new information about firm value, its effects on firm-level returns should be immediate, unbiased and enduring. Prior research findings, however, are not consistent with this insofar as newswire tone has been shown to impact returns with short and longer-term delays (Tetlock et al., 2008; Heston and Sinha, 2012; Sinha, 2012; Boudoukh et al., 2013). When we repeat our panel analysis, we find that negative newswire tone leads to significantly negative next-day returns that persist more strongly than for the full corpus. Replicating our firm-level rolling VAR regressions with the newswire corpus, we find that the relation is similarly episodic. Consistent with the notion that negative newswire tone reflects news, we find that in all but one of the episodes the effect of negative newswire tone on returns endures.

These findings prompt us to ask whether a related trading strategy yields positive excess returns. We conduct a zero-investment long-short portfolio analysis in which we sort our 20 firms each day from highest to lowest negative tone.⁷ We short the 10 stocks with the highest negative tone and take a long position in the remainder. For the full corpus, we find a

² See, for example, Engelberg (2008), Sinha (2010), Boudoukh et al. (2013), Dzielinski and Hasseltoft (2013), Sinha (2013) and Chen et al. (2014).

³ See Holtz-Eakin, Newey and Rozen (1988); Canova and Ciccarelli (2013), and Lütkepohl (2014).

⁴ Boudoukh et al. (2013) delineate ‘unidentified news’ from ‘identified news’, and find that ‘identified news’ days are associated with partial return continuation. Neuhierl, Scherbina and Schlusche (2013) classify corporate press releases into topic categories and show that some topics, such as corporate restructurings and FDA rejections, are associated with greater return and volatility impacts than others. Engle, Hansen and Lunde (2012) classify news events into different types and show that the categorisations help explain return and volatility dynamics.

⁵ It is drawn from the 421 newswire services available on LexisNexis. The full corpus is likewise drawn from LexisNexis.

⁶ For good descriptions of the newswire dissemination process, see Engle, Hansen and Lunde (2012), and Sinha (2012).

⁷ A similar approach is used by Sinha (2012).

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