Media Attention, Macroeconomic Fundamentals, and the Stock Market

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Abstract

We construct indices of media attention to macroeconomic risks including employment, growth, inflation, monetary policy, and oil prices. Attention rises around macroeconomic announcements and following changes in fundamentals over quarterly, annual, and business cycle horizons. The effect is asymmetric, with bad news raising attention more than good news. Attention relates to the stock market in two ways. First, increases in aggregate trade volume and volatility coincide with rising attention, controlling for announcements. Second, changes in attention prior to the unemployment announcement predict both the announcement surprise and stock returns on the announcement day. We conclude that media attention to macroeconomic fundamentals provides useful information beyond the dates and contents of macroeconomic announcements.

Keywords: attention dynamics, macroeconomic fundamentals, stock market.

JEL Classification: G12, E20.

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1 Introduction

Classical theories of asset pricing, based on exogenous information flows and efficient market pricing (e.g., Merton, 1973), provide no explicit role for investor attention. A growing literature establishes however that investor attention, to both firm-level and aggregate news, plays an important role in financial markets. For example, Da, Engelberg, and Gao (2011) show that investor attention to individual stocks positively predicts subsequent short-run returns for those stocks.[1] Andrei and Hasler (2014) develop theoretical and empirical links between attention to the aggregate stock market and conditional moments of the aggregate stock market. Kacperczyk, Van Nieuwerburgh, and Veldkamp (2016) study interactions between firm-level and aggregate attention.

If attention in general is important to understanding financial markets, then what other types of attention, beyond firm-level and aggregate attention, might be worth studying? In this paper we propose new measures of attention, derived from news media coverage, to separate categories of macroeconomic fundamentals such as unemployment, output growth, inflation, and oil prices.

We focus on macroeconomic fundamentals for several reasons. First, the finance literature has long sought to connect asset prices to underlying macroeconomic factors (Chen, Roll, and Ross, 1986). Second, current evidence establishes that scheduled macroeconomic announcements have strong impacts on asset prices (Andersen, Bollerslev, Diebold, and Vega, 2003, 2007, Savor and Wilson, 2013), and we anticipate that such announcements should also impact attention. Third, while the asset pricing literature often tends towards stock-market based factors in describing the cross-section of returns (e.g., Fama and French, 1993), casual observation of news media coverage suggests that attention to systematic risks is more frequently framed in terms of macroeconomic factors such as unemployment and inflation as opposed to stock-market based factors like size and

[1] For further evidence regarding attention to individual stocks, see Huberman and Regev (2001), Barber and Odean (2008), DellaVigna and Pollet (2009).

value. Finally, an interesting aspect of attention to macroeconomic fundamentals is that we can relate the dynamics of attention to the dynamics of the underlying macroeconomic fundamentals. This allows us to answer questions such as what types of changes in unemployment or output growth or inflation result in increases or decreases in attention to these fundamentals.

Our measures of attention are based on media coverage of different types of fundamental news. The categories of macroeconomic fundamentals are: unemployment, output growth, inflation, credit ratings, the housing market, interest rates, monetary policy, oil, and the U.S. dollar. We create lists of search words that capture attention to each of these fundamentals. For example, to capture attention to U.S. output growth, we use the following set of words: gross domestic product, GDP, gross national product, and GNP. We count the number of articles in the Wall Street Journal (WSJ) and New York Times (NYT) starting in 1980 for NYT and 1984 for WSJ until 2015 that include any of these search terms. Scaling by the total number of articles published gives us a measure of relative attention to each category of macroeconomic fundamental.

Our indices most directly measure media attention, but the media clearly has strong incentives to cover issues of interest to their readers, and prior literature often uses media attention as a proxy for investor attention (e.g., Barber and Odean, 2008, Yuan, 2015). A separate line of research, which we do not contribute to, investigates the causal role of media attention (e.g., Tetlock, 2007, 2010, Peress, 2014). We view media coverage as a useful proxy for investor attention because of the long time series it permits. Our indices permit daily estimates of attention beginning in 1980. More direct measures of investor attention, such as Google search (e.g., Da, Engelberg, and Gao, 2011) have other advantages but provide shorter time series. Henceforth, we do not distinguish between media and investor attention, although this could be an interesting topic for future research. Although not the focus of our research, we do provide separate measures of attention for the NYT and WSJ, which suggests heterogeneity in attention across the

different readerships of these outlets.

Our macroeconomic attention indices ("MAI") show interesting empirical properties. We first address comovement in attention, and show that the indices are not driven by a single factor. They are imperfectly correlated, and over time attention shifts across inflation, employment, monetary policy, and the other fundamentals. If these shifts in attention reflect changes in investor concerns, then only in very special cases could efforts to price assets reduce to a single factor representation of risk.

We next address the duration of cycles in attention. For the macroeconomic fundamentals we consider, the attention indices are stationary, but persistent. The conservative Bayesian Information Criterion suggests at most four lags in a monthly autoregression framework. However, when we aggregate the attention indices over different window lengths, similar to the MIDAS framework of Ghysels, Santa-Clara, and Valkanov (2006), we find that most of the series show evidence of cycles at multiple frequencies, ranging from one day to as long as one year. These aspects of attention are consistent with fractal behavior over a range of frequencies, producing a slow decay in autocorrelations over a range of lags that is often associated with long-memory. These patterns in attention are properties also observed in aggregate stock market volume and volatility in prior literature (see Andersen, Bollerslev, Diebold, and Ebens, 2001, Bollerslev and Mikkelsen, 1996).

We next seek to relate attention to movements in economic fundamentals. We associate each of the attention indices with a related macroeconomic variable, and, where possible, at least one scheduled announcement. As expected, high frequency variations in attention do relate to scheduled news announcements, and we document which announcements have the most impact on attention. Lower frequency movements in attention relate to movements in economic fundamentals. We decompose each of the economic series (e.g., unemployment, inflation) into simple moving averages over different window sizes. Attention relates to variations and squared variations in shorter-horizon simple moving averages of fundamentals relative to longer-horizon moving averages. All significant squared terms

on variations are positive, consistent with the idea that changes in fundamentals lead to increased attention. The directional effect of signed changes in fundamentals on attention is generally also consistent with intuition. For example, increases in unemployment increase attention, and decreases in house prices increase attention. These findings are consistent with Andrei and Hasler (2016) where the authors investigate whether asymmetry in attention is rational and find that investors pay more attention to news the further away the predictive variable is from its long-term average.

In some cases the relation between attention and fundamentals is very strong. For example, over 50% of the variation in our unemployment attention index is explained by unemployment fundamentals, and the comovement is strong enough to be apparent in a simple plot (see Figure 1). We also document differences between the WSJ and NYT in the strength of the relation between their attention indices and fundamentals.

We further show that news media attention to macroeconomic fundamentals relates to measures of daily stock market activity. Controlling for macroeconomic announcements, increases in attention correlate with higher aggregate volume and higher aggregate volatility.

We then investigate how media attention to unemployment might act as a leading indicator to predict the surprise in the announced unemployment rate, -i.e. the difference between the actual and expected unemployment rate. Increasing media attention to unemployment leading to up to the employment announcement predicts the surprise in the unemployment rate and the S&P 500 stock return on announcement day.

Finally, we examine how media attention to monetary policy can predict stock returns, changes in VIX, and changes in Fed fund rates on FOMC announcement days. We find that an increase in attention to monetary on days preceding FOMC announcements predicts positive stock returns, a decrease in VIX, and a decrease in Fed fun rates on FOMC announcement days.

This paper relates to at least three literatures. The first is research on the links be-

tween attention and financial markets. Theoretical studies built on rational inattention framework highlights the importance of attention allocation to asset prices (e.g., Sims, 2003, Peng and Xiong, 2006, Kacperczyk, Van Nieuwerburgh, and Veldkamp, 2016). Andrei and Hasler (2014) establish the links between attention to aggregate stock market volatility and risk premium and Andrei and Hasler (2016) show that attention is time-varying. Also, recent studies create direct measures of stock-specific investor attention using search frequency in Google and find that investor attention predicts stock prices (Da, Engelberg, and Gao, 2011, Da, Gurun, and Warachka, 2014). We extend this literature by creating measures of attention to macroeconomic fundamentals and examining their links to fundamentals as well as the stock market.

Second, we contribute to the literature relating macroeconomic news to asset prices. Andersen, Bollerslev, Diebold, and Vega (2003, 2007) show that macroeconomic announcements have an impact on financial assets at high-frequency. Boyd, Hu, and Jagannathan (2005) find that unemployment announcements impact stock prices condition on business cycle. Gilbert (2011) documents that macro announcements revisions have strong relation with the stock market index. Recent studies find that Federal Open Market Committee (FOMC) announcements have significant impact on market risk premium (Savor and Wilson, 2013, Cieslak, Morse, and Vissing-Jorgensen, 2015). Media coverage of macroeconomic risks can also be used as a conditioning variable in testing asset pricing models (**?**). We show that high-frequency movements in media attention to macro fundamentals are linked to macroeconomic announcements, while lower-frequency fluctuations are linked to the fundamentals itself. Further, we show that changes in media attention predict both surprises and stock returns on unemployment announcement days.

Finally, our paper relates to the literature on text search methods. Examples include Antweiler and Frank (2004), Tetlock (2007), Fang and Peress (2009). In particular, Baker, Bloom, and Davis (2015) measure economic policy uncertainty using, in part, newspaper articles mentioning policy uncertainty. The authors show that economic policy uncer-

tainty (EPU) index affects both aggregate and firm-level activities. Our research differs by focusing on attention to macroeconomic risks.

2 Macroeconomic Attention Indices

We create indices of news-media attention to the following macroeconomic risks: output growth, inflation, employment, interest rates, monetary policy, housing, credit conditions, oil, and the U.S. dollar. For each fundamental, we create a list of related words and phrases, shown in Table 1. We aim for the lists to be objectively reasonable.

We search articles in the Wall Street Journal (WSJ) and New York Times (NYT). These publications cover general news, economic news, and financial news, and have been used in numerous prior studies. We use two different publications to provide a sense of the robustness, and also to illuminate differences in attention across outlets with different audiences. WSJ is generally regarded as having a tighter focus on the economy and financial markets as well as a more conservative editorial slant, while NYT provides broader coverage of general news and has a more politically liberal reputation.[2] For the NYT, the sample period is from June 1, 1980 to April 30, 2015. For the WSJ, the sample period is from January 1, 1984 to April 30, 2015. During these sample periods broad digital coverage of the publications is available. We consider only the newspaper print editions.

2.1 Construction of the Attention Indices

Each day in the sample period, we count the number of articles in each publication that satisfy the search criteria for each macro fundamental. This provides a daily count $N_{p,f,t}$, where p indexes the publication (WSJ or NYT) of articles showing some form of attention

[2]The differences in media slant and its economic impact are well-documented in the literature (see e.g., DellaVigna and Kaplan (2007), Gentzkow and Shapiro (2010)).

to each fundamental f. We normalize these counts by dividing by the average number of articles per day $\hat{N}_{p,t}$ for publication p during the calendar month including observation t. The"unadjusted" macroeconomic attention index for each individual publication p is:

$$\text{MAI-}p\text{U}_{f,t} = \frac{N_{p,f,t}}{\hat{N}_{p,t}}. \tag{1}$$

The unadjusted attention indices measure the percentage of articles on a given day that have content related to the macroeconomic fundamental of interest.

We define related measures that are demeaned, or alternatively demeaned and standardized. Let $\mu_{p,f}$ and $\sigma_{p,f}$ denote respectively the time-series means and standard deviations of the daily unadjusted attention indices MAI-p$U_{f,t}$. The demeaned measures are denoted

$$\text{MAI-}p\text{D}_{f,t} = \text{MAI-}p\text{U}_{f,t} - \mu_{p,f},$$

and the standardized measures are denoted

$$\text{MAI-}p_{f,t} = \text{MAI-}p\text{D}_{f,t}/\sigma_{p,f}.$$

We also define two composite indexes of attention. The first composite index, denoted MAI-C1, is an average of the demeaned NYT and WSJ indices in time periods when both are available, and the NYT index only in the 1980-1983 period:

$$\text{MAI-C1}_{ft} = \begin{cases} (\text{MAI-WD}_{ft} + \text{MAI-ND}_{ft})/2 & \text{from Jan. 1, 1984 to Apr. 30, 2015,} \\ \text{MAI-ND}_{ft} & \text{from June 1, 1980 to Dec. 31, 1983.} \end{cases} \tag{2}$$

Demeaning the individual publication indices before averaging ensures that we will not induce a level effect driven simply by the change in composition that occurs in 1984 when the WSJ data becomes available.

The second composite index, denoted MAI-C2, is an average of the standardized NYT

and WSJ indices when both are available:

$$\text{MAI-C2}_{ft} = \begin{cases} (\text{MAI-W}_{ft} + \text{MAI-N}_{ft})/2 & \text{from Jan. 1, 1984 to Apr. 30, 2015,} \\ \text{MAI-N}_{ft} & \text{from June 1, 1980 to Dec. 31, 1983.} \end{cases} \quad (3)$$

Standardizing ensures that both publications contribute equally to the variation of MAI-C2. While the weighting of the two composite indices is different, neither is superior in any sense. The publication with more variation in its own attention index will be weighted more heavily in MAI-C1 relative to MAI-C2. If one believes that greater variation in attention over time reflects more information, then the weighting of MAI-C1 may be preferred to MAI-C2.

All of the indices build on simple counts of the number of articles related to a macroeconomic fundamental, as a proportion of all articles. Many elaborations of this approach are possible, for example weighting articles by their number of words, or attempting to measure the intensity of relevance rather than a simple binary coding. We take a basic approach for simplicity, and expect other measurement methods to be explored in future research. We emphasize that the indices measure attention only, and do not attempt to distinguish other possible article attributes such as positive versus negative sentiment.

2.2 Empirical Properties of the Attention Indices

Table 3, Panel A provides summary statistics for the unadjusted daily attention indices for both NYT and WSJ. For the WSJ, the index averages range from a low of about 0.5% of articles for credit to a high of over 2% for inflation and oil. NYT coverage of macroeconomic fundamentals is uniformly lower as a proportion of all coverage. The NYT index means have a lowest value of 0.08% for U.S. dollar coverage, and the highest index means are inflation (0.90%), unemployment (0.81%), and oil (0.76%). Consistent with the higher mean attention levels in the WSJ, the standard deviation of attention is also uniformly higher for the WSJ than the NYT. This implies that the weight of the WSJ in the composite indices MAI-C1 will be higher than in the composite indices MAI-C2.

Table 3, Panel A also provides index means by day of the week. The Saturday edition of WSJ generally has less coverage of macro fundamentals than other days of the week. For NYT, the Saturday edition appears to have roughly similar content to other days, while the large Sunday edition offers more coverage than other days. While the effects of weekend news coverage are interesting and potentially important, for simplicity in the remainder of our analysis we discard all non-trading days (weekends and holidays). To account for potential day-of-the weak seasonalities in news coverage, all of our empirical results use day-of-the-week dummy variables.

Figure 2 plots the attention indices. For reference, each attention index is associated with a series of macroeconomic fundamentals that seems relevant.[3] For example, the output growth attention index is plotted on the same axes with the log quarter-to-quarter growth in real GDP. The full list of attention indices versus the associated macroeconomic fundamentals plotted in Figure 2 is given in Table 2.

We emphasize several properties of the attention indices. First, the indices do not appear to be driven by a single factor. They are imperfectly correlated, and over time attention shifts across different fundamentals. Second, attention is highly persistent. All series show fluctuations that last over periods at least as long as several years, including both gradual trends and sharp changes. Third, the indices also show cycles at a range of higher frequencies, including short bursts of attention. Finally, attention seems to be at least loosely related to underlying fundamentals. This is seen most clearly in the plot for employment, where broad patterns in attention seem to match closely with the level of the unemployment rate. We now investigate each of these aspects of the plots using statistical analyses.

Table 3 shows daily (Panel B) and monthly (Panel C) correlations among the composite attention indices MAI-C1, as well as correlations with other series of interest: implied

[3]This approach follows Carroll (2003), who plots a monthly news count index of inflation from the New York Times and the Washington Post against CPI, from 1981 to 2001.

volatility (VXO) from the Chicago Board Options Exchange (CBOE)[4], economic policy uncertainty (EPU) from Baker, Bloom, and Davis (2015)[5], detrended S&P 500 trade volume (Volume) from the Center for Research in Security Prices (CRSP), and lagged values of the VXO and Volume. The results confirm the imperfect correlation of the attention indices. In daily data, the highest inter-MAI correlations MAI are between monetary and inflation (0.45), monetary and interest rates (0.57), oil and inflation (0.31), US dollar and oil (0.37), and inflation and interest rates (0.34). Not all correlations are positive. For example, in monthly data the MAI for GDP and inflation are negatively correlated (-0.14) and credit rating and inflation (-0.18). We also are interested in correlations between the attention indices and other variables. In the monthly data, the highest correlations with EPU are unemployment (0.35), credit rating (0.28), and monetary (0.15). The highest correlations with VXO are US dollar (0.33), credit rating (0.32), and unemployment (0.32).

To address stationarity, we estimate AR (p) models for each attention index from monthly data. Following Campbell and Yogo (2006), we use the lag length that minimized the Bayesian information criteria (BIC). The minimum BIC for all of our MAI occurs at four lags or less. Table 4 shows these AR estimates, controlling for monthly fixed-effects. The table also reports Dickey-Fuller p-values for the null hypothesis that each series has a unit root. The DF statistics reject the presence of unit roots except for the US dollar MAI.[6]

To further explore time-series dependence, Figure 3 shows autocorrelation plots of each composite series MAI-C1 for lag lengths from 1 to 250 trading days. We plot the autocorrelations for residuals after controlling for day-of-the-week dummies and month-of-the-year dummies. The plots show very slow decay in this range of frequencies, and the autocorrelations are significantly larger than zero at 250 lags for all series. Several of the autocorrelation plots show apparent cycles in dependence. For example, GDP shows

[4]Data source: https://www.cboe.com/micro/vix/historical.aspx.
[5]The data is available at http://www.policyuncertainty.com/.
[6]The US dollar MAI-C2 rejects the unit root with a p-value of 0.09.

strong increases in correlations at each monthly interval. Other series (housing, US dollar) have increases in autocorrelations at weekly intervals. These cycles are consistent with the importance of periodic news announcements.

To account for potential long-memory dependence as well as multiple cycles in news variation, we use regressions that aggregate the attention indices over different horizons similarly to MIDAS regression (see Ghysels, Santa-Clara, and Valkanov, 2006). Specifically, we construct simple moving averages of the attention indices over window sizes of 1 day, 5 days, 21 days (monthly), 62 days (quarterly), and 250 days (annual), and 1000 days (business cycle).

Panel B of Table 4 shows results of regressing each attention index on lagged simple moving averages of its own history, for the full set of different window sizes. All of the series show persistence at multiple frequencies, with the majority having significant positive persistence in daily, weekly, monthly, quarterly, and annual-length moving averages in the multiple regression framework. One exception is credit rating attention, which does not show significant persistence beyond monthly horizons. A separate monthly cycle is not present in GDP attention, although it does show significant persistence at all other cycle lengths between daily and annual. This result seems intuitive given the quarterly reporting cycle for GDP growth. These results are consistent with slow, approximately hyperbolic decay in the persistence of attention to each of the fundamental factors. The presence of multiple frequencies in attention to financial news are also broadly consistent with the motivation and theoretical framework in Calvet and Fisher (2007), who hypothesize fractal patterns in news about the fundamentals impacting asset prices. We next determine whether the fluctuations of the individual attention indices can be related to macroeconomic fundamentals.

3 Attention and Macroeconomic Fundamentals

Intuition suggests that high frequency fluctuations in attention could be driven by economic announcements, while lower frequency variations might be related to movements in economic fundamentals. We test these ideas.

3.1 Macroeconomic Announcements

Prior literature has established links between economic announcements and returns and volatility for the foreign exchange and stock market (Andersen, Bollerslev, Diebold, and Vega, 2003, 2007). We now investigate the relationship between macroeconomic announcements and attention to macroeconomic fundamentals. Attention could be limited to simply reporting on announcements. Alternatively, attention might be high in advance of announcements as news media strive to anticipate the content of announcements, or to put the potential outcomes of an announcement into a broader context for the benefit of their readers.

Cross-sectionally, our analysis can tell us which types of announcements have the largest impacts on macroeconomic attention. If the media play an important role in the transmission of economic news, then understanding the allocation of media resources to covering different types of announcements should be informative about which announcement matters most to readers.

The economic announcements we consider are: consumer price index (CPI), employment situation, and Federal Open Market Committee (FOMC) announcements. The announcement dates span the entire sample length of our indices. The CPI, and employment situation announcement dates are from the Bureau of Labor Statistics and FOMC announcement dates are from the Federal Reserve Board. Macroeconomic attention can be influenced by multiple announcements, hence we study the most intuitive links between the macroeconomic attention indices and macroeconomic announcements as shown

in Table 2. The specification we use is:

$$\text{MAI-C1d}_{f,t} = \alpha + \sum_{\delta=-4}^{\delta=4} \beta_\delta Ann_{j,t+\delta} + \epsilon_t \tag{4}$$

where $\text{MAI-C1d}_{f,t}$ is the composite index MAI-C1 detrended by its own 60-day simple moving average. The variables $Ann_{j,t+\delta}$ are equal to 1 if there is an announcement on day-$t+\delta$, 0 otherwise, and we let δ take integer values from -4 to 4. Since the model specification contains many variables we show the regression coefficients, β_δ and their 95 percent confidence intervals in Figure 4. In the first row, attention to inflation increases leading up to the CPI announcement, and the index is at its highest one day after the announcement. CPI announcements also raise attention more moderately in the monetary and oil attention indices.

For unemployment announcements (second row), macroeconomic attention increases two days in advance of the announcement, spikes on the announcement day, and remains high for two days after the announcement. Unemployment announcements do not impact other MAI, such as inflation and monetary.

FOMC announcements (the third row) have moderate impacts on the attention index associated with monetary policy in the full sample. However, a subsample analysis shows that the effects are indistinguishable prior to 1994, when policy actions were not publicly announced. After 1994 when the FOMC started public announcements of the policy action, the pattern in attention becomes more pronounced. Boguth, Grégoire, and Martineau (2016) use our monetary policy attention index and show that times when investors expect important decisions from the Federal Open Market Committee, attention is high prior to committee meeting.

3.2 Macroeconomic Fundamentals

Beyond the link between economic announcements and daily spikes in attention, what accounts for the lower-frequency fluctuations in the attention indices? Figure 1 and 2 suggests attention dynamics could reflect changing economic conditions.

Prior literature has attempted to establish links between macroeconomic variables and financial market variables such as volatility (Schwert, 1989). We expect that macroeconomic attention connects economic news with financial markets, serving an intermediary function. A benefit of measuring macroeconomic attention is that we can measure not just aggregate interest in financial and economic news, we can also tell what writers are talking about. Hence the low frequency variations in our different MAI should pick up changing patterns in concerns for different macroeconomic fundamentals.

To study how variations in macroeconomic fundamentals impact macroeconomic attention, we decompose the macro variables into detrended moving averages over different window sizes. That is, given a particular macroeconomic fundamental F_t (e.g., unemployment rate, change in log CPI, change in log house price index), we can decompose the fundamental into a set of detrended moving averages:

$$F_t \equiv (F_t - \overline{F}_{t,t-2}) + (\overline{F}_{t,t-2} - \overline{F}_{t,t-11}) + (\overline{F}_{t,t-11} - \overline{F}_{t,t-47}) + \overline{F}_{t,t-47}, \tag{5}$$

where $\overline{F}_{t,t-k}$ is the simple moving average of the fundamental from $t-k$ to t. The components on the right hand side of the equation, each in parentheses, are detrended moving averages over window sizes that are expanding approximately geometrically. These could be capable of capturing the low-frequency patterns in autocorrelations documented for the attention indices in Table 4. We regress the monthly attention indices on these detrended moving averages and their squared values:

$$\begin{aligned} MAI_{f,t} = \alpha &+ \beta_1(F_t - F_{t,t-2}) + \beta_2(F_t - F_{t,t-2})^2 + \\ &\beta_3(F_{t,t-2} - F_{t,t-11}) + \beta_4(F_{t,t-2} - F_{t,t-11})^2 + \\ &\beta_5(F_{t,t-11} - F_{t,t-47}) + \beta_6(F_{t,t-11} - F_{t,t-47})^2 + \epsilon_t. \end{aligned} \tag{6}$$

Table 5 reports results for regression (6) for the NYT (Panel A) and WSJ (Panel B) indices. The results show generally that attention responds to changes in macro fundamentals. Adjusted R^2 range from 0 to over 50%, with most of the regressions having at least one significant coefficient on fundamentals.

To help synthesize the results, we first focus on aspects that are similar across Panels A and B, or across attention in both the NYT and WSJ. Confirming the idea that change raises attention, many of the coefficients on *squared* changes in fundamentals are significant and positive in both panels. For the NYT, of the fifteen significant coefficients on squared changes in fundamentals, thirteen are positive. For the WSJ, all fifteen of the fifteen squared changes on fundamentals are positive. These results are consistent with theories where changes in fundamentals raise attention, such as in Andrei and Hasler (2014, 2016).

A second intuitive idea is that for a given magnitude of the absolute change, attention will be higher when the change is in a direction that is associated with "bad" versus "good" times. Focusing on the significant coefficients on *signed* changes in fundamentals, many of the series show consistent results across the NYT and WSJ in the intuitive direction suggesting that bad news raises attention: Attention to credit rises when relative credit spreads rise; attention to housing rises when house prices fall; attention to unemployment rises when unemployment increases.

We also see interesting differences across the WSJ and NYT attention indices. In general, the R^2 for the WSJ attention index regressions on fundamentals are higher than for the NYT. One notable exception is unemployment. More than 50% of the variation of the NYT attention index is explained by movements in the unemployment rate, consistent with the very strong comovement apparent in Figure 1, compared to the lower R^2 of 33% for explaining WSJ attention to unemployment. Why do unemployment fundamentals have less explanatory power for WSJ attention than for NYT attention? Examining the plots in Figure 1, the NYT has shown a consistently positive relation between unemployment

and attention to unemployment. For the WSJ, in the 1980's and 1990's attention moved almost inversely with the unemployment level. Starting in the 2000's and certainly by the financial crisis, WSJ coverage of unemployment began to comove positively with changes in unemployment, similar to the NYT. This is consistent with the idea that the readership and editorial policy of the NYT have been more consistently focused on unemployment than the WSJ over time; however, following the financial crisis, the WSJ became more attentive to unemployment in a manner similar to NYT.[7]

Consistent with this idea of different focuses and audiences between the NYT and WSJ, we also see a difference in how inflation impacts attention. An increase in inflation tends to raise attention to inflation at the WSJ, but reduces attention at the NYT. This is again consistent with the idea that the WSJ tends to be more politically conservative and associated with monetarist views on inflation than the NYT, which tends towards more Keynesian views on the economy.

4 Attention and Stock Market Activity

Beber, Brandt, and Kavajecz (2011) conjecture that market participants are continually digesting news about the macroeconomy, which impacts their preferences, expectations, and risk tolerances. As a result, macroeconomic news induce them to trade. The authors show that market trade volume segmented by economic sectors contain important macroeconomic information and in turn predict important macroeconomic announcements.

We study the link between daily macroeconomic attention and stock market activity. Let $Vlmd_t$ be the logarithm of the daily aggregate trade volume of S&P 500 firms, detrended by its own 60-day moving average, following Tetlock (2007). We run the regression:

$$Vlmd_t = \alpha_f + \beta_f MAI_{5-20,f,t} + \gamma_f Ann_t + \delta_f Ann_t \cdot MAI_{5-20,f,t} + \epsilon_{f,t}, \tag{7}$$

[7] Another contributing factor could be the retirement of conservative editor Robert Bartley, who retired from the WSJ in 2000 after serving for thirty years.

where $MAI_{5-20,tt}$ is the difference between the five-day and twenty-day moving average of MAI-C1 to macro fundamental f. $Ann_{j,t}$ is equal to 1 if there is an announcement on day-t, zero otherwise.[8]

Table 6 shows that for all MAI, rising attention is associated with an increase in market volume. When we include macro announcements in the regressions, many of the announcements have significant impacts on volume, but the inclusion of these variables does not alter inferences about the importance of attention. Interaction terms do not have a consistent sign, and do not alter inference about the effects of attention or announcements on trading volume.

Another way to look at the impact of macroeconomic attention on stock market activity is to investigate the relationship between macroeconomic attention and implied volatility, measured by the VXO index, which is available beginning in 1986. We implement the following regression for each attention index:

$$VXO_t = \alpha_f + \beta_f MAI_{20-250,f,t} + \gamma_f Ann_t + \delta_f Ann_t \cdot MAI_{f,20-250,t} + \epsilon_{f,t} \tag{8}$$

Table 7 shows that increases in macroeconomic attention on interest rates, GDP, unemployment, credit ratings and USD positively relate to increases in implied volatility. The R^2 are highest for unemployment (13%) and GDP (7%). Results are similar if we detrend VXO using a 250-day moving average. Thus, controlling for macroeconomic announcements, increases in attention is associated with an increase in both aggregate volume and volatility.

Overall the results of this section provide strong evidence that increases in attention to macro fundamentals is positively correlated with the aggregate stock market activities.

[8]To simplify the analysis, we do not differentiate between all GDP announcements (advance, preliminary, and final).

5 Using Attention for Forecasting

Given the links between media attention and macroeconomic fundamentals, it is natural to consider whether media attention might help to predict fundamentals on macroeconomic announcements. We are particularly interested to understand the link between the MAI to unemployment and the employment situation announcements and the MAI to monetary policy and FOMC announcements. Our decision to focus on unemployment is partly motivated by the plots in Figure 1 which suggest that the unemployment attention indices might act as a leading indicator, and partly motivated by findings in prior literature that the unemployment report is important for stock market returns (Boyd et al., 2005). We also ask whether attention to monetary policy can forecast the stock returns, change in implied volatility, and the Fed fund rate on FOMC announcements. Lucca and Moench (2015) show that a significant fraction of the risk premium is earned on FOMC announcements. Savor and Wilson (2013) further show that implied volatility significantly decrease on FOMC announcements.

5.1 Unemployment Announcements

We construct measures of "surprises" in the monthly employment report in two ways. First, we consider a simple random walk model of unemployment, under which the prediction for the following month's unemployment rate is the prior month's unemployment rate, and the surprise is defined as the change in unemployment. Second, we use the regression model of Boyd, Hu, and Jagannathan (2005) to generate the unemployment forecasts, which we call the Boyd, Hu, and Jagannathan (2005) surprise. The authors' forecasting model uses information from related macroeconomic variables, including industrial production, T-bill rate, corporate bond yield spreads, and past unemployment rate. The surprise is defined as the difference between the announced unemployment rate and the unemployment forecast. The date of reference for the actual unemployment rate

is the release date of the employment situation announcement made by the U.S. Bureau of Labor Statistics.

For predictor variables, we carry out separate analyses using detrended levels of the composite indices MAI-C1. Specifically, to capture very short run movements, we use the difference between the 5-day simple moving average and the 20-day simple moving average of the attention indices (MAI $_{5-20}$). To capture a range of other movements, we similarly calculate 5-, 20-, and 60-day moving averages detrended by the 252-day moving average (i.e., MAI $_{5-252}$, MAI $_{20-252}$, MAI $_{60-252}$). Following Boyd et al. (2005), we also interact each of the predictor variables with NBER recession dummies. Since the NBER dummies are not known in advance, regressions using these interactions are not predictive. Boyd et al. (2005) hypothesize that "bad news" for unemployment means different things in expansions and contractions, and the interaction variables allow us to see whether the predictive ability of attention, if it exists, concentrates in contractions.

To investigate the link between unemployment surprises and our attention index to unemployment, we estimate the following regression:

$$Surp_t = c + MAI_{t-1} + MAI_{t-1} \cdot NBER + +e_t, \tag{9}$$

where Ret_t is the daily return of S&P 500 index, MAI_{t-1} is the detrended MAI-C1 for unemployment, $NBER$ is an indicator variable for NBER recession, and $Surp_t$ is unemployment announcement surprise.[9]

Table 8 shows that the detrended unemployment attention variables are significantly related to surprises in the unemployment report, and that the interaction variables are often important. Under the random walk model, attention indices positively predict future surprises in unemployment, and variables are significant when interacted with the NBER recession dummies. Hence, increases in macroeconomic attention to unemployment

[9]When the Employment Situation announcement occurs on Good Friday (U.S. holiday) we use the stock return on the following trading if the market is close.

positively predict future changes in unemployment, and this relationship is strong during recessions. Changes in macroeconomic attention retain the ability to explain future changes in employment relative to the Boyd et al. (2005) regression model.

Figure 5 shows graphically how attention changes before and after unemployment surprises. There are four panels, corresponding to all combinations of the main two unemployment surprises, and the two unemployment attention indices. For each unemployment surprise, we separate the data into three equal-sized bins of small, medium, and large surprises. We then plot in event time the average attention over a period one year prior to the surprise, out to one year subsequent to the surprise. The results show similar patterns. When the unemployment surprise is particularly low, on average attention to unemployment in the media has been declining over the past year, and continues to decline over the following year. Conversely, when the unemployment surprise is large and positive, on average attention has been increasing over the prior year, and continues to increase over the following year. When the unemployment surprise is in the middle tercile, on average attention is approximately flat over the prior and following years, and at a lower level than for large positive or negative surprises. These findings are consistent with the regression results, and confirm that attention moves both before and after changes in reported fundamentals.

It is natural to think that if changing attention to unemployment predicts unemployment announcement surprises, then it may also predict market returns on the day of the employment announcement. This topic relates to prior research by Boyd et al. (2005), who show that unemployment surprises generally relate positively to market returns on the announcement date, but the relationship turns negative during NBER recessions. In Table 9, we revisit their results using the two different measures of unemployment surprise defined previously, and adding measures of macroeconomic attention as explanatory variables. We specify:

$$Ret_t = c + MAI_{t-1} + MAI_{t-1} \cdot NBER + Surp_t + Surp_t \cdot NBER + e_t. \qquad (10)$$

where Ret_t is the daily return of S&P 500 index.

The first column of Table 9 shows results with only the variables used by Boyd et al. (2005). The coefficient estimates are consistent with their results: unemployment surprises positively relate to market returns, but the relationship turns negative in recessions. Both the surprise and the interaction term are significant at the 5% and 10% level.

The remaining columns of Table 9 consider as explanatory variables, separately and with the Boyd et al. (2005) surprise as controls, measures of changes in attention to unemployment. The short-horizon trend in attention (5-day minus 20-day moving average) is positive and significant at the 5% level in all specifications, and remains significant with the Boyd et al. (2005) variables as controls. The medium-horizon attention trend (20-day minus 250-day moving average), positively relates to the market return, but is not significant independently. However, interacted with the NBER recession dummy, the coefficients are uniformly positive and significant. The sign is opposite to the coefficient on the surprise itself interacted with the NBER recession dummy.

It is important to distinguish between the trend in attention, which reflects anticipation, and the surprise itself, which reflects a realization. Consistent with the results of Boyd et al. (2005), during a recession a higher realization of unemployment on the announcement date leads to lower market returns. We add to this that rising attention before the announcement date tends to be associated with higher market returns on the announcement date, as uncertainty is resolved.

5.2 FOMC Announcements

We now investigate whether our attention indices to monetary policy can predict stock returns, changes in implied volatility, and changes in Fed fund rates on FOMC announce-

ments. We focus specifically on the period post 1994 when FOMC decisions are publicly announced. We use a similar OLS regression framework as in Equation (9) but using the S&P 500 returns, changes in implied volatility proxied by VXO, or changes in Fed fund rates as dependent variables. Changes in Fed fund rate consist of a random-walk surprise measure.

Table 10, Panel A shows that, controlling for the interaction between NBER dummies and MAI, our attention index to monetary policy predicts positive stock returns on FOMC announcements. The short-horizon trend in attention (5-day minus 20-day moving average) is positive and significant at the 5% level. Similar results hold for long-horizon trend in attention (60-day minus 250-day moving average). We next investigate whether attention to monetary can predict changes in VIX on FOMC announcement days. Panel B shows that an increase in the short-horizon trend in attention predicts a decrease in VIX, which suggests that an increase attention predicts a decrease in uncertainty on FOMC announcement days. The coefficient on the interaction term MAI×NBER is positive and significant, indicating that an increase in attention predicts greater resolution of uncertainty on FOMC announcements during expansion than during recessions. Finally, we examine the relationship between changes in the Fed fund rates and attention on FOMC announcements. Panel C shows that our attention measure to monetary predicts negative changes in Fed fund rates, meaning that attention increases before the Fed announces a cut in Fed fund rates. This is consistent with the fact that during 1994-2008, most of the Fed's decision on interest rate was to lower rather than increase the Fed fund rate.[10] More importantly, the relationship is stronger during recessions. This is consistent with Kacperczyk, Van Nieuwerburgh, and Veldkamp (2016), who show that investors pay more attention to macroeconomic risks during recessions.

[10]We focus on the 1994-2008 period because the Fed reached the so-called 'zero lower bound' and did not change the Fed fund rate after 2008. The most recent rate change was the increase in December 2015.

6 Conclusion

We build indices of investor attention to macroeconomic fundamentals using news articles from WSJ and NYT. Attention indices rises around macroeconomic announcements and following changes in fundamentals over quarterly, annual, and business cycle horizons. The effect of announcements and changes in fundamentals on indices is asymmetric, with bad news raising attention more than good news. Attention indices have important implications to financial markets, and we show that aggregate trade volume and volatility coincide with rising attention, controlling for announcements. We further show that attention predicts surprises as well as stock returns on unemployment and FOMC announcement days.

Our paper adds to the growing literature documenting the importance of investor attention in financial markets (e.g. Andrei and Hasler, 2014, Da, Engelberg, and Gao, 2011). Future work could go in many directions. We find evidence of time-varying attention to different macroeconomic fundamentals in the news media. In the spirit of the Merton (1980) Intertemporal Capital Asset Pricing Model, such attention dynamics could be related to time-variation in the risks or risk premia associated with different types of macroeconomic fundamentals. Another possible extension is to combine both investors' sentiment and attention to macroeconomic fundamentals and relate to stock market returns.

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Figure 1: Attention to Unemployment

This figure shows the monthly unemployment attention indices for the Wall Street Journal (MAI-WU) and the New York Times (MAI-NU) and the monthly unemployment rate. The blue line is the attention index (MAI) and the red dotted line is the unemployment rate. The units are in percentage. The gray vertical bars are NBER recessions.

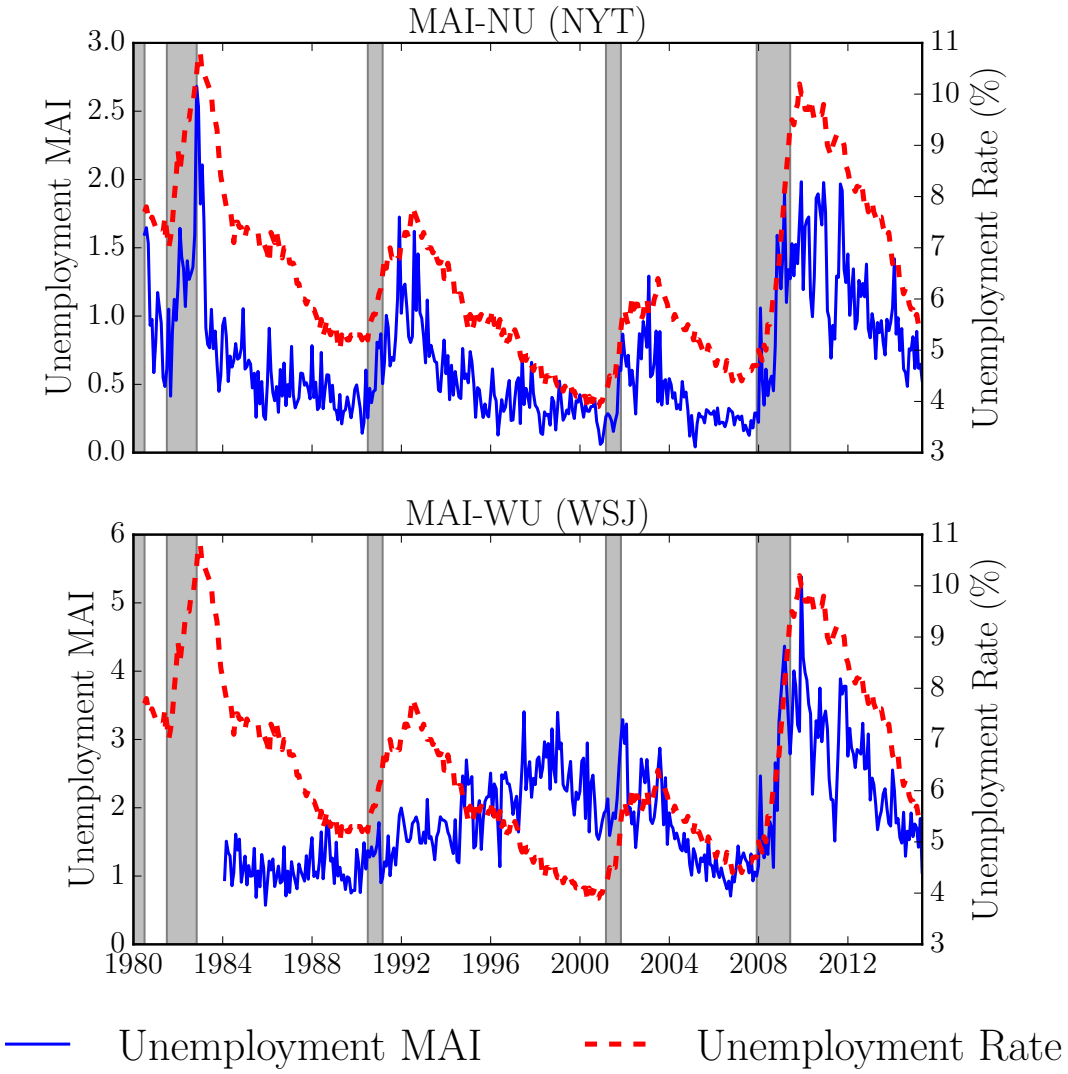


Figure 2: Macro Attention and Macroeconomic Fundamentals

This figure shows the monthly macroeconomic attention indices (MAI) for the Wall Street Journal (MAI-WU) and the New York Times (MAI-NU) against related monthly macroeconomic fundamentals described in Table 2. The blue line represents a macroeconomic attention index (left y-axis) and the red dotted line (right y-axis) the MAI related macroeconomic fundamental (see Table 2). The units are in percentage. The gray vertical bars are NBER recessions.

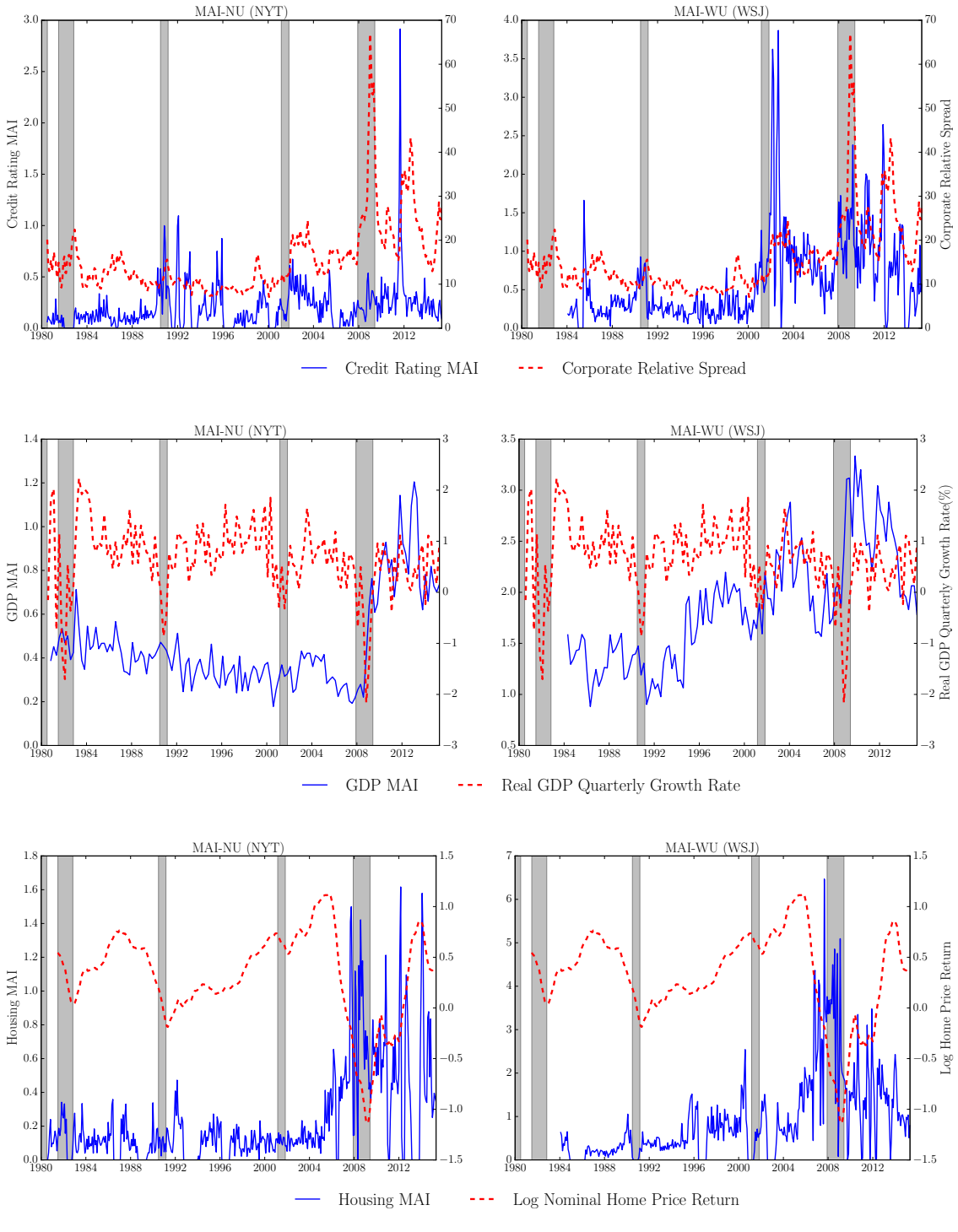


Figure 2: Continued

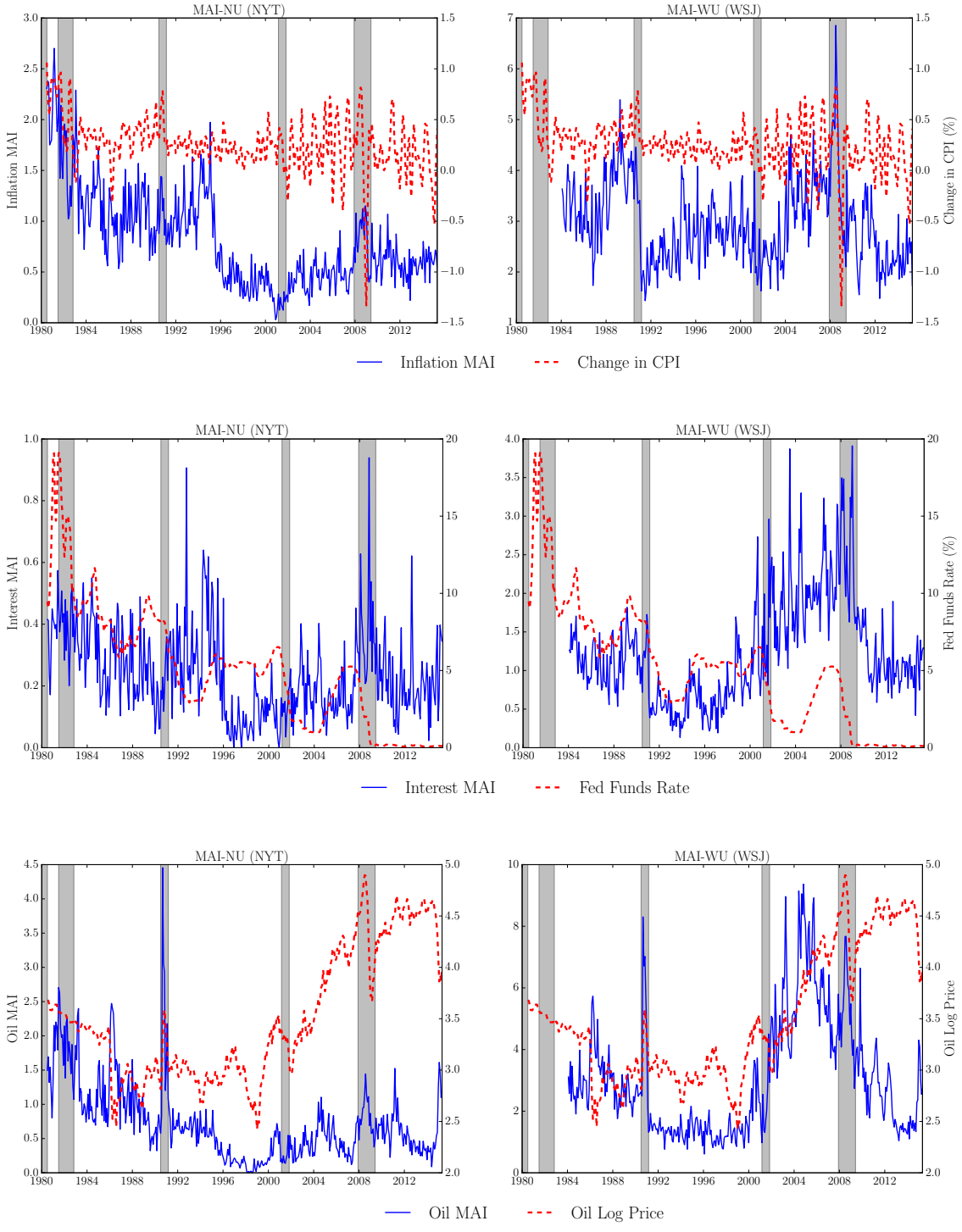


Figure 3: Autocorrelation in Macroeconomic Attention

This figure shows the autocorrelations (ρ_k) for residuals after controlling for day-of-the-week dummies and month-of-the-year dummies for each of the composite macroeconomic attention index MAI-C1 for k lags ranging from 1 to 250 trading days. The dashed line represents the 95% critical value for the test $\rho_k \leq 0$, where we use the "large-lag" standard errors of Anderson (1976). These standard errors account for the observed autocorrelations for lags less than k.

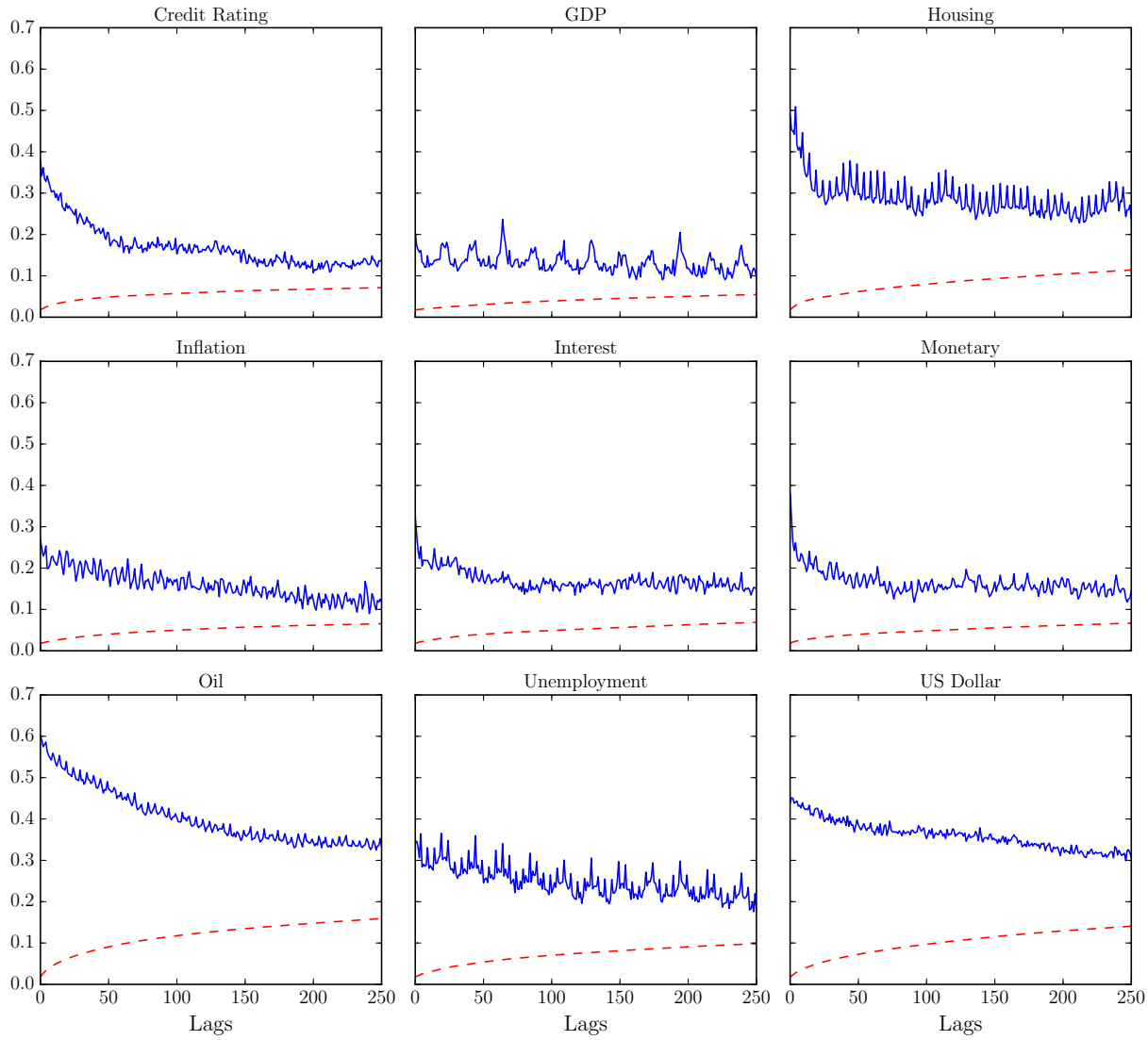


Figure 4: Macroeconomic Attention around Macroeconomic Announcements

This figure shows the lag and forward estimated coefficients β_δ from an OLS regression of detrended macroeconomic attention indices MAI-C1 on announcement dummies as specified in Equation (4). The shaded area corresponds to the 95% confidence interval around the estimated coefficients. The x-axis is the number days since the announcement. The first row shows attention around the consumer price index (CPI) announcements, the second row the Employment situation announcements, and the third row the Federal Open Market Committee (FOMC) announcements for different MAI-C1. The vertical line represents the day of the announcement.

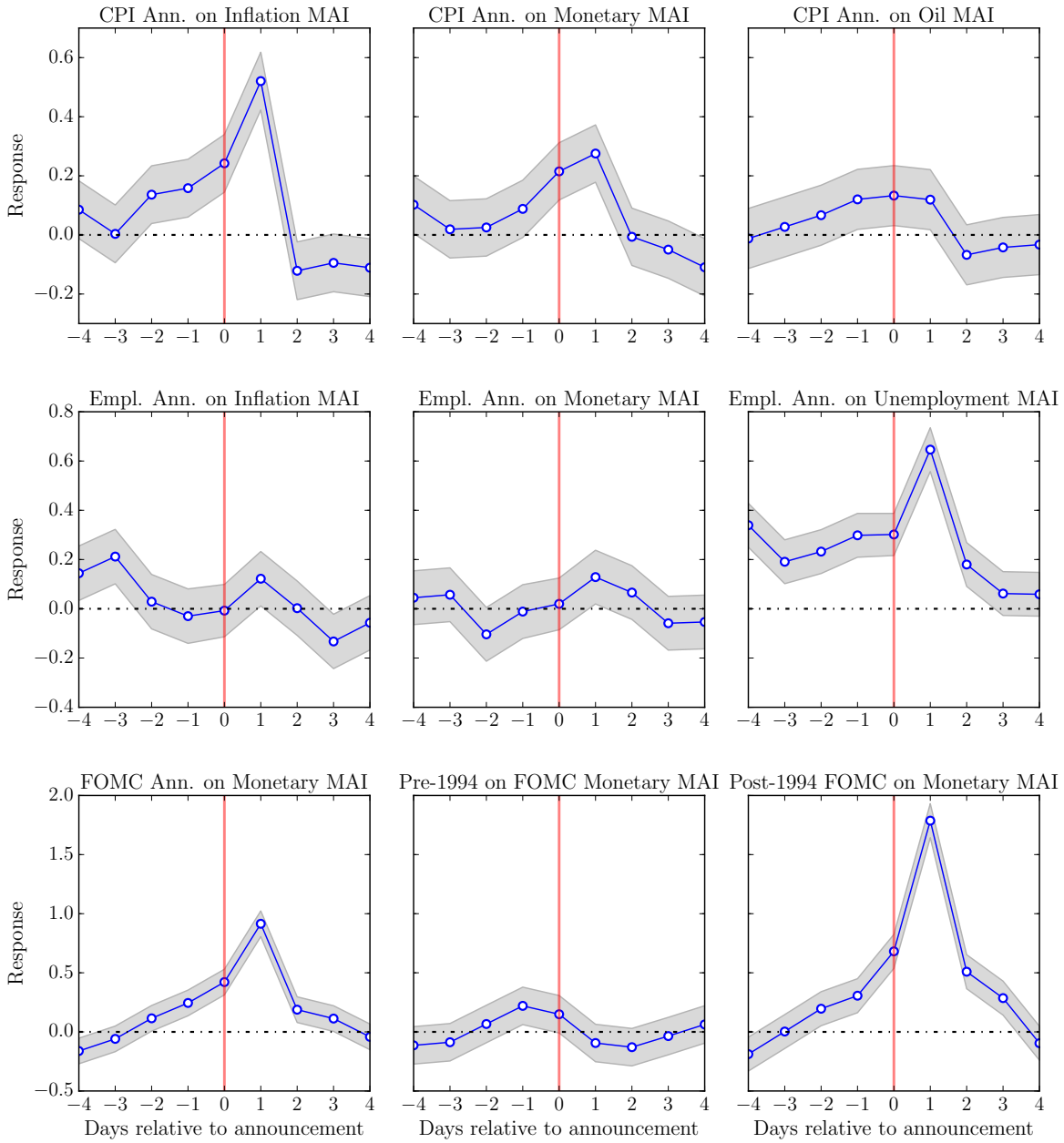


Figure 5: Attention to Unemployment around Employment Situation Announcements

This figure shows the daily 60-day moving average of the unemployment attention index for the Wall Street Journal (MAI-WU) and the New York Times (MAI-NU) around the employment situation announcements. The window is 250 trading days before and after each announcement. We separate the random-walk and the Boyd, Hu, and Jagannathan (2005) surprises into terciles. The MAI around low surprises is in blue (solid line), medium surprises is in red (dotted line), and high surprises is in black (dashed line).

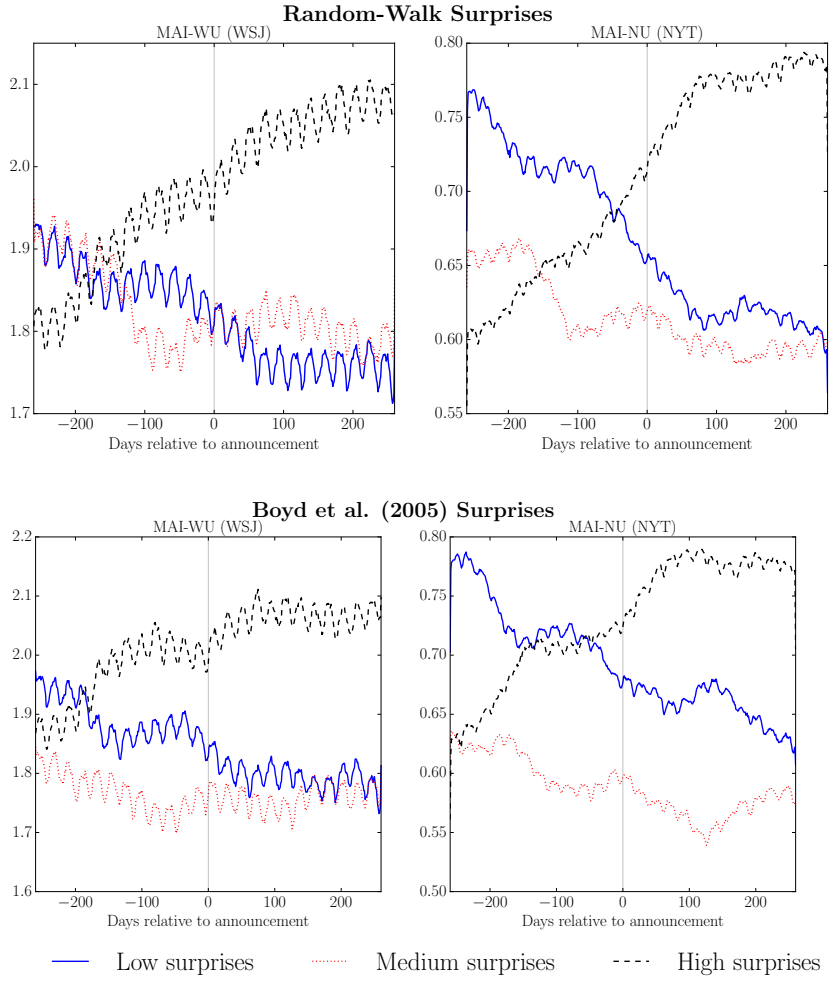


Table 1: Newspapers Search Words

This table presents the search words used to select the articles related to nine specific macroeconomic fundamentals in the Wall Street Journal (WSJ) and New York Times (NYT). The nine macroeconomic fundamentals are credit ratings, Gross Domestic Product (GDP), housing market, inflation, interest rate, monetary, oil, U.S. dollar, and unemployment.

Category	Newspapers search words
Credit Rating	(credit rating) OR (bond rating)
GDP	gross domestic product OR GDP OR GNP or gross national product
Housing Market	(housing market) OR (house sale) OR (new home start) OR (home construction) OR (residential construction) OR (housing sale) OR (home price)
Inflation	inflation AND (economy OR economic OR Federal Reserve)
Interest Rate	interest rate AND (economic or economy OR federal reserve)
Monetary	(federal reserve OR federal open market committee OR fomc) AND (interest rate OR monetary OR inflation OR economy OR economic OR unemployment)
Oil	oil
U.S. Dollar	U.S. dollar OR U.S. exchange rate OR U.S. currency
Unemployment	(unemployment OR population out of work) AND (economy OR economic)

Table 2: Macroeconomic Attention and Macroeconomic Fundamentals

This table presents the macroeconomic attention indices (MAI) for credit ratings, gross domestic product (GDP), housing market, inflation, interest rate, monetary, oil, US dollar, and unemployment and its related macroeconomic fundamentals and announcements. The table also reports the data sources for the fundamentals. The announcement dates are from Bloomberg except for the historical GDP announcements (pre-1997) that are from the U.S. Bureau of Economic Analysis.

MAI	Fundamental		Macroeconomic Announcement	
	Fundamental	Source of Fundamental	Name of Announcement	Frequency
Credit Rating	Corporate Relative Spread*	Moody's Corporate Bond Yield		
GDP	Quarter-to-quarter real GDP log growth rate	Federal Reserve of St-Louis	Gross Domestic Product (GDP)	Quarterly
Housing	Nominal Home Price Index	Robert Shiller's website**	Case-Shiller Home Price	Monthly
Inflation	log growth in CPI	Bureau of Labor Statistics	Consumer Price Index (CPI)	Monthly
Interest	Federal Fund Rate	Federal Reserve of St-Louis	Federal Open Market Committee (FOMC)	8 per year
Monetary	Federal Fund Rate	Federal Reserve of St-Louis	Federal Open Market Committee (FOMC)	8 per year
Oil	Crude Oil Spot Price	Energy Information Administration		
Unemployment†	Unemployment rate	Bureau of Labor Statistics	Employment Situation	Monthly
USD	Trade Weighted U.S. Dollar Index: Major Currencies	Federal Reserve of St-Louis		

* The relative spread is the difference between BAA and AAA in corporate bond yields divided by AAA.

** US home prices 1890 to present, http://www.econ.yale.edu/ shiller/data.htm.

† Unemployment rates are from the initial release.

Table 3: Descriptive Statistics

This table presents the descriptive statistics for the macroeconomic attention indices (MAI). Panel A shows the daily unadjusted media attention indices (MAI) for the Wall Street Journal (MAI-WU $_{f,t}$) and New York Times (MAI-NU $_{f,t}$), the Economic Policy Uncertainty (EPU) index, the implied volatility (VXO), and the three-month detrended log S&P 500 trade volume. Columns Mon to Sun are the daily averages for each MAI. Panels B shows the correlation between the demeaned macroeconomic attention composite indices (MAI-C1), EPU, VXO, and the 60-day detrended S&P 500 trade volume at the daily frequency. Obs. stands for the number of observations, and St. dev. stands for the standard deviation.

***Panel A: Daily unadjusted MAI descriptive statistics (1980-2015)**

	Obs.	Mean	St. Dev.	Min	Max	Mon	Tues	Wed	Thur	Frid	Sat	Sun
Wall Street Journal												
Credit Rating	11443	0.46	0.89	0.00	9.67	0.50	0.58	0.73	0.57	0.62	0.22	0.00
GDP	11443	1.41	1.54	0.00	12.91	2.09	1.65	1.82	1.77	1.94	0.62	0.00
Housing	11443	0.71	1.46	0.00	17.18	0.62	0.68	1.40	0.84	0.99	0.42	0.00
Inflation	11443	2.24	2.06	0.00	15.71	3.28	2.47	3.01	2.86	3.15	0.87	0.00
Interest	11443	0.95	1.23	0.00	13.54	1.21	1.02	1.40	1.31	1.30	0.40	0.00
Monetary	11443	1.91	1.95	0.00	18.62	2.60	2.11	2.61	2.63	2.50	0.90	0.00
Oil	11443	2.34	2.57	0.00	19.47	2.82	2.98	3.37	3.05	3.16	0.97	0.00
Unemp.	11443	1.44	1.64	0.00	14.07	2.00	1.48	2.09	1.59	2.18	0.73	0.00
USD	11443	0.78	1.08	0.00	9.60	0.97	1.07	1.07	1.03	1.08	0.24	0.00
New York Times												
Credit Rating	12752	0.20	0.43	0.00	10.06	0.11	0.21	0.24	0.23	0.20	0.17	0.23
GDP	12752	0.51	0.58	0.00	5.65	0.37	0.43	0.46	0.49	0.53	0.43	0.88
Housing	12752	0.29	0.57	0.00	7.23	0.11	0.18	0.28	0.28	0.28	0.20	0.68
Inflation	12752	0.90	0.91	0.00	12.26	0.66	0.70	0.93	0.89	0.94	0.82	1.37
Interest	12752	0.26	0.38	0.00	3.12	0.19	0.21	0.27	0.28	0.26	0.24	0.34
Monetary	12752	0.92	0.77	0.00	8.68	0.60	0.78	0.98	1.04	1.06	0.95	1.05
Oil	12752	0.76	0.84	0.00	8.94	0.50	0.73	0.80	0.84	0.81	0.70	0.91
Unemp.	12752	0.81	0.90	0.00	10.53	0.58	0.55	0.70	0.67	0.92	0.78	1.48
USD	12752	0.08	0.20	0.00	3.34	0.01	0.08	0.07	0.08	0.08	0.07	0.18
Other Variables												
EPU	11077	102.61	70.29	3.38	719.07	111.25	102.56	96.44	90.01	93.26	90.70	134.02
VXO	7386	20.73	9.06	8.51	150.19	20.80	20.67	20.68	20.79	20.74		
Volume	8798	20.17	1.48	16.52	23.16	20.09	20.19	20.20	20.19	20.17	20.20	20.16

Table 3: Continued.

***Panel B: Daily MAI-C1 correlation (1980-2015)**

	Credit Rating	GDP	Housing	Inflation	Interest	Monetary	Oil	Unemp.	USD	EPU	VXO	Volume
Credit Rating	1.00	0.16	0.16	-0.02	0.13	0.17	0.14	0.15	0.15	0.13	0.20	0.29
GDP	0.16	1.00	0.15	0.21	0.16	0.23	0.12	0.33	0.10	0.10	0.08	0.25
Housing	0.16	0.15	1.00	0.08	0.24	0.26	0.13	0.16	0.06	0.04	0.02	0.38
Inflation	-0.02	0.21	0.08	1.00	0.34	0.45	0.31	0.22	0.18	0.02	0.02	-0.24
Interest	0.13	0.16	0.24	0.34	1.00	0.57	0.33	0.14	0.29	0.08	0.16	0.14
Monetary	0.17	0.23	0.26	0.45	0.57	1.00	0.29	0.27	0.24	0.16	0.17	0.20
Oil	0.14	0.12	0.13	0.31	0.33	0.29	1.00	0.02	0.37	0.03	0.08	0.02
Unemp.	0.15	0.33	0.16	0.22	0.14	0.27	0.02	1.00	-0.02	0.21	0.17	0.16
USD	0.15	0.10	0.06	0.18	0.29	0.24	0.37	-0.02	1.00	0.02	0.23	0.03
EPU	0.13	0.10	0.04	0.02	0.08	0.16	0.03	0.21	0.02	1.00	0.28	0.07
VXO	0.20	0.08	0.02	0.02	0.16	0.17	0.08	0.17	0.23	0.28	1.00	0.10
Volume	0.29	0.25	0.38	-0.24	0.14	0.20	0.02	0.16	0.03	0.07	0.10	1.00

Table 4: Persistence of Macroeconomic Attention

Panel A of this table presents AR (p) models of the monthly demeaned macroeconomic attention composite indices (MAI-C1), controlling for monthly time-fixed effects. DF (p-value) are the p-values for the Dickey-Fuller (DF) statistics that test the null of a unit root in each time series. Panel B reports the estimates from an OLS regression of the daily demeaned macroeconomic attention composite indices (MAI-C1) on various moving average lags of itself. L1 corresponds to the lag of itself and L5, L21, L62, L250, and L1000 are the moving average for 5, 21, 62, 250, and 1000 days preceding the observed values at time t. We control for day-of-week fixed effects. The standard errors are reported in parenthesis and are calculated using Newey-West standard errors (10 lags). Obs. stands for the number of observations. *, **, and *** denote the statistical significance at the 10%, 5%, 1% levels, respectively.

***Panel A: Monthly MAI-C1 AR(4) coefficients and DF statistics**

	Credit Rating	GDP	Housing	Inflation	Interest	Monetary	Oil	Unemp.	USD
const	0.01	0.03	-0.02	0.09**	0.02	0.07	0.14*	0.01	-0.02
	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.05)	(0.08)	(0.04)	(0.03)
AR(1)	0.70***	0.25***	0.47***	0.51***	0.58***	0.50***	0.71***	0.62***	0.69***
	(0.08)	(0.04)	(0.10)	(0.05)	(0.05)	(0.04)	(0.05)	(0.06)	(0.06)
AR(2)	-0.02	0.29***	0.10	0.21***	0.17**	0.13**	0.17***	0.17***	0.06
	(0.10)	(0.04)	(0.08)	(0.04)	(0.07)	(0.05)	(0.04)	(0.05)	(0.06)
AR(3)	-0.01	0.30***	0.29***	0.05	-0.00	0.15**	0.02	0.11**	0.01
	(0.07)	(0.05)	(0.10)	(0.05)	(0.06)	(0.07)	(0.08)	(0.05)	(0.05)
AR(4)	0.15**	0.08	0.01	0.10**	0.10**	0.04	0.01	0.01	0.18***
	(0.07)	(0.05)	(0.06)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)
DF (p-value)	0.00	0.02	0.04	0.00	0.01	0.00	0.00	0.00	0.13
Adj-R2	0.58	0.70	0.63	0.67	0.62	0.54	0.79	0.78	0.82
Obs.	415	415	415	415	415	415	415	415	415

***Panel B: Daily MAI-C1 regressions on lagged attention**

	Credit Rating	GDP	Housing	Inflation	Interest	Monetary	Oil	Unemployment	U.S. Dollar
const	-0.09***	0.08**	-0.21***	0.09**	-0.04	-0.11**	-0.21***	0.04	-0.08***
	(0.02)	(0.04)	(0.03)	(0.05)	(0.03)	(0.04)	(0.05)	(0.04)	(0.02)
L1	0.07***	0.05***	0.06**	0.03**	0.12***	0.17***	0.06***	0.00	-0.01
	(0.02)	(0.01)	(0.03)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
L5	0.28***	0.11***	0.56***	0.13***	0.16***	0.19***	0.38***	0.23***	0.18***
	(0.05)	(0.03)	(0.06)	(0.03)	(0.03)	(0.03)	(0.05)	(0.04)	(0.04)
L21	0.44***	-0.01	0.05	0.30***	0.24***	0.23***	0.36***	0.22***	0.51***
	(0.07)	(0.07)	(0.09)	(0.06)	(0.07)	(0.05)	(0.05)	(0.07)	(0.07)
L62	0.02	0.41***	0.12**	0.34***	0.18**	0.12*	0.13***	0.30***	0.13*
	(0.07)	(0.10)	(0.06)	(0.07)	(0.09)	(0.07)	(0.05)	(0.08)	(0.08)
L250	0.12*	0.43***	0.20**	0.09	0.25***	0.23***	0.03	0.26***	0.19***
	(0.06)	(0.10)	(0.08)	(0.06)	(0.07)	(0.08)	(0.03)	(0.07)	(0.06)
L1000	0.02	-0.04	-0.01	0.03	-0.01	0.01	0.02	-0.09***	-0.04
	(0.06)	(0.06)	(0.05)	(0.05)	(0.04)	(0.05)	(0.02)	(0.03)	(0.03)
Obs.	8109	8109	8109	8109	8109	8109	8109	8109	8109
Adj-R2	0.29	0.15	0.43	0.17	0.23	0.26	0.54	0.32	0.41

Table 5: Macroeconomic Attention and Macroeconomic Fundamentals

This table presents the results of an OLS regression of monthly macroeconomic attention indices (MAI) on different macroeconomic fundamentals. Panel A and Panel B report the results for the New York Times macroeconomic attention indices (MAI-NU) and the Wall Street Journal (MAI-WU) respectively. The general regression is specified in equation 6. F corresponds to the associated fundamental to each MAI as described in Table 2 and F_t is the moving average over t days of the respective macroeconomic fundamental. We control for monthly fixed effects. The standard errors are reported in parenthesis and are calculated using Newey-West standard errors (10 lags). Obs. stands for the number of observations. *, **, *** denote the statistic significance at the 10%, 5%, 1% levels, respectively.

*Panel A: MAI-NU (New York Times)

MAI:	Credit Rating	GDP	Housing	Inflation	Interest	Monetary	Oil	Unemployment	US Dollar
F:	Credit Rating Spreads	GDP Growth	Home Price Ret	Δ CPI	Fed Fund	Fed Fund	Oil Price Ret	Unemp. Rate	USD Index Ret
$F_t - F_{t,t-2}$	0.022		-0.221*	-0.171**	-0.020	-0.022	-0.003	0.034	0.000
	(0.014)		(0.122)	(0.068)	(0.018)	(0.035)	(0.004)	(0.155)	(0.001)
$F_{t,t-2} - F_{t,t-11}$	-0.001	0.059*	-0.317***	-0.533***	0.004	-0.010	0.005	0.063	-0.001
	(0.004)	(0.031)	(0.110)	(0.163)	(0.013)	(0.034)	(0.009)	(0.091)	(0.004)
$F_{t,t-11} - F_{t,t-47}$	-0.011	0.154	-0.013	0.641	-0.019***	-0.041*	0.044*	0.140***	-0.020
	(0.012)	(0.100)	(0.107)	(0.758)	(0.006)	(0.021)	(0.024)	(0.048)	(0.012)
$(F_t - F_{t,t-2})^2$	0.000		0.538***	-0.476***	0.030***	0.059***	0.002***	0.632	0.000
	(0.001)		(0.117)	(0.170)	(0.007)	(0.017)	(0.001)	(0.737)	(0.001)
$(F_{t,t-2} - F_{t,t-11})^2$	-0.000	0.055	0.242***	-0.260	0.014**	0.048***	0.003***	0.229**	-0.004*
	(0.000)	(0.039)	(0.086)	(0.177)	(0.006)	(0.014)	(0.001)	(0.104)	(0.002)
$(F_{t,t-11} - F_{t,t-47})^2$	0.001	0.190	0.413**	6.503***	0.007***	-0.005	-0.007	0.066***	-0.016
	(0.001)	(0.150)	(0.202)	(2.207)	(0.002)	(0.008)	(0.006)	(0.025)	(0.012)
const	0.189***	0.416***	0.004	0.644***	0.187***	0.819***	0.488***	0.559***	0.068***
	(0.038)	(0.057)	(0.043)	(0.078)	(0.026)	(0.067)	(0.083)	(0.065)	(0.018)
Obs.	419	125	419	419	419	419	376	419	419
Adj-R2	0.05	0.06	0.35	0.15	0.16	0.09	0.28	0.51	-0.00

*Panel B: MAI-WU (Wall Street Journal)

MAI:	Credit Rating	GDP	Housing	Inflation	Interest	Monetary	Oil	Unemployment	US Dollar
F:	Credit Rating Spreads	GDP Growth	Home Price Ret	Δ CPI	Fed Fund	Fed Fund	Oil Price Ret	Unemp. Rate	USD Index Ret
$F_t - F_{t,t-2}$	0.053**		-0.272	-0.259	-0.280	-0.488	-0.016	-0.193	0.007
	(0.023)		(0.302)	(0.185)	(0.242)	(0.361)	(0.011)	(0.268)	(0.013)
$F_{t,t-2} - F_{t,t-11}$	0.024**	0.176	-0.680***	0.704	0.161	0.198	0.016	0.141	-0.022
	(0.012)	(0.120)	(0.256)	(0.444)	(0.163)	(0.241)	(0.020)	(0.247)	(0.042)
$F_{t,t-11} - F_{t,t-47}$	0.022	0.294	-0.268	4.609***	0.132	0.129	0.172*	0.241**	-0.362***
	(0.023)	(0.293)	(0.318)	(1.321)	(0.090)	(0.117)	(0.099)	(0.103)	(0.136)
$(F_t - F_{t,t-2})^2$	-0.002		0.486	-0.274	0.571	0.162	0.006***	3.176**	0.016**
	(0.003)		(0.479)	(0.358)	(0.640)	(0.826)	(0.001)	(1.413)	(0.008)
$(F_{t,t-2} - F_{t,t-11})^2$	0.001	0.315**	0.672***	1.139**	0.362***	0.343*	0.007***	0.202	0.055**
	(0.001)	(0.147)	(0.236)	(0.455)	(0.123)	(0.177)	(0.001)	(0.183)	(0.022)
$(F_{t,t-11} - F_{t,t-47})^2$	0.001	0.399	2.393***	12.976**	0.075**	0.070	-0.003	0.082*	0.295**
	(0.001)	(0.454)	(0.458)	(6.190)	(0.038)	(0.065)	(0.019)	(0.043)	(0.148)
const	0.558***	1.740***	0.142	3.015***	1.032***	2.364***	2.728***	1.866***	0.829***
	(0.084)	(0.121)	(0.106)	(0.105)	(0.110)	(0.183)	(0.359)	(0.133)	(0.159)
Obs.	376	125	376	376	376	376	376	376	376
Adj-R2	0.11	0.06	0.47	0.19	0.13	0.03	0.08	0.33	0.14

Table 6: Media Attention and Aggregate Trade Volume

This table presents the results of an OLS regression of the daily detrended S&P 500 trade volume on the difference between the 5-day and 20-day moving average MAI-C1 and a dummy (Ann) equal to one if there is a related announcement specified in Table 2, zero otherwise. We detrend the log trade volume using the moving average of the log trade volume of the past 60 trading days. For all model specifications, we control for day-of-week fixed effects. The standard errors are reported in parenthesis and are calculated using Newey-West standard errors (250 lags). Obs. stands for the number of observations. *, **, *** denote the statistical significance at the 10%, 5%, 1% levels, respectively.

MAI:	Inflation			Monetary			Interest		
Ann:	CPI			FOMC			FOMC		
MAI_{5-20}	0.052***	0.051***	0.056***	0.066***	0.065***	0.066***	0.058***	0.057***	0.058***
	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)	(0.013)	(0.013)	(0.013)
Ann		0.034***	0.043***		0.026***	0.027***		0.030***	0.031***
		(0.007)	(0.007)		(0.009)	(0.010)		(0.009)	(0.009)
MAI_{5-20}×Ann			-0.104***			-0.011			-0.043
			(0.024)			(0.035)			(0.039)
const	0.002	0.000	0.001	0.002	0.002	0.002	0.002	0.002	0.002
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Obs.	8787	8787	8787	8787	8787	8787	8787	8787	8787
Adj-R2	0.06	0.06	0.06	0.07	0.07	0.07	0.05	0.05	0.05

MAI:	GDP			Unemployment			Credit Rating	Oil	USD
Ann:	GDP Report			Employment					
MAI_{5-20}	0.027***	0.027***	0.026***	0.030***	0.029***	0.030***	0.068***	0.026***	0.075***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.018)	(0.010)	(0.019)
Ann		0.005	0.003		0.013	0.018			
		(0.008)	(0.008)		(0.011)	(0.013)			
MAI_{5-20}×Ann			0.035			-0.031			
			(0.036)			(0.034)			
const	0.002	0.002	0.002	0.002	-0.000	-0.000	0.002	0.013**	0.028***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.006)	(0.007)	(0.006)
Obs.	8787	8787	8787	8787	8787	8787	8787	7368	8321
Adj-R2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06

Table 7: Media Attention and Implied Volatility

This table presents the results of an OLS regression of the daily implied volatility proxied by VXO regressed on the difference between the 20-day and 250-day moving average MAI-C1 and a dummy (Ann) equal to one if there is a related announcement specified in Table 2, zero otherwise. For all model specifications, we control for day-of-week fixed effects. The standard errors are reported in parenthesis and are calculated using Newey-West standard errors (250 lags). Obs. stands for the number of observations. *, **, *** denote the statistical significance at the 10%, 5%, 1% levels, respectively.

MAI:	Inflation			Monetary			Interest		
Ann:	CPI			FOMC			FOMC		
MAI_{20-250}	-2.730	-2.729	-2.750	3.443**	3.442**	3.448**	4.709*	4.708*	4.727*
	(3.362)	(3.362)	(3.335)	(1.600)	(1.599)	(1.601)	(2.606)	(2.606)	(2.606)
Ann		0.259	0.266		-0.205	-0.207		-0.244	-0.246
		(0.182)	(0.184)		(0.224)	(0.225)		(0.237)	(0.240)
$MAI_{20-250} \times$Ann			0.438			-0.213			-0.591
			(0.764)			(0.569)			(1.112)
const	20.720***	20.703***	20.703***	20.722***	20.722***	20.722***	20.732***	20.733***	20.733***
	(1.231)	(1.227)	(1.226)	(1.249)	(1.249)	(1.249)	(1.257)	(1.257)	(1.258)
Obs.	7386	7386	7386	7386	7386	7386	7386	7386	7386
Adj-R2	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01

MAI:	GDP			Unemployment			Credit Rating	Oil	USD
Ann:	GDP Report			Employment					
MAI_{20-250}	11.370**	11.377**	11.398**	11.079***	11.080***	11.103***	7.603***	0.511	6.786**
	(4.613)	(4.614)	(4.600)	(4.075)	(4.074)	(4.079)	(2.898)	(1.148)	(2.654)
Ann		0.286	0.279		0.207	0.206			
		(0.200)	(0.199)		(0.153)	(0.156)			
$MAI_{20-250} \times$Ann			-0.420			-0.475			
			(1.168)			(0.761)			
const	20.650***	20.628***	20.628***	20.645***	20.598***	20.598***	20.765***	20.762***	20.805***
	(1.139)	(1.135)	(1.135)	(1.087)	(1.088)	(1.088)	(1.218)	(1.252)	(1.245)
Obs.	7386	7386	7386	7386	7386	7386	7361	7361	7005
Adj-R2	0.07	0.07	0.07	0.13	0.13	0.13	0.05	0.00	0.02

Table 8: Unemployment Surprise Forecasts on Employment Situation Announcement Days

This table presents the results of an OLS regression of the unemployment surprise regressed on the one-day lag detrended demeaned daily composite MAI-C1 for unemployment at different frequencies and an interaction term between MAI-C1 and an NBER dummy. For example, MAI_{5-20} is the difference between the five-day and twenty-day moving average of MAI-C1 for unemployment. The NBER dummy equals one if the unemployment surprise occurs during a NBER recession, zero otherwise. The surprise is calculated as the difference between the actual unemployment for month t reported in month $t+1$ and the random-walk (i.e. the previous month unemployment rate) in Panel A and the forecasted unemployment rate as in Boyd, Hu, and Jagannathan (2005) in Panel B. The standard errors are reported in parenthesis and are calculated using the White's heteroskedasticity robust standard errors. Obs. stands for the number of observations. *, **, *** denote the statistical significance at the 10%, 5%, 1% levels, respectively.

***Panel A: Random-Walk**

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	0.040	0.020	0.074***	0.042**	0.142***	0.090**	0.216***	0.110**
	(0.027)	(0.026)	(0.019)	(0.019)	(0.033)	(0.035)	(0.045)	(0.052)
MAI×NBER		0.298**		0.194***		0.183**		0.375***
		(0.138)		(0.051)		(0.080)		(0.083)
const	-0.010	-0.010	-0.012	-0.017*	-0.002	-0.009	-0.001	-0.012
	(0.010)	(0.010)	(0.009)	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)
Obs.	418	418	407	407	407	407	407	407
Adj-R2	0.00	0.02	0.04	0.08	0.06	0.07	0.07	0.11

***Panel B: Boyd et al. (2005) Surprise**

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	0.024	0.017	0.046***	0.036**	0.089***	0.078***	0.129***	0.092**
	(0.023)	(0.023)	(0.016)	(0.017)	(0.024)	(0.029)	(0.034)	(0.043)
MAI×NBER		0.106		0.065		0.040		0.134**
		(0.095)		(0.043)		(0.054)		(0.064)
const	-0.018**	-0.018**	-0.020***	-0.021***	-0.013*	-0.015*	-0.013*	-0.017**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)
Obs.	418	418	407	407	407	407	407	407
Adj-R2	0.00	0.00	0.02	0.03	0.03	0.03	0.04	0.05

Table 9: S&P Return Forecast on Employment Situation Announcement Days

This table presents the results of an OLS regression of the daily S&P 500 log return on the employment situation announcement date regressed on the Boyd, Hu, and Jagannathan (2005) surprise (Surp_{Boyd}) of the unemployment announcement, the surprise interacted with an NBER dummy, the one-day lag detrended unemployment attention index composite index MAI-C1, and the detrended unemployment attention index interacted with an NBER dummy. For example, $\text{MAI}_{5-20,t}$ is the difference between the five-day and twenty-day moving average of MAI-C1 for unemployment. The NBER dummy equal one if the unemployment surprise occurs during a NBER recession, zero otherwise. We show the results for two different detrended frequencies for the unemployment attention index. The standard errors are reported in parenthesis and are calculated using the White's heteroskedasticity robust standard errors. Obs. stands for the number of observations. *, **, *** denote the statistical significance at the 10%, 5%, 1% levels, respectively.

MAI:		MAI_{5-20}			MAI_{20-250}		
MAI		0.361**	0.319**	0.295*	0.278	-0.059	-0.106
		(0.159)	(0.160)	(0.161)	(0.212)	(0.223)	(0.221)
MAI×NBER			0.617	0.800		1.177**	1.442***
			(0.787)	(0.721)		(0.514)	(0.511)
Surp_{Boyd}	0.620*			0.572			0.725**
	(0.354)			(0.352)			(0.366)
Surp_{Boyd}×NBER	-2.022*			-2.282*			-3.184**
	(1.229)			(1.278)			(1.323)
const	0.052	-0.015	-0.015	0.011	0.032	-0.015	0.009
	(0.057)	(0.061)	(0.061)	(0.062)	(0.058)	(0.060)	(0.060)
Obs.	419	418	418	418	407	407	407
Adj-R2	0.01	0.01	0.01	0.02	0.00	0.02	0.04

Table 10: Forecasts on FOMC Announcements

This table presents the results of an OLS regression .... The standard errors are reported in parenthesis and are calculated using the White's heteroskedasticity robust standard errors. Obs. stands for the number of observations. *, **, *** denote the statistical significance at the 10%, 5%, 1% levels, respectively.

***Panel A: S&P 500 returns (1994-2015)**

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	0.362	0.591**	0.115	0.287*	-0.096	0.062	0.432	0.546**
	(0.265)	(0.281)	(0.154)	(0.168)	(0.204)	(0.212)	(0.368)	(0.260)
MAI×NBER		-0.675		-0.489*		-0.666		-0.561
		(0.480)		(0.277)		(0.546)		(1.539)
const	0.329***	0.337***	0.330***	0.344***	0.323***	0.332***	0.323***	0.327***
	(0.089)	(0.090)	(0.091)	(0.092)	(0.091)	(0.091)	(0.089)	(0.086)
Obs.	171	171	171	171	171	171	171	171
Adj-R2	0.01	0.02	-0.00	0.01	-0.00	-0.00	0.01	0.00

***Panel B: Changes in implied volatility (1994-2015)**

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	-4.423**	-6.079***	-2.124*	-3.152**	-0.574	-1.043	-3.272*	-3.660*
	(1.849)	(2.236)	(1.104)	(1.369)	(1.431)	(1.747)	(1.922)	(1.899)
MAI×NBER		4.887*		2.926*		1.975		1.901
		(2.876)		(1.676)		(2.767)		(6.309)
const	-2.088***	-2.149***	-2.128***	-2.214***	-2.066***	-2.093***	-2.031***	-2.043***
	(0.579)	(0.581)	(0.599)	(0.611)	(0.608)	(0.614)	(0.585)	(0.584)
Obs.	171	171	171	171	171	171	171	171
Adj-R2	0.05	0.06	0.02	0.03	-0.01	-0.01	0.01	0.00

***Panel C: Changes in Fed fund rates (1994-2008)**

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	-0.105	0.007	-0.127*	-0.007	-0.218**	-0.017	-0.326***	-0.096
	(0.151)	(0.089)	(0.072)	(0.059)	(0.109)	(0.087)	(0.124)	(0.120)
MAI×NBER		-0.215		-0.251***		-0.615***		-0.731**
		(0.247)		(0.084)		(0.179)		(0.288)
const	-0.028	-0.026	-0.025	-0.020	-0.025	-0.017	-0.012	-0.012
	(0.032)	(0.032)	(0.030)	(0.030)	(0.030)	(0.029)	(0.028)	(0.028)
Obs.	104	104	104	104	104	104	104	104
Adj-R2	0.01	0.02	0.06	0.12	0.07	0.21	0.07	0.15

Internet Appendix for

Media Attention, Macroeconomic Fundamentals, and the Stock Market

September 2016

A Details on the Attention Indices

A.1 Sample of news articles mentioning macroeconomic fundamentals

We present in this appendix samples of news articles from the Wall Street Journal (WSJ) and New York Time (NYT) that are selected to build our media attention indices to macroeconomic fundamentals.

Inflation

1) Jonathan Fuerbringer, "Do Deficit Impede Recovery? New Analysis", New York Times, January 21, 1983.

"These levels give rise to the persistent fear of renewed inflation with the Federal Reserve being forced, in an effort to keep the economy going, to ease its tight hold on the money supply and push down interest rates so that the deficit is easier to finance and the recovery will not be tripped up."

Unemployment

1) Ken Gilpin, "Jobs Data Push Bonds Up Sharply", New York Times, July 3, 1992.

"Stunning weakness in labor statistics for June and the Federal Reserve Board's equally striking response to the data caused an eruption in the credit markets yesterday. Prices of fixed-income securities rose sharply and interest rates fell."

2) Jonathan Fuerbringer, "Greenspan Speaks: Recession's Over," New York Times, March 10, 2002.

"The recovery, he told Congress, 'is already well under way.' His comments followed economic data showing a turnaround in manufacturing and a surge in the service sector. Then, on Friday, the Labor Department said the unemployment rate had slipped and that the number of lost jobs had shrunk to just 50,000. All this was uplifting for stocks and bad for bonds."

3) Kate Davidson, "Strong Jobs Report Clears Fed for Liftoff on Rates" Wall Street Journal, December 4, 2015.

"The U.S. economy delivered another month of sturdy job growth in November, clearing a path for the Federal Reserve to end later this month an extraordinary seven-year run of near-zero interest rates."

Monetary policy

1) Greg Ip, Nicholas Kulish and Jacob M. Schlesinger, "New Model: This Economic Slump Is Shaping Up to Be A Different Downturn," Wall Street Journal, January 5, 2001.
"One reason is that investors may respond quickly to a cut in Fed interest rates – as they did with Wednesday's huge rally in response to the surprise reduction of half a percentage point in short-term rates. That instantly eased some of the pain that had spread through the economy. The stock market has become the most important transmission mechanism of monetary policy,' says Jan Hatzius, senior economist at Goldman Sachs. And that's one reason, adds Brad DeLong, an economist at the University of California at Berkeley, that Fed moves have a bigger effect now."

2) Michael Derby, "Yield Curve, Fresh Data Are Unsettling Factors—Back From Holiday Break, Investors Will Get a Look at FOMC's Dec. 12 Mintues," Wall Street Journal, January 3, 2006.
"Not only will the market digest reports on manufacturing and employment data, but the publication of the minutes from the Federal Open Market Committee's Dec. 13 meeting today also could help settle the debate over whether a yield-curve inversion makes sense... The Fed's role has become more important to the market after central bankers rejiggered their policy statement at their last gathering to suggest at least one more rise in the federal-funds rate, bringing it to 4.50% from 4.25%, is likely."

A.2 Additional Figures

Figure A1: Media Attention and Macroeconomic Fundamentals

This figure shows the monthly media attention indices for the Wall Street Journal (MAI-WU), the New York Times (MAI-NU), the demeaned composite index (MAI-C1), and the demeaned and standardized composite index (MAI-C2) against related macroeconomic fundamentals described in Table 2. The blue line represents a particular media attention index (MAI) (y-axis) and the red dotted line (secondary-y axis) is the related macroeconomic fundamental. The units are in percentage. The gray vertical bars are NBER recessions. See Table 2

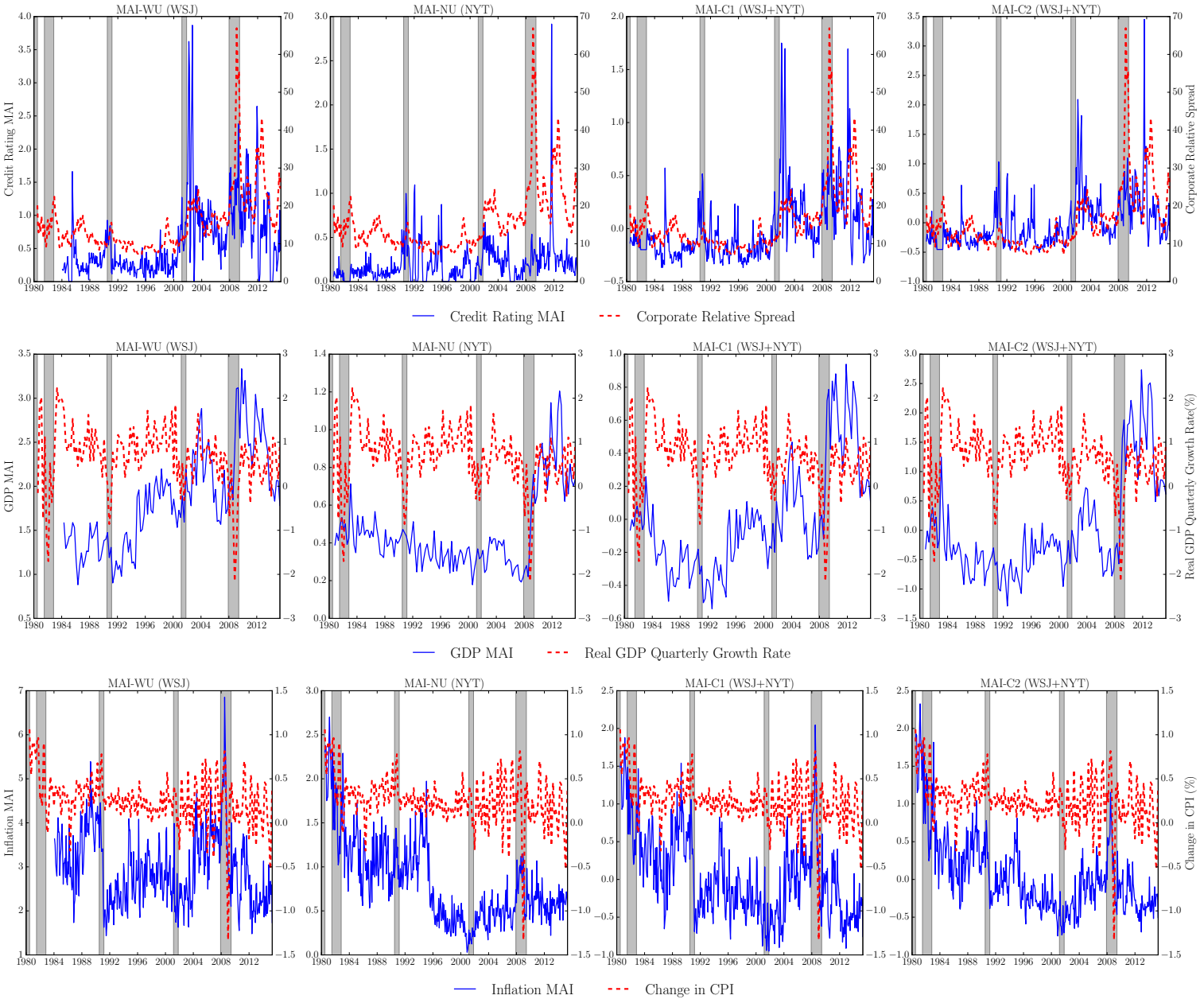


Figure A1: Continued

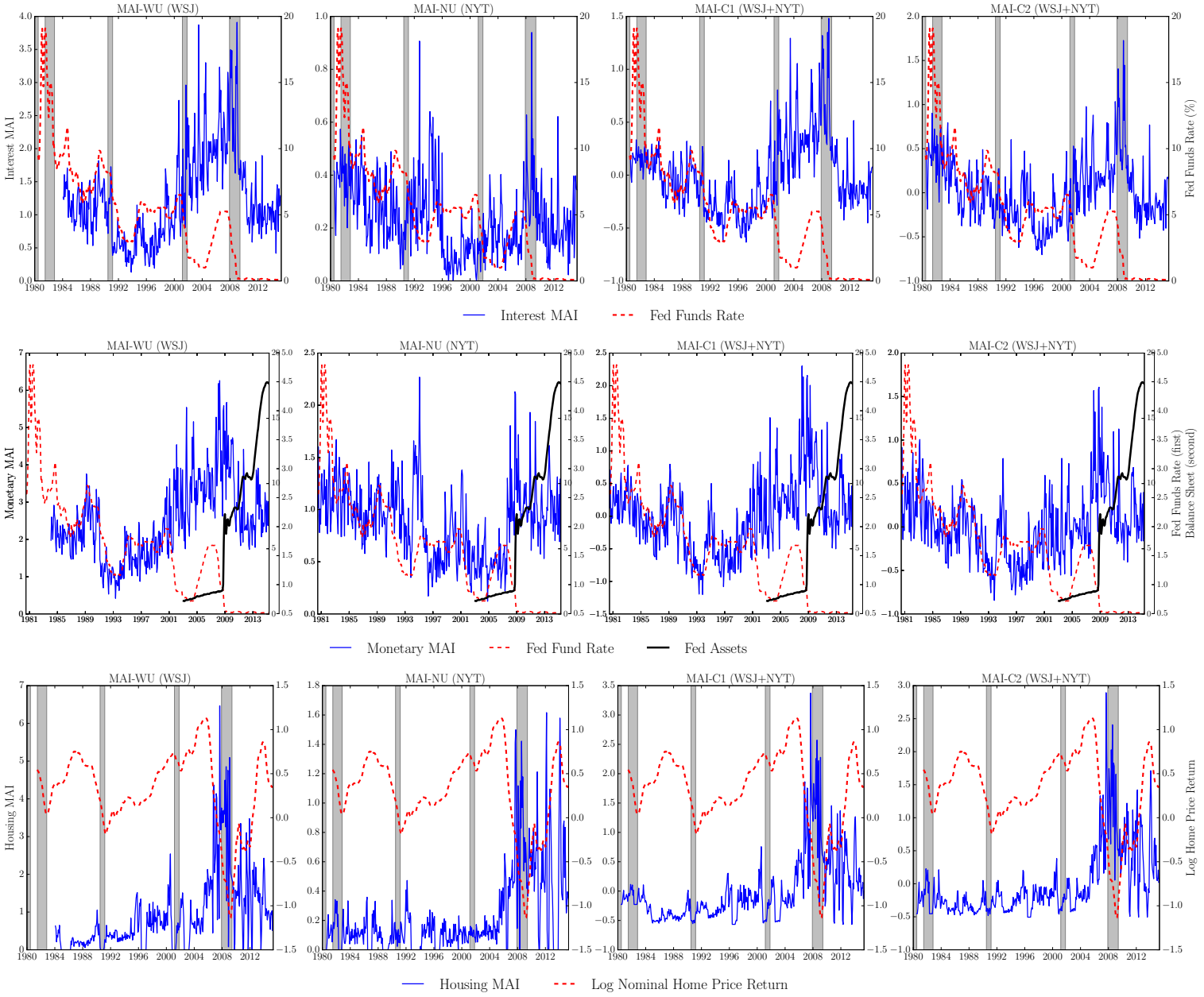
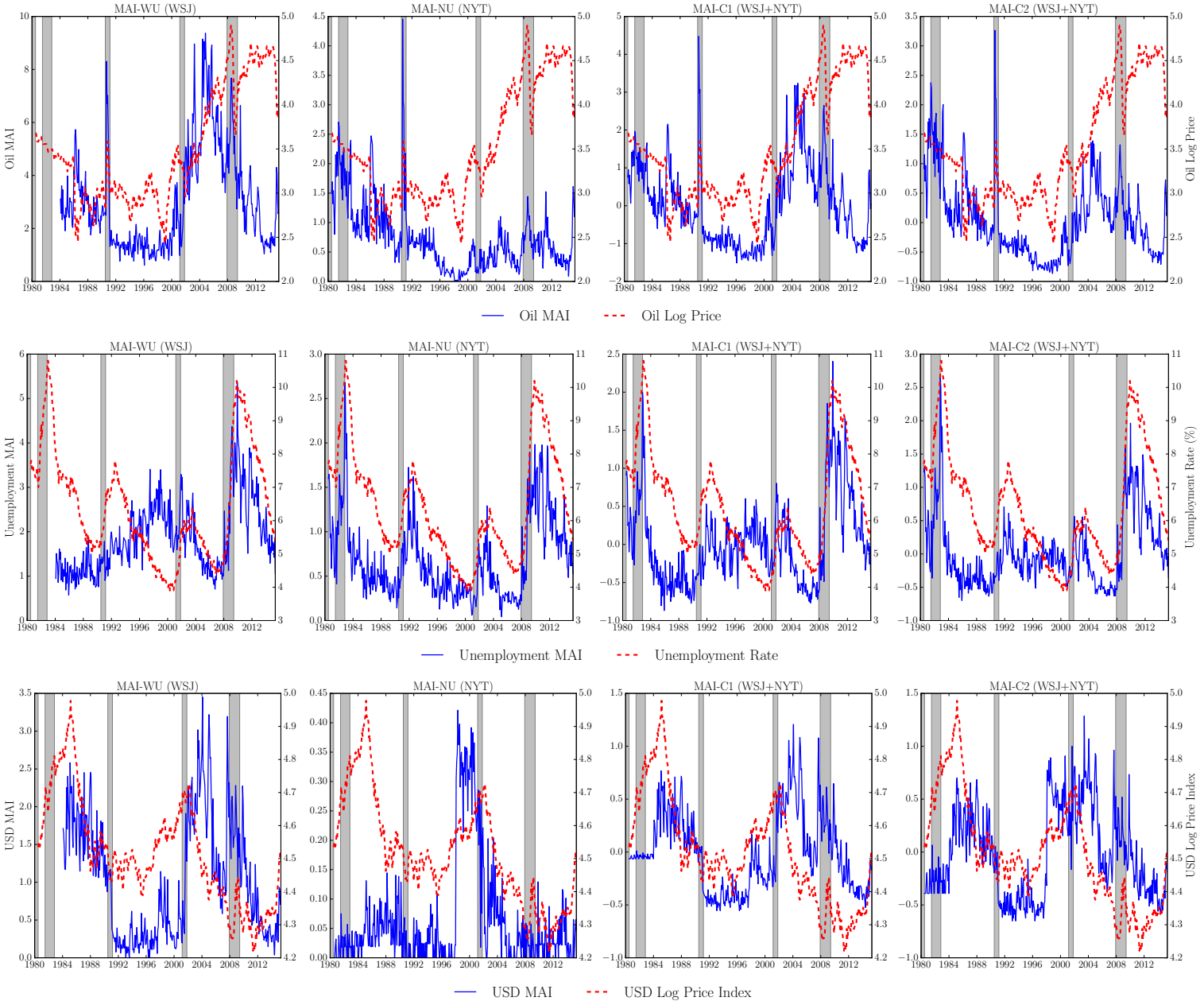


Figure A1: Continued



B Additional Results

Table B1: Descriptive Statistics and Correlation

This table presents the descriptive statistics for the monthly unadjusted media attention indices (MAI) for the Wall Street Journal (MAI-WU) and New York Times (MAI-NU), the Economic Policy Uncertainty (EPU) index, the implied volatility (VXO), and the three-month detrended log S&P 500 trade volume. Columns Jan to Dec are the monthly averages for each MAI. Panels B shows the correlation between the demeaned macroeconomic attention composite indices (MAI-C1), EPU, VXO, and the 60-day detrended S&P 500 trade volume at the monthly frequency.

Table B2: Panel A: Descriptive Statistics for Monthly Unadjusted MAI

	Obs.	Mean	St. Dev.	Min	Max	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wall Street Journal																	
Credit Rating	376	0.60	0.56	0.00	3.87	0.59	0.61	0.60	0.51	0.52	0.65	0.61	0.68	0.56	0.58	0.62	0.65
GDP	376	1.86	0.61	0.73	4.10	1.93	1.92	1.79	1.77	1.70	1.78	1.83	2.03	1.83	1.85	1.95	1.90
Housing	376	0.90	1.01	0.00	6.47	1.00	0.87	0.86	0.86	0.93	0.96	0.94	0.96	0.88	0.92	0.83	0.83
Inflation	376	2.96	0.82	1.43	6.85	3.15	3.08	2.93	2.81	3.00	3.05	2.79	3.00	2.98	2.81	2.87	3.01
Interest	376	1.24	0.69	0.13	3.91	1.34	1.12	1.25	1.13	1.18	1.31	1.20	1.39	1.22	1.24	1.26	1.31
Monetary	376	2.49	1.06	0.42	6.26	2.66	2.45	2.49	2.24	2.36	2.56	2.36	2.61	2.63	2.41	2.47	2.60
Oil	376	3.07	1.94	0.61	9.37	3.13	2.87	3.13	3.09	3.08	2.99	2.89	3.15	3.13	3.20	3.03	3.22
Unemp.	376	1.87	0.80	0.57	5.38	2.03	1.91	1.74	1.68	1.68	1.78	1.85	1.90	1.98	1.86	1.99	2.03
USD	376	1.04	0.79	0.00	3.45	1.21	0.99	1.01	0.99	0.97	0.89	1.08	1.05	1.08	1.07	1.12	1.05
New York Times																	
Credit Rating	419	0.20	0.23	0.00	2.91	0.23	0.19	0.17	0.17	0.17	0.18	0.20	0.21	0.19	0.21	0.23	0.22
GDP	419	0.46	0.23	0.11	1.55	0.51	0.45	0.42	0.46	0.40	0.43	0.45	0.43	0.46	0.46	0.48	0.50
Housing	419	0.23	0.28	0.00	1.62	0.28	0.27	0.21	0.18	0.18	0.17	0.23	0.28	0.25	0.26	0.20	0.22
Inflation	419	0.82	0.48	0.03	2.70	0.97	0.85	0.81	0.74	0.82	0.87	0.83	0.81	0.82	0.78	0.74	0.82
Interest	419	0.24	0.14	0.00	0.94	0.24	0.23	0.25	0.21	0.24	0.23	0.26	0.27	0.24	0.24	0.21	0.24
Monetary	419	0.89	0.36	0.12	2.27	1.02	0.96	0.91	0.77	0.81	0.88	0.90	0.94	0.94	0.85	0.82	0.89
Oil	419	0.74	0.58	0.00	4.46	0.82	0.75	0.78	0.72	0.68	0.71	0.72	0.78	0.73	0.75	0.63	0.77
Unemp.	419	0.68	0.45	0.04	2.68	0.81	0.71	0.61	0.55	0.61	0.61	0.70	0.66	0.72	0.76	0.76	0.71
USD	419	0.06	0.09	0.00	0.42	0.06	0.07	0.07	0.06	0.08	0.06	0.05	0.08	0.05	0.07	0.06	0.06
Other Variables																	
EPU	360	101.33	41.96	37.27	271.83	127.67	106.13	94.75	82.98	86.87	89.70	94.48	95.44	107.89	112.99	111.94	105.12
VXO	352	20.77	8.36	9.54	61.41	21.04	20.54	20.50	19.40	19.21	18.82	19.84	20.91	22.67	23.88	21.91	20.63
Volume	419	0.01	0.09	-0.35	0.31	0.12	-0.04	0.05	0.02	-0.03	0.02	0.05	-0.03	0.00	0.07	-0.08	-0.04

Table B2: Continued.

***Panel B: Monthly MAI-C1 correlation (1980-2015)**

	Credit Rating	GDP	Housing	Inflation	Interest	Monetary	Oil	Unemp.	USD	EPU	VXO	Volume
Credit Rating	1.00	0.48	0.30	-0.18	0.32	0.40	0.22	0.31	0.30	0.28	0.32	-0.01
GDP	0.48	1.00	0.36	-0.14	0.20	0.40	0.07	0.64	0.10	0.13	0.18	-0.08
Housing	0.30	0.36	1.00	0.03	0.45	0.48	0.16	0.20	0.06	-0.07	0.05	0.06
Inflation	-0.18	-0.14	0.03	1.00	0.35	0.36	0.43	-0.05	0.23	-0.01	0.03	0.06
Interest	0.32	0.20	0.45	0.35	1.00	0.77	0.59	0.04	0.56	0.04	0.23	0.03
Monetary	0.40	0.40	0.48	0.36	0.77	1.00	0.45	0.28	0.42	0.15	0.27	0.04
Oil	0.22	0.07	0.16	0.43	0.59	0.45	1.00	-0.11	0.59	0.07	0.08	0.05
Unemp.	0.31	0.64	0.20	-0.05	0.04	0.28	-0.11	1.00	-0.17	0.35	0.32	-0.05
USD	0.30	0.10	0.06	0.23	0.56	0.42	0.59	-0.17	1.00	0.07	0.33	0.03
EPU	0.28	0.13	-0.07	-0.01	0.04	0.15	0.07	0.35	0.07	1.00	0.44	0.05
VXO	0.32	0.18	0.05	0.03	0.23	0.27	0.08	0.32	0.33	0.44	1.00	0.06
Volume	-0.01	-0.08	0.06	0.06	0.03	0.04	0.05	-0.05	0.03	0.05	0.06	1.00

Table B3: Persistence of Macroeconomic Attention

Panel A of this table presents AR (p) models of the monthly demeaned and standardized media attention composite indices (MAI-C2), controlling for monthly time-fixed effects. DF (p-value) are the p-values for the Dickey-Fuller (DF) statistics that test the null of a unit root in each time series. Panel B reports the estimates from an OLS regression of the daily demeaned and standardized media attention composite indices (MAI-C2) on various moving average lags of itself. L1 corresponds to the lag of itself and L5, L21, L62, L250, and L1000 are the moving average for 5, 21, 62, 250, and 1000 days preceding the observed values at time t. We control for day-of-week fixed effects. The standard errors are reported in parenthesis and are calculated using Newey-West standard errors (10 lags). Obs. stands for the number of observations. *, **, and *** denote the statistical significance at the 10%, 5%, 1% levels, respectively.

***Panel A: Monthly MAI-C2 AR(4) Coefficients and DF statistics**

	Credit Rating	GDP	Housing	Inflation	Interest	Monetary	Oil	Unemp.	USD
const	0.02	0.05	-0.01	0.08**	0.03	0.03	0.11**	-0.01	-0.04
	(0.05)	(0.04)	(0.05)	(0.03)	(0.04)	(0.04)	(0.05)	(0.04)	(0.03)
AR(1)	0.66***	0.26***	0.60***	0.49***	0.53***	0.47***	0.66***	0.67***	0.54***
	(0.07)	(0.06)	(0.10)	(0.05)	(0.05)	(0.04)	(0.05)	(0.06)	(0.06)
AR(2)	0.01	0.28***	0.09	0.25***	0.15**	0.15***	0.18***	0.13**	0.19***
	(0.07)	(0.04)	(0.08)	(0.05)	(0.07)	(0.05)	(0.05)	(0.06)	(0.05)
AR(3)	0.05	0.31***	0.14	0.08	-0.03	0.08*	0.08	0.10*	0.13**
	(0.05)	(0.06)	(0.09)	(0.05)	(0.05)	(0.04)	(0.10)	(0.06)	(0.05)
AR(4)	0.09	0.06	0.03	0.09**	0.17***	0.06	-0.02	0.01	0.07
	(0.05)	(0.05)	(0.08)	(0.04)	(0.04)	(0.04)	(0.06)	(0.05)	(0.06)
DF (p-value)	0.00	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.09
Adj-R2	0.55	0.66	0.64	0.76	0.52	0.44	0.75	0.78	0.77
Obs.	415	415	415	415	415	415	415	415	415

***Panel B: Daily MAI-C2 Frequency Regressions**

	Credit Rating	GDP	Housing	Inflation	Interest	Monetary	Oil	Unemployment	U.S. Dollar
const	-0.15***	0.00	-0.21***	-0.02	-0.10***	-0.20***	-0.18***	-0.03	-0.22***
	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)
L1	0.08***	0.07***	0.04*	0.06***	0.13***	0.19***	0.11***	0.04**	0.01
	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.03)	(0.02)	(0.01)
L5	0.28***	0.12***	0.46***	0.13***	0.15***	0.18***	0.39***	0.22***	0.16***
	(0.06)	(0.03)	(0.07)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)
L21	0.40***	0.06	0.23***	0.26***	0.27***	0.23***	0.30***	0.25***	0.39***
	(0.09)	(0.07)	(0.08)	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)	(0.06)
L62	0.06	0.34***	0.06	0.36***	0.15*	0.13*	0.13**	0.26***	0.29***
	(0.06)	(0.10)	(0.07)	(0.07)	(0.08)	(0.07)	(0.05)	(0.08)	(0.07)
L250	0.08	0.41***	0.17**	0.08	0.25***	0.20***	0.01	0.23***	0.14**
	(0.06)	(0.11)	(0.08)	(0.06)	(0.07)	(0.07)	(0.03)	(0.06)	(0.05)
L1000	0.02	-0.05	0.01	0.05	-0.01	0.00	0.03	-0.08***	-0.03
	(0.05)	(0.06)	(0.06)	(0.04)	(0.04)	(0.05)	(0.02)	(0.03)	(0.03)
Obs.	8109	8109	8109	8109	8109	8109	8109	8109	8109
Adj-R2	0.28	0.18	0.42	0.20	0.18	0.25	0.52	0.36	0.34

Table B4: Media Attention and Macroeconomic Fundamentals

This table presents the results of an OLS regression of monthly macroeconomic media attention indices (MAI) on different macroeconomic fundamentals. Panels A and Panel B report the results for the demeaned composite index (MAI-C1) and the demeaned and standardized composite index (MAI-C2), respectively. The general regression is specified in equation 6. F corresponds to the associated fundamental to each MAI as described in Table 2 and F_t is the moving average over t days of the respective fundamental. We control for monthly fixed effects. The standard errors are reported in parenthesis and are calculated using Newey-West standard errors (5 lags). Obs. stands for the number of observations. *, **, *** denote the statistic significance at the 10%, 5%, 1% levels, respectively.

*Panel A: MAI-C1 (Demeaned)

MAI:	Credit Rating	GDP	Housing	Inflation	Interest	Monetary	Oil	Unemployment	US Dollar
F:	Credit Rating Spreads	GDP Growth	Home Price Ret	Δ CPI	Fed Fund	Fed Fund	Oil Price Ret	Unemp. Rate	USD Index Ret
$F_t - F_{t,t-3}$	0.034**		-0.250	-0.234**	-0.042	-0.031	-0.009	-0.013	0.004
	(0.015)		(0.176)	(0.104)	(0.040)	(0.057)	(0.006)	(0.175)	(0.006)
$F_{t,t-3} - F_{t,t-12}$	0.011	0.117	-0.462***	-0.085	-0.005	-0.015	0.010	0.164	-0.007
	(0.007)	(0.072)	(0.160)	(0.234)	(0.033)	(0.049)	(0.013)	(0.125)	(0.019)
$F_{t,t-12} - F_{t,t-48}$	0.003	0.224	-0.097	2.268***	0.010	-0.000	0.108**	0.171***	-0.186***
	(0.015)	(0.184)	(0.180)	(0.648)	(0.028)	(0.041)	(0.054)	(0.062)	(0.063)
$(F_t - F_{t,t-3})^2$	-0.001		0.517*	-0.407*	0.007	0.018	0.004***	1.022	0.007**
	(0.002)		(0.269)	(0.218)	(0.023)	(0.025)	(0.001)	(0.782)	(0.004)
$(F_{t,t-3} - F_{t,t-12})^2$	0.000	0.185**	0.451***	0.288	0.015	0.040**	0.005***	0.232**	0.023**
	(0.000)	(0.084)	(0.141)	(0.234)	(0.015)	(0.020)	(0.001)	(0.104)	(0.010)
$(F_{t,t-12} - F_{t,t-48})^2$	0.001	0.295	1.418***	9.858***	0.007	0.001	-0.005	0.075***	0.141**
	(0.001)	(0.296)	(0.329)	(1.605)	(0.007)	(0.013)	(0.011)	(0.026)	(0.067)
const	-0.031	-0.076	-0.472***	-0.062	-0.006	0.010	-0.300	-0.061	-0.099
	(0.041)	(0.076)	(0.054)	(0.077)	(0.068)	(0.093)	(0.183)	(0.078)	(0.070)
Obs.	419	125	419	419	419	419	376	419	419
Adj-R2	0.10	0.08	0.49	0.19	0.01	0.01	0.15	0.50	0.14

*Panel B: MAI-C2 (Demeaned and Standardized)

MAI:	Credit Rating	GDP	Housing	Inflation	Interest	Monetary	Oil	Unemployment	US Dollar
F:	Credit Rating Spreads	GDP Growth	Home Price Ret	Δ CPI	Fed Fund	Fed Fund	Oil Price Ret	Unemp. Rate	USD Index Ret
$F_t - F_{t,t-3}$	0.049**		-0.312*	-0.216**	-0.054	-0.016	-0.005	-0.024	0.004
	(0.023)		(0.177)	(0.086)	(0.049)	(0.044)	(0.004)	(0.171)	(0.006)
$F_{t,t-3} - F_{t,t-12}$	0.010	0.300*	-0.501***	-0.378*	-0.001	-0.017	0.006	0.184	-0.007
	(0.009)	(0.171)	(0.164)	(0.203)	(0.032)	(0.032)	(0.008)	(0.113)	(0.018)
$F_{t,t-12} - F_{t,t-48}$	-0.006	0.636	-0.045	1.729**	-0.008	-0.017	0.060**	0.166***	-0.225***
	(0.023)	(0.463)	(0.180)	(0.704)	(0.024)	(0.025)	(0.027)	(0.053)	(0.069)
$(F_t - F_{t,t-3})^2$	-0.001		0.697***	-0.456**	0.053**	0.039**	0.003***	0.949	0.007*
	(0.003)		(0.225)	(0.189)	(0.022)	(0.015)	(0.000)	(0.801)	(0.004)
$(F_{t,t-3} - F_{t,t-12})^2$	0.000	0.414**	0.450***	-0.028	0.032*	0.050***	0.003***	0.236**	0.009
	(0.001)	(0.191)	(0.135)	(0.183)	(0.017)	(0.016)	(0.001)	(0.119)	(0.012)
$(F_{t,t-12} - F_{t,t-48})^2$	0.002	0.819	1.172***	9.650***	0.015**	-0.000	-0.005	0.070***	0.081
	(0.001)	(0.751)	(0.344)	(1.955)	(0.006)	(0.008)	(0.006)	(0.026)	(0.074)
const	-0.045	-0.194	-0.451***	-0.109	-0.064	-0.027	-0.219***	-0.067	-0.091
	(0.059)	(0.205)	(0.056)	(0.072)	(0.064)	(0.068)	(0.084)	(0.070)	(0.080)
Obs.	419	125	419	419	419	419	376	419	419
Adj-R2	0.08	0.08	0.47	0.22	0.12	0.07	0.25	0.54	0.09

Table B5: Media Attention and Aggregate Trade Volume

This table presents the results of an OLS regression of the daily detrended S&P 500 trade volume on the difference between the 5-day and 20-day moving average MAI-C2 and a dummy (Ann) equal to one if there is a related announcement specified in Table 2, zero otherwise. We detrend the log trade volume using the moving average of the log trade volume of the past 60 trading days. For all model specifications, we control for day-of-week fixed effects. The standard errors are reported in parenthesis and are calculated using Newey-West standard errors (250 lags). Obs. stands for the number of observations. *, **, *** denote the statistical significance at the 10%, 5%, 1% levels, respectively.

MAI:	Inflation			Monetary			Interest		
Ann:	CPI			FOMC			FOMC		
MAI_{5-20}	0.059***	0.058***	0.063***	0.086***	0.085***	0.086***	0.049***	0.048***	0.049***
	(0.013)	(0.013)	(0.014)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Ann		0.035***	0.042***		0.027***	0.027***		0.030***	0.031***
		(0.007)	(0.007)		(0.009)	(0.010)		(0.009)	(0.009)
MAI_{5-20}×Ann			-0.114***			-0.011			-0.033
			(0.032)			(0.038)			(0.032)
const	0.003	0.000	0.001	0.002	0.002	0.002	0.003	0.002	0.002
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Obs.	8787	8787	8787	8787	8787	8787	8787	8787	8787
Adj-R2	0.06	0.06	0.06	0.07	0.07	0.07	0.05	0.05	0.05

MAI:	GDP			Unemployment			Credit Rating	Oil	USD
Ann:	GDP Report			Employment					
MAI_{5-20}	0.019*	0.019*	0.017	0.034***	0.033***	0.034***	0.043***	0.043**	0.027*
	(0.011)	(0.011)	(0.011)	(0.012)	(0.012)	(0.012)	(0.013)	(0.017)	(0.014)
Ann		0.005	0.003		0.014	0.017			
		(0.008)	(0.008)		(0.011)	(0.012)			
MAI_{5-20}×Ann			0.058			-0.031			
			(0.041)			(0.039)			
const	0.002	0.002	0.002	0.003	-0.001	-0.000	0.002	0.013**	0.028***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.006)	(0.007)	(0.006)
Obs.	8787	8787	8787	8787	8787	8787	8787	7368	8321
Adj-R2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06

Table B6: Media Attention and Implied Volatility

This table presents the results of an OLS regression of the daily implied volatility proxied by VXO regressed on the difference between the 20-day and 250-day moving average MAI-C2 and a dummy (Ann) equal to one if there is a related announcement specified in Table 2, zero otherwise. For all model specifications, we control for day-of-week fixed effects. The standard errors are reported in parenthesis and are calculated using Newey-West standard errors (250 lags). Obs. stands for the number of observations. *, **, *** denote the statistical significance at the 10%, 5%, 1% levels, respectively.

MAI:	Inflation			Monetary			Interest		
Ann:	CPI			FOMC			FOMC		
MAI_{20-250}	-2.427	-2.425	-2.466	5.647**	5.646**	5.668**	5.671**	5.670**	5.698**
	(4.705)	(4.706)	(4.667)	(2.415)	(2.415)	(2.416)	(2.558)	(2.558)	(2.562)
Ann		0.265	0.277		-0.178	-0.187		-0.196	-0.204
		(0.185)	(0.189)		(0.221)	(0.224)		(0.222)	(0.229)
$MAI_{20-250}\times$Ann			0.881			-0.750			-0.846
			(1.157)			(0.732)			(1.053)
const	20.728***	20.711***	20.711***	20.719***	20.720***	20.720***	20.724***	20.724***	20.724***
	(1.240)	(1.236)	(1.236)	(1.245)	(1.245)	(1.245)	(1.253)	(1.253)	(1.253)
Obs.	7386	7386	7386	7386	7386	7386	7386	7386	7386
Adj-R2	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.03	0.03

MAI:	GDP			Unemployment			Credit Rating	Oil	USD
Ann:	GDP Report			Employment					
MAI_{20-250}	12.939***	12.946***	12.995***	14.035***	14.037***	14.075***	5.462***	1.148	4.202**
	(5.008)	(5.009)	(4.994)	(4.866)	(4.866)	(4.879)	(1.719)	(1.781)	(1.921)
Ann		0.297	0.284		0.222	0.221			
		(0.199)	(0.202)		(0.155)	(0.159)			
$MAI_{20-250}\times$Ann			-0.973			-0.781			
			(1.097)			(0.996)			
const	20.632***	20.609***	20.609***	20.633***	20.583***	20.582***	20.766***	20.763***	20.777***
	(1.124)	(1.120)	(1.120)	(1.066)	(1.067)	(1.066)	(1.216)	(1.252)	(1.250)
Obs.	7386	7386	7386	7386	7386	7386	7361	7361	7005
Adj-R2	0.08	0.08	0.08	0.15	0.15	0.15	0.05	0.00	0.01

Table B7: Unemployment Surprise Forecasts

This table presents the results of an OLS regression of the unemployment surprise regressed on various detrended daily media attention indices at different frequencies and an interaction term between the detrended media attention indices and an NBER dummy. The NBER dummy is equal to one if the unemployment surprise occurs during a NBER recession, zero otherwise. Panel A shows the result for MAI-WU, MAI-NU in Panel B, and MAI-C2 in Panel C. We use three different unemployment surprises. Each surprise is calculated as the difference between the actual unemployment for month t reported in month $t+1$ and (1) the random-walk (i.e. the previous month unemployment rate), (2) the forecasted unemployment rate as in Boyd, Hu, and Jagannathan (2005), or (3) the median of the forecasted unemployment rate by economists surveyed by Bloomberg. The standard errors are reported in parenthesis and are calculated using the White's heteroskedasticity robust standard errors. Obs. stands for the number of observations. *, **, *** denote the statistical significance at the 10%, 5%, 1% levels, respectively.

***Panel A: MAI-WU (Wall Street Journal)**

Random-Walk

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	0.030*	0.015	0.035***	0.013	0.054**	0.006	0.096**	0.002
	(0.016)	(0.016)	(0.013)	(0.012)	(0.026)	(0.025)	(0.037)	(0.037)
MAI×NBER		0.200***		0.128***		0.174***		0.319***
		(0.066)		(0.029)		(0.053)		(0.051)
const	-0.013	-0.013	-0.011	-0.014	-0.004	-0.011	-0.003	-0.014
	(0.010)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Obs.	375	375	364	364	364	364	364	364
Adj-R2	0.01	0.04	0.02	0.07	0.02	0.05	0.03	0.09

Boyd et al. (2005) Surprise

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	0.019	0.014	0.024**	0.016	0.044**	0.025	0.068***	0.034
	(0.013)	(0.013)	(0.011)	(0.011)	(0.018)	(0.020)	(0.025)	(0.027)
MAI×NBER		0.057		0.047*		0.068*		0.117***
		(0.057)		(0.028)		(0.039)		(0.045)
const	-0.020***	-0.020***	-0.019**	-0.020***	-0.014*	-0.017**	-0.014*	-0.018**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)
Obs.	375	375	364	364	364	364	364	364
Adj-R2	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.03

Table B7: continued

*Panel A: Continued.

Bloomberg Surprise

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	0.033**	0.021	0.019*	0.009	0.005	-0.014	0.013	-0.028
	(0.015)	(0.015)	(0.011)	(0.012)	(0.020)	(0.025)	(0.029)	(0.037)
MAI×NBER		0.138***		0.049**		0.059		0.118**
		(0.046)		(0.022)		(0.040)		(0.051)
const	-0.039***	-0.039***	-0.035***	-0.037***	-0.031***	-0.035***	-0.031***	-0.037***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)	(0.010)	(0.011)
Obs.	217	217	217	217	217	217	217	217
Adj-R2	0.02	0.05	0.01	0.02	-0.00	-0.00	-0.00	0.01

Table B7: continued

*Panel B: MAI-NU (New York Times MAI)

Random-Walk

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	0.000	0.001	0.079***	0.051**	0.186***	0.131***	0.294***	0.178***
	(0.037)	(0.036)	(0.026)	(0.026)	(0.039)	(0.040)	(0.057)	(0.062)
MAI×NBER		-0.005		0.210**		0.224**		0.503***
		(0.181)		(0.104)		(0.112)		(0.141)
const	-0.006	-0.006	-0.008	-0.013	-0.002	-0.009	-0.003	-0.013
	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Obs.	418	418	407	407	407	407	407	407
Adj-R2	-0.00	-0.00	0.03	0.05	0.06	0.08	0.08	0.12

Boyd et al. (2005) Surprise

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	-0.001	-0.002	0.041*	0.034	0.095***	0.090**	0.164***	0.125**
	(0.032)	(0.034)	(0.021)	(0.023)	(0.031)	(0.035)	(0.048)	(0.058)
MAI×NBER		0.005		0.052		0.021		0.170*
		(0.111)		(0.057)		(0.077)		(0.101)
const	-0.015**	-0.015**	-0.017**	-0.018**	-0.014*	-0.015*	-0.014*	-0.018**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)
Obs.	418	418	407	407	407	407	407	407
Adj-R2	-0.00	-0.00	0.01	0.01	0.02	0.02	0.04	0.04

Bloomberg Surprise

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	-0.001	0.010	0.019	0.014	0.048	0.025	0.015	-0.069
	(0.038)	(0.040)	(0.029)	(0.032)	(0.045)	(0.058)	(0.065)	(0.080)
MAI×NBER		-0.150		0.032		0.069		0.270**
		(0.118)		(0.070)		(0.091)		(0.130)
const	-0.031***	-0.031***	-0.032***	-0.033***	-0.031***	-0.033***	-0.031***	-0.037***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)
Obs.	217	217	217	217	217	217	217	217
Adj-R2	-0.00	-0.00	-0.00	-0.01	0.00	-0.00	-0.00	0.01

Table B7: continued

*Panel C: MAI-C2 (Demeaned and Standardized MAI)

Random-Walk

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	0.036	0.017	0.083***	0.051**	0.158***	0.110***	0.234***	0.136***
	(0.032)	(0.031)	(0.021)	(0.021)	(0.034)	(0.034)	(0.046)	(0.051)
MAI×NBER		0.228		0.211***		0.180*		0.382***
		(0.170)		(0.066)		(0.093)		(0.103)
const	-0.009	-0.008	-0.011	-0.017*	-0.002	-0.009	-0.002	-0.012
	(0.010)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Obs.	418	418	407	407	407	407	407	407
Adj-R2	0.00	0.01	0.04	0.08	0.07	0.08	0.09	0.12

Boyd et al. (2005) Surprise

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	0.021	0.013	0.049***	0.038**	0.092***	0.084***	0.135***	0.099**
	(0.028)	(0.029)	(0.018)	(0.019)	(0.025)	(0.030)	(0.038)	(0.048)
MAI×NBER		0.096		0.070		0.031		0.142**
		(0.104)		(0.048)		(0.057)		(0.071)
const	-0.017**	-0.017**	-0.019**	-0.021***	-0.013*	-0.015*	-0.013*	-0.017**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)
Obs.	418	418	407	407	407	407	407	407
Adj-R2	-0.00	-0.00	0.02	0.03	0.03	0.03	0.04	0.05

Bloomberg Surprise

MAI:	MAI_{5-20}		MAI_{5-250}		MAI_{20-250}		MAI_{60-250}	
MAI	0.049	0.036	0.031	0.017	0.027	-0.002	0.018	-0.058
	(0.033)	(0.034)	(0.022)	(0.025)	(0.035)	(0.047)	(0.050)	(0.065)
MAI×NBER		0.335**		0.072		0.079		0.212**
		(0.168)		(0.047)		(0.072)		(0.093)
const	-0.036***	-0.038***	-0.034***	-0.036***	-0.031***	-0.034***	-0.031***	-0.038***
	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.011)	(0.010)	(0.011)
Obs.	217	217	217	217	217	217	217	217
Adj-R2	0.01	0.02	0.01	0.01	-0.00	-0.00	-0.00	0.01

Table B8: S&P Return Forecast on Employment Situation Announcement Days

This table presents the results of an OLS regression of the daily S&P 500 log return on the employment situation announcement date regressed on the unemployment surprise as in Boyd, Hu, and Jagannathan (2005), the surprise interacted with an NBER dummy, the daily detrended unemployment media attention index composite index MAI-C2, and the detrended unemployment media attention index interacted with an NBER dummy. The NBER dummy is equal to one if the unemployment surprise occurs during a NBER recession, zero otherwise. We show the results for two different detrended frequencies for the unemployment media attention index. The standard errors are reported in parenthesis and are calculated using the White's heteroskedasticity robust standard errors. Obs. stands for the number of observations. *, **, *** denote the statistical significance at the 10%, 5%, 1% levels, respectively.

MAI:		MAI_{5-20}			MAI_{20-250}		
MAI		0.395**	0.372**	0.350**	0.282	-0.053	-0.105
		(0.172)	(0.174)	(0.175)	(0.194)	(0.193)	(0.192)
MAI·NBER			0.288	0.443		1.256**	1.502***
			(0.756)	(0.724)		(0.488)	(0.483)
$Surp_{Boyd}$	0.615*			0.585*			0.724**
	(0.354)			(0.351)			(0.368)
$Surp_{Boyd}$×NBER	-1.938*			-2.174*			-3.070**
	(1.133)			(1.273)			(1.283)
const	0.047	-0.009	-0.009	0.017	0.031	-0.017	0.007
	(0.057)	(0.061)	(0.061)	(0.062)	(0.058)	(0.059)	(0.059)
Obs.	423	418	418	418	407	407	407
Adj-R2	0.01	0.01	0.01	0.01	0.00	0.02	0.04