Media Coverage and Option Returns*

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ABSTRACT

This paper examines the predictive power of abnormal media coverage for the cross-section of equity option returns. We find that options with large increases in media coverage over the past month underperform those with large decreases by 0.77% per month for calls and 0.71% for puts. This predictive power persists after controlling for existing option return predictors and attention proxies. Moreover, the return predictability is independent of the content of news stories and remains after removing news related to earnings announcements. Further evidence demonstrates that abnormal media coverage is positively associated with option trading propensity and order imbalance from retail investors, but negatively associated with those from professional investors. Our findings suggest that the return predictability of abnormal media coverage is consistent with the demand-based option pricing theory.

Keywords: abnormal media coverage, return predictability, delta-hedged options

JEL classification: G12, G13, G14, G17

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1 Introduction

The U.S. equity options market has experienced substantial growth over the past five years, playing an increasingly important role for investors. The total number of option contracts traded increased from 4.2 billion in 2013 to 10.3 billion in 2022.[1] While option markets were previously thought to be the domain of sophisticated investors, the COVID-19 lockdown led to a surge in retail investor participation, significantly increasing the popularity of trading equity options. Compared with stocks, options are more popular among retail investors, with 38% of retail investors in the sample studied by Bogousslavsky and Muravyev (2024) trading only options. The equity options market offers retail investors access to high-priced stocks and leverage opportunities (Bogousslavsky and Muravyev (2024)), and retail investors are thought to contribute significantly to the substantial increase in option trading volume since 2020. According to the NYSE, options volume from retail investors rose from about 36% of total trading volume in late 2019 to about 45% in July 2022.[2]

The news media plays an important role in the financial market as a crucial source of information for investors. Its impact has been documented in various areas, such as stock returns, investor trading behaviors, corporate debt, and IPOs. Unlike institutional investors, who rely on sophisticated information sources such as Reuters or Bloomberg terminals (Da, Engelberg, and Gao (2011)), retail investors often obtain stock information from online news stories. Intuitively, when a stock suddenly receives extensive media coverage, retail investors may be motivated to place bets on that stock in the equity options market, thus affecting the pricing of these options and their subsequent returns. Although the impact of media coverage is well documented in the stock markets, little attention has been paid to the equity options market. Our paper aims to fill this gap by investigating the relationship between media coverage and the returns and trading behaviors of individual equity options.

To examine the effect of media coverage on option returns, we first construct a measure for change in media coverage, termed abnormal media coverage (AMC). Specifically, we collect media coverage data from RavenPack News Analytics. For each firm, we quantify the media coverage (MC) by counting the number of news stories that cover it in a given month. To remove the influence of other firm characteristics that may correlate with media coverage, we scale the current month's media coverage by the average media coverage of the past three months. We use this ratio as the measure of abnormal media coverage. Merging these data with option data results in a large sample of 271,131 observations spanning from April 2000

[1] https://www.bloomberg.com/news/articles/2022-12-30/us-stock-options-smash-record-surpassing-10-billion-contracts?embedded-checkout=true

[2] https://www.nyse.com/data-insights/trends-in-options-trading

to November 2022. The news in our sample covers a wide range of topics, including earnings, product services, order imbalances, insider trading, labor issues, and more, with over 54.8% of the news being full articles.

We first examine the effect of abnormal media coverage on option returns using the portfolio sorting approach. Our main variable of interest is the return of delta-hedged option portfolios, which involves purchasing one option contract hedged by a short position in delta shares of the underlying stock. We find a monotonically decreasing pattern of option returns from groups with low AMC to groups with high AMC. For call options, the return spreads are -0.77%, -0.74%, and -0.37% under the equal weighting, open interest weighting, and stock value weighting scheme, respectively. For put options, the corresponding return spreads are -0.71%, -1.07%, and -0.37%, respectively. Following Boulatov, Eisdorfer, Goyal, and Zhdanov (2022), we also adjust the delta-hedged option returns using a 7-factor model, which includes the five stock factors in Fama and French (2015), the momentum factor, and the option factor in Coval and Shumway (2001). The differences in alphas between high and low AMC groups are also close to raw return spreads, suggesting that return spreads generated by AMC are not explained by common risk factors.

The literature has documented various option return predictors, including both stock and option characteristics. To show that our results are not explained by firm characteristics, we further conduct dependent sorts. At the end of each month, we sort all options into tertiles based on a control variable. Within each tertile, we further sort the options into five portfolios based on AMC. We then calculate the average returns for each AMC quintile across the control variable groups, resulting in five control-variable adjusted quintile returns. The adjusted return spreads range from -0.65% to -0.83% for call options, and -0.63% to -0.74% for put options, and are statistically significant. Therefore, the return spreads generated by AMC are not captured by existing option return predictors.

To better examine the effect of AMC on option returns while controlling for firm and option characteristics, we perform Fama and MacBeth (1973) regressions. We first run univariate regressions of delta-hedged option returns on AMC and the coefficient on AMC is negative and statistically significant. Subsequently, we include control variables in the regression. These control variables encompass firm characteristics such as firm size and book-to-market ratio, established option return predictors like idiosyncratic volatility, the difference between implied and realized volatility, illiquidity, and raw measures of media coverage. Our findings indicate that while the coefficient on AMC becomes slightly smaller, it remains significant in both economic and statistical terms.

After documenting the predictive power of AMC on option returns, we investigate the relationship between option trading activities and AMC. At the monthly level, we document that AMC is positively associated with option trading propensity and option order imbalance from retail investors, but is negatively related to order imbalance from professional investors. Our finding suggests that retail investors suffer from the limited attention bias. However, professional investors do not suffer from this, instead, they trade as the counterparties of retail investors.

Furthermore, we show that the 'attention-grabbing' effect induced by abnormal media coverage does not last long. It peaks during the current week, significantly attenuated in the following week, and finally reverses in the longer period. This pattern is consistent for all the trading metrics we consider. Specifically, we find that professional investors always trade in the opposite direction with retail investors. The relationship between AMC and option trading activities is consistent with the demand-based option pricing theory: retail investors are attracted by stocks heavily covered by news media, purchase options written on these stocks, exert demand pressure to these options, push their prices higher temporally, thus leading to lower returns in the future when the pattern reverses.

Our results suggest a negative association between abnormal media coverage (AMC) and future option returns. To determine whether the quantity or content of news is more influential in predicting option returns, we decompose the news into positive and negative categories based on sentiment, resulting in two AMC measures: AMC_Positive and AMC_Negative. At the end of each month, we sort the options for each stock into quintile portfolios based on AMC_Positive and AMC_Negative, respectively. Both AMC_Positive and AMC_Negative negatively predict option returns. Therefore, the effect of abnormal media coverage on option returns is consistent across different types of news content.

Since earnings news constitutes the largest proportion of news coverage and earnings announcement risk is priced in the option market (Dubinsky, Johannes, Kaeck, and Seeger (2019)), we investigate whether our results are primarily driven by earnings-related news. We remove observations with earnings announcements and exclude headlines related to earnings. After controlling for the effect of earnings news, the return spreads sorted by abnormal media coverage remain significant, ranging from -0.44% to -0.55%. Therefore, the effect of abnormal media coverage on option returns is not solely driven by earnings-related news; instead, news on different topics also affects option returns.

Our paper is closely related to Choy and Wei (2022), who find that investor attention negatively predicts future option returns. Since the AMC measure captures abnormal news coverage, it is likely to be highly correlated with investor attention. For example, the daily winners and losers in Choy and Wei (2022) are also covered by major news outlets such as the

Wall Street Journal and the New York Times. Therefore, we investigate whether the return predictability of AMC can be explained by other investor attention proxies documented in previous literature. Specifically, we use the Fama-Macbeth regression to control for other attention proxies, including the two dummy variables for daily winners and daily losers in Choy and Wei (2022) and other attention proxies like abnormal stock trading volume, abnormal stock return, and so on. The results show that after controlling for established attention proxies, the return predictive power of AMC is still robust.

Finally, we conduct several robustness tests. Our baseline analysis focuses on at-the-money options, which are the most actively traded. To ensure the robustness of our findings, we also construct delta-hedged positions using in-the-money and out-of-the-money options. We find that the negative association between abnormal media coverage and delta-hedged option returns persists across options with different moneyness. Additionally, we construct daily-rebalanced delta-hedged positions, raw option positions, and straddle positions. The results remain robust across these different definitions of option returns.

Our paper contributes to three strands of literature. First, it adds to the rapidly growing literature on option return predictions. Goyal and Saretto (2009) demonstrate that the difference between implied and historical volatility significantly predicts future straddle returns. Cao and Han (2013) document that idiosyncratic volatility is a strong predictor of future delta-hedged option returns. Byun and Kim (2016) highlight that lottery-like options are overvalued due to investors' gambling preference. Ramachandran and Tayal (2021) examine the impact of short-sale constraints on put option of overpriced stocks. Zhan, Han, Cao, and Tong (2022) uncover the return predictability of delta-hedged option returns using several stock characteristics. Bali, Beckmeyer, Mörke, and Weigert (2023) employ machine learning methodologies to enhance the predictability of option returns. Closely related to our study, Choy and Wei (2022) show that investor attention, measured by daily winners and losers over the past month, significantly predicts future option returns. Building on this literature, our paper documents a novel option return predictor: abnormal media coverage. We demonstrate that its predictive power is strong and robust, and its predictability cannot be subsumed by many existing option return determinants.

Second, our paper relates to the literature examining the impact of media coverage. The seminal work by Fang and Peress (2009) finds that stocks with no media coverage earn higher returns than those with high media coverage. Engelberg and Parsons (2011) disentangle the effect of media coverage from the events reported and shows that media coverage itself significantly impacts investors' trading behaviors. Fang, Peress, and Zheng (2014) further finds that media coverage affects the trading behaviors and performance of fund managers, who are typically considered sophisticated investors and less prone to behavioral biases.

Furthermore, Solomon, Soltes, and Sosyura (2014) study how media coverage influences investors' capital allocation to mutual funds. From an IPO perspective, Liu, Sherman, and Zhang (2014) and Chen, Goyal, Veeraraghavan, and Zolotoy (2019) investigate the impact of media coverage in the U.S. and global markets, respectively. Gao, Wang, Wang, Wu, and Dong (2019) document that media coverage negatively affects firms' cost of debt, independent of several economic channels. To the best of our knowledge, our paper is the first to study the impact of media coverage in the equity options market. We show that abnormal media coverage is negatively associated with future option returns. Regarding investor trading behavior, we find that abnormal media coverage is positively associated with overall option turnover and order imbalance. Differentiating by clientele, we find that the positive relationship between abnormal media coverage and option order imbalance is driven by retail investors. In contrast, professional investors, being more sophisticated and less influenced by behavioral biases, often act as the counterparty to retail investors.

Finally, our paper is closely related to the literature on the trading behaviors of retail investors in the equity options market. While the study of retail investor trading activities in the stock market is extensive, research on their behavior in the equity options market is nascent and somewhat controversial. Bauer, Cosemans, and Eichholtz (2009) argue that retail investors primarily trade options for gambling and entertainment purposes, while Bogousslavsky and Muravyev (2024) suggest that retail investors trade options to participate in high-priced stocks and benefit from embedded leverage. de Silva, Smith, and So (2023) documents that retail investors trade options around firms' earnings announcements, which often leads to significant losses. Using transaction-level data, Bryzgalova, Pavlova, and Sikorskaya (2023) propose a novel measure for retail options trading and also find that retail investors typically lose money. In contrast, Bogousslavsky and Muravyev (2024) use data from a trading journal provider and argue that retail option trades incur relatively small losses overall. Our paper documents that retail investors are particularly attracted to stocks with heavy media coverage, especially when there is a sudden increase in coverage. These investors tend to bet on such stocks by purchasing options. However, this attention-grabbing effect is transient: it peaks in the contemporaneous week, diminishes in the following week, and eventually reverses over a longer period.

The remainder of the paper is organized as follows. Section 2 provides sample descriptions and variable constructions. Section 3 provides main empirical evidence. Section 4 discusses our findings and performs several robustness tests. Section 5 concludes the paper.

2 Data and Sample

2.1 Delta-hedged Option Return

For equity option data, we obtain information on best bid, best offer, expiration date, and strike price from the OptionMetrics database. We also collect variables on underlying stocks, such as stock return, stock price, trading volume, and shares outstanding, from the CRSP database.[3] Our sample period spans from April 2000 to November 2022. To construct the option sample for our analysis, in each month, we first keep equity options with more than one month to expire and standard expiration dates. Then, we follow the literature and apply several filters to ensure the quality of our option data. In particular, we exclude observations that breach no-arbitrage limits, have no trading activity in the month preceding portfolio formation, or have zero open interest. Furthermore, we remove options that have mid-prices lower than $0.125, have bid-ask spreads lower than the minimum tick size,[4] or involve dividend payment during the holding period (we require that the announcement date of the dividend is no later than the portfolio formation date to avoid any look-ahead bias). Finally, we retain only those options with a moneyness ranging from 0.8 to 1.2.[5] To avoid the potential look-ahead bias mentioned in Duarte, Jones, Khorram, Mo, and Wang (2024), we make sure that all filters are strictly based on information prior to the portfolio formation date, so that no future information is involved in our filtering process. For each firm, we choose options from our filtered dataset that are closest to being at-the-money. We also ensure that the firms included in our sample have both call and put options available after filtering. The holding period is from the beginning to the end of each month.

Our main dependent variable is the buy-and-hold delta-hedged option returns. Studying delta-hedged option returns allows us to reduce the influence of the underlying stocks and focus specifically on equity options. Although the portfolio is hedged only once at the formation date, the delta-hedged strategy can remove about 70% of the option investment risk, according to Tian and Wu (2021). The delta-hedged option return equals the total dollar gains of the delta-hedged option positions scaled by the absolute values of the initial costs. Specifically, the dollar gains of the buy-and-hold delta-hedged option position over $[t, t{+}\tau]$ are given by:

$$\Pi_{t,t+\tau} = O_{t+\tau} - O_t - \Delta_t(S_{t+\tau} - S_t) - r_f(O_t - \Delta_t S_t) \tag{1}$$

[3]The stock prices are split-adjusted prices

[4]$0.10 for options trading above $3 and $0.05 otherwise

[5]Moneyness is defined as the ratio of the strike price (K) to the stock price (S), represented as K/S.

where O_t is the midpoint price of the option at date t, Δ_t is the Black–Scholes delta of the option on date t, S_t is the underlying stock price at date t, and r_f is the risk-free rate on date t. To make option returns comparable across stocks, we scale the dollar gains by the absolute value of the initial costs of the portfolio, specifically $\Delta_t S_t - C_t$ for call options and $P_t - \Delta_t S_t$ for puts. Hence, our delta-hedged option returns are defined as follows:

$$r_{i,t}^{\text{call}} = \frac{\Pi_{t,t+\tau}}{\Delta_t S_t - C_t} \tag{2}$$

$$r_{i,t}^{\text{put}} = \frac{\Pi_{t,t+\tau}}{P_t - \Delta_t S_t} \tag{3}$$

2.2 Abnormal Media Coverage

We gather media coverage data from Ravenpack News Analytics, a comprehensive and widely used data vendor. In each month, we gather all observations from Ravenpack and only retain those observations that have a relevance score of 100, ensuring that the given news story is highly related to the corresponding firm. Panel (a) of Figure 1 displays the top 10 groups of news events in our dataset. Among the news events included in our sample, the majority are related to earnings, comprising 18.33% of the total events. This is followed by product services and order imbalances, accounting for 11.95% and 10.63% respectively. Regarding the type of news, over 54.8% are full articles, which contain not only a headline but also one or more paragraphs of mostly textual material. Panel (b) of Figure 1 illustrates the composition of our dataset in terms of news type. Figure 2 shows that the news is evenly distributed throughout different times of the month. For each firm, within each month, we quantify the media coverage (MC) by counting the number of observations that cover the firm. Subsequently, we compute the ratio of a firm's current month media coverage to its average media coverage over the past three months. This ratio serves as our main independent variable, which we refer to as AMC (Abnormal Media Coverage).

$$AMC_{i,t} = \frac{MC_{i,t}}{Avg\_MC\_3M} \tag{4}$$

where $MC_{i,t}$ is the media coverage for firm i in month t, and Avg_MC_3M is the average media coverage of firm i from month *t-3* to month *t-1*. According to the provided formula, if a firm is not covered by news media from month *t-3* to *t-1* but is covered in month t, the AMC will be computed as missing. Consequently, we address this by using the cross-sectional maximum of the AMC to replace missing values.

2.3 Summary Statistics

Table 1 presents the summary statistics. Panel A reports the results for call options and Panel B reports the results for put options. The average buy-and-hold return is -0.28% for call options and -0.39% for put options. It has large variation in the cross section, with a standard deviation of 8.47% for call options and 7.18% for put options. Panel C reports the summary statistics for firm-level characteristics. On average, the stock price is 32.14 dollars and book-to-market ratio is 0.35. The number of news reports covering a firm is 45.74. Our main variable of interest, AMC, has a mean value of 1.37 and standard deviation of 2.24, suggesting that there is large variation in our sample.

3 Empirical Results

3.1 Baseline Results

3.1.1 Single Portfolio Sorting

First, we investigate whether AMC predicts future delta-hedged option returns. The cross-sectional predictive power of AMC is tested using the univariate portfolio-level analysis. Specifically, at the end of each month, we sort delta-hedged equity options into quintile portfolios based on AMC of their underlying stocks. We then calculate the average return of each portfolio and the return spread between the portfolios with the highest AMC and the lowest AMC.

[Insert Table 2]

Table 2 demonstrates that AMC strongly predicts delta-hedged equity option returns. Panel A and Panel B report the results of call options and put options respectively. Quintile 1 consists of options with the lowest AMC and quintile 5 consists of options with the highest AMC. The long-short strategy based on AMC generates return spreads which are both economically and statistically significant. We use three weighting schemes to calculate the average portfolio return: equal-weight (EW), open interest value weight (Opt-VW), and firm size value weight (Stock-VW). For example, if we use equal weights, the average monthly return spread between the highest and the lowest quintiles sorted by AMC is -0.77% (t-stat = -8.62) for call options and -0.71%(t-stat = -10.78) for put options. This return spread is substantial, larger than the absolute value of the median of the buy-and-hold option return, which is 0.30% (0.38%) for call (put) options. Following Boulatov et al. (2022), we also adjust the delta-hedged option returns using a 7-factor model, which includes the five stock factors in Fama and French (2015), the momentum factor, and the option factor in Coval and Shumway (2001). The differences in 7-factor alpha are -0.76% for call options and -0.67% for put options, which are very close to the raw return spreads, indicating that common risk factors can not explain our results. We further examine the return spreads based on open interest weights and stock value weights. For call options, the return spreads are -0.74% and -0.37% for option value weights and stock value weights, respectively. For put options, the return spreads are -1.07% and -0.37% for option value-weighted and stock value-weighted results, respectively.

3.1.2 Double Portfolio Sorting

To examine whether the effects of AMC are robust when controlling for other option return predictors, we extend our portfolio analysis by double sorting options first by various option or stock characteristics and then by our main variable, AMC. We consider nine control variables, including (1) average media coverage in the past three months (Avg_MC_3M); (2) Composite Sentiment Score from the Ravenpack News Analytics (CSS); (3) idiosyncratic volatility (IVOL) estimated from the Fama-French 3-factor model as in Ang, Hodrick, Xing, and Zhang (2006); (4) volatility deviation (HV-IV), computed as the difference between realized volatility and implied volatility of the at-the-money options as in Goyal and Saretto (2009); (5) Amihud illiquidity measure (ILLIQ) (6) Option's bid-ask spread (OSPREAD); (7) stock return autocorrelation (AUTO), calculated as the first-order autocorrelation of underlying stock returns using daily return observations over a past one-year rolling window as in Jeon, Kan, and Li (2019); (8) the logrithm of firm's market capitalization (SIZE); (9) book-to-market ratio (BM).

At the end of each month, we first sort all options into tertiles based on one of the control variables. Then, within each group, we further sort the options into five portfolios based on AMC. Finally, we calculate the average returns for each AMC quintile across the groups of control variables, yielding five control-variable adjusted quintile returns. Table 3 shows that none of the above control variables can subsume the effects of AMC. The return spreads of call options range from -0.65% to -0.83% per month, and those of put options range from -0.63% to -0.74% per month, after controlling for each variable separately. For example, if we control for the raw firm size, the adjusted return spread is -0.73% for call options and -0.68% for put options. These results are statistically and economically significant and confirm the robustness of our main findings.

[Insert Table 3]

Table 3 confirms that the predictive power of the news-based option predictors on equity option returns cannot be explained by existing quantitative option predictors. In most of the bins sorted by the control variables, we continue to see the average call or put delta-hedged option returns to be negatively related to the news-based option predictors, and most of the portfolio spreads between the high and low AMC quintiles are statistically significant. The results in Table 3 are robust if we adjust the raw delta-hedged option returns to alphas based on the 7-factor model by Boulatov et al. (2022).

3.1.3 Fama-Macbeth Regression

To further examine the relationship between abnormal media coverage and the cross-section of option returns, we run the Fama and MacBeth (1973) regression to test whether the predictive power of abnormal media coverage for delta-hedged option return is statistically significant, especially after controlling for existing option return predictors. We run the following cross-sectional regressions using abnormal media coverage as the predictor:

$$r_{i,t} = \alpha_t + \beta_t AMC_{i,t-1} + \sum_{j=1}^{M} \gamma_t^j X_{i,t-1}^j + \epsilon_{i,t}, \quad i = 1, \ldots, N_t, \tag{5}$$

where $r_{i,t}$ is either delta-hedged call or put option returns for firm i at time t. $AMC_{i,t-1}$ is the abnormal media coverage for firm i at time $t-1$, and $X_{i,t-1}^j$ are control variables that we use to perform double portfolio sorting in Section 3.1.2. All independent variables are winsorized at the 1^{st} and 99^{th} percentiles and standardized cross-sectionally with zero mean and one standard deviation.

We run the cross-sectional regression of Equation 5 each month. After obtaining the time series of the coefficients (e.g., β_t) for the independent variables, we conduct the t-test for each coefficient using Newey and West (1987) standard errors with the four-lag correction. The hypothesis of the t-test is: $H_0 : \beta = 0$ *vs.* $H_a : \beta \neq 0$. The average of the time-series coefficients and the corresponding t-statistics are reported in Table 4.

[Insert Table 4]

Table 4 presents the Fama-Macbeth regression results. For call options, the coefficient on AMC is -0.18 with t-statistic of -6.65 in the univariate regression . The magnitude is also economically significant: an one-unit increase in abnormal media coverage is associated with 0.18% decrease in delta-hedged option return. If we control for established option return predictors in the multivariate regression, the coefficients on AMC remain economically and statistically significant, with a coefficient of -0.19 and a t-statistic of -5.34. The coefficients on the control variables in Table 4 are consistent with the existing literature on option return predictability. For instance, idiosyncratic volatility has a negative effect on delta-hedged option returns, while stock volatility deviation has a positive effect on forecasting the cross-section of equity option returns. For put options, the results are also similar. The coefficient on AMC is -0.18 (t-statistic = -9.35) and -0.17 (t-statistic = -5.39) for univariate and multivariate regressions, respectively. Therefore, the Fama-Macbeth regression results again support the relationship between AMC and delta-hedged option returns.

3.2 AMC and Option Trading Behavior

Media coverage has been shown to be correlated with investors' trading behavior. For example, Barber and Odean (2008) document that investors are more likely to buy "attention-grabbing" stocks featured in the news media, and retail investors are particularly prone to this behavioral bias. Fang et al. (2014) show that even fund managers, who are expected to be more sophisticated, tend to buy more stocks that are heavily covered by the media, and this behavior bias negatively impacts the performance of the funds they manage. Given the increasing participation of retail investors in the equity options market, it provides an excellent setting to test whether retail investors will bet on stocks that attract their attention by trading options. In this section, we investigate whether abnormal media coverage is related to investors' option trading behavior. We explore this issue at both the monthly and weekly levels to determine the duration of the impact of abnormal media coverage.

Using signed option volume data from the International Securities Exchange (ISE) and Chicago Board Options Exchange (CBOE), we calculate the option order imbalance as the difference between the total volume of buying and selling orders to open new positions, scaled by their summation.[6]. Gârleanu, Pedersen, and Poteshman (2009) demonstrate that the demand pressure for a particular option not only raises its price but also increases the prices of other options on the same underlying stock. Therefore, consistent with previous studies, we aggregate options across different moneyness and maturities to calculate the demand pressure at the level of the underlying stock. In addition to aggregating all types of orders, we split orders into those from retail investors and professional investors. ISE and CBOE classify orders as being from professional investors or non-professional investors, and we treat orders from non-professional investors as originating from retail investors.

Table 5 presents the relationship between abnormal media coverage and investors' option trading behavior at the monthly level. The results indicate that option trading activities are

[6]We focus on open positions because they are shown to be more informative than closed positions (Pan and Poteshman (2006)). Our results are also robust if we also include orders that close existing positions

significantly more intense for stocks with higher abnormal media coverage for both call and put options. In the quintile of stocks with the highest abnormal media coverage, the option turnover is 9.03 for call options and 11.18 for put options, compared to the option turnover of 4.79 for call options and 4.78 for put options in the quintile with the lowest abnormal media coverage. The differences in option turnover between the highest and lowest quintiles are 4.20 for call options and 6.35 for put options, both of which are statistically significant at the 1% level.

[Insert Table 5]

In addition to finding that investors trade more options for stocks that attract their attention, we also observe that investors tend to buy rather than sell options for stocks with high abnormal media coverage. As shown in Table 5, the order imbalance is significantly negative for both call and put options in the lowest quintile of abnormal media coverage. However, in the highest quintile, the order imbalance is less negative for put options and even insignificantly positive for call options. The differences are striking, with the order imbalance difference being 14.10 for call options and 12.38 for put options.

Decomposing option orders by clientele, we find that this effect is primarily driven by retail investors. Since our main analysis shows that options written on stocks with higher abnormal media coverage tend to have lower returns over the following month, retail investors who buy more options on these stocks will, on average, incur losses if they hold their options until the end of the month. Our findings indicate that investors suffer from limited attention bias, aligning with results from de Silva et al. (2023) and Bryzgalova et al. (2023), which show that retail investors tend to lose money trading options.

Interestingly, the relationship between the order imbalance of professional investors and abnormal media coverage is significantly negative, suggesting that professional investors act as counterparties to retail investors. For example, the difference in order imbalance for professional investors between the highest and lowest quintiles is 10.31 for call options and 9.23 for put options, both significant at the 1% level. While Fang et al. (2014) shows that professional fund managers suffer from limited attention bias, our findings in the option market indicate that professional investors appear more sophisticated and immune to this behavioral bias.

In addition to the contemporaneous relationship between option trading behaviors and AMC at the monthly level, we investigate their intertemporal relationship at the weekly level. Specifically, we form the weekly AMC and explore how long the option trading propensity and demand pressure can last. Consistent with the reference period in our baseline analysis, we construct weekly AMC by dividing the media coverage of the current week by the average media coverage of the past 12 weeks. We examine the intertemporal relationship between the weekly AMC and weekly option trading behaviors, considering option trading behaviors from the current week to the fourth week in the future.

The findings in the first row of Table 6 are completely consistent with those in Table 5. Contemporaneously, for stocks with higher abnormal media coverage, their option turnover, option order imbalance from all orders, and orders from retail investors are positively associated with AMC, while professional investors' order imbalance is negatively associated with AMC. However, this "attention-grabbing" effect for retail investors does not last long. In the following week, although the option turnover remains higher for stocks with high abnormal media coverage for call options, the option turnover spread for put options becomes insignificantly negative. Regarding the option order imbalance of retail investors, although their buying intention persists, its magnitude significantly decreases.

[**Insert Table 6**]

From week 2 to week 4, the option turnover spread for call options is only marginally significant (for week 2) or indifferent from 0, while the option turnover spread for put options is consistently negative. By week 2, the retail order imbalance for call options is already indifferent from 0, while those for put options are still marginally significantly positive. Starting from the third week, the relationship between total and retail order imbalance and AMC reverses, and the spread is significantly negative. Regarding the order imbalance from professional investors, we observe that the relationship is consistently opposite to that of the order imbalance of retail investors, indicating that they consistently trade options as the counterparties of retail investors and do not suffer from limited attention bias.

The literature has found evidence that option demand pressure affects option pricing. Bollen and Whaley (2004) show that changes in implied volatility are related to buying pressure from public order flow. Gârleanu et al. (2009) model demand-pressure effects on option prices and find a positive cross-sectional relationship between option expensiveness and end-user demand for equity options. Cao and Han (2013) provide evidence that option market makers charge premiums for options with high end-user demand. Muravyev (2016) demonstrates the effect of inventory risk faced by market makers on option prices and finds that past order imbalances have significant predictive power for option returns. Consistent with the demand-based option pricing theory, our results indicate that retail investors are attracted to stocks with higher abnormal media coverage and trade their options, thus exerting demand pressure on these options. This demand pressure quickly pushes option prices higher, making them overpriced. However, this demand pressure does not last long; it attenuates rapidly and reverses over a longer period. Consequently, the prices of options with higher abnormal media coverage decline, leading to lower returns in the following month.

4 Economic Channel and Discussion

4.1 Quantity versus Content

As shown in Table 2, there is a negative association between abnormal media coverage and future option returns. This raises a natural question: does the abnormal media coverage measure captures the content of the news or simply reflects the quantity of news coverage. The existing literature has extensively documented the predictive power of news sentiment for asset returns. For instance, Tetlock (2007) and Garcia, Hu, and Rohrer (2023) study the sentiment in news content and find that news content affect asset prices. Given these insights, we investigate whether the abnormal media coverage measure in our study is driven by the sentiment of the news content or if it simply reflects the sheer volume of news articles.

Specifically, to explore whether the effect is driven by the content of media coverage, we decompose the news into positive and negative categories according to sentiment. This results in two AMC measures: AMC_Positive and AMC_Negative. At the end of each month, we sort the options for each stock into quintile portfolios based on AMC_Positive and AMC_Negative, respectively. Table 7 presents the results. For call options, the return spread is -0.51% for positive news and -0.38% for negative news. The results are also largely consistent for put options. Therefore, the negative relationship between delta-hedged option returns and the AMC measure does not depend on the content of the news coverage, suggesting that it is the news amount instead of news amount that affects option returns.

[Insert Table 7]

4.2 The Role of Earnings Related News

So far, our results indicate that abnormal media coverage is a robust predictor of option returns. Dubinsky et al. (2019) find that earnings announcement risk is significantly priced in the option market. As shown in Figure1, there are different types of news such as earnings, products and service, labor issues, acquisitions and mergers, revenues, and so on. Earnings-related news constitutes the largest proportion of media coverage in our sample, which is about 18% of the total media coverage. Therefore, we investigate whether our documented results are predominantly driven by earnings-related news.

To explore this, we conduct the following tests. First, we remove observations with earnings announcements. Despite these exclusions, the return spreads remain statistically significant, equal -0.44% for call options and -0.44% for put options. Second, we exclude headlines related to earnings and the return spreads are -0.55% and -0.53% for calls and puts. These findings suggest that the association between abnormal media coverage and option returns documented in our study is not solely driven by earnings-related news; other types of news also affect investor behavior and option returns.

In conclusion, even after accounting for the potential influence of earnings announcements, abnormal media coverage continues to be a significant predictor of option returns. This robustness underscores the broader impact of media coverage on market behavior, beyond the context of earnings-related news.

[Insert Table 8]

4.3 Controlling for Attention Measures

Choy and Wei (2022) document a negative relationship between investor attention and equity option returns. They find that increasing attention to daily winners and losers leads to buying pressure to their options, and these options will have lower returns subsequently. Since the AMC measure captures abnormal news coverage, it is likely to be highly correlated with investor attention. For example, the daily winners and losers in Choy and Wei (2022) are also covered by major news outlets such as the Wall Street Journal and the New York Times. Therefore, we investigate whether the return predictability of the AMC can be explained by other investor attention proxies documented in previous literature.

Specifically, we use the Fama-Macbeth regression to control for seven attention proxies, including abnormal stock trading volume (Barber and Odean (2008)), abnormal stock return (Barber and Odean (2008)), past stock return (Aboody, Lehavy, and Trueman (2009)), nearness to the 52-week high (Huddart, Lang, and Yetman (2009)), analyst coverage (Hirshleifer and Teoh (2003)), and two dummy variables for daily winners and daily losers in Choy and Wei (2022). In Table AX in the appendix, we show the correlation coefficients between AMC and these attention proxies, and the correlation is generally low with highest correlation with the abnormal trading volume (0.25).

Table 9 presents the Fama-Macbeth regression results. After controlling for various attention proxies, the coefficients on AMC remain highly significant both statistically and economically. In the baseline results, the absolute value of coefficient of AMC is 0.229 (0.203) for call (put) options, and it slightly decreases to 0.207 (0.181) after controlling other investor attention proxies. Additionally, after adding more control variables in our baseline Fama-Macbeth regressions, the absolute value of coefficient of AMC for call (put) options even increases to 0.228 (0.212). Therefore, the predictability of AMC cannot be subsumed by various existing investor attention proxies. Besides, our regression results also align with those of Choy and Wei (2022). For example, the coefficients on indicators of daily winner and daily loser are -0.34 and -0.23 and statistically significant, showing that these indicators negatively predict option returns.

[**Insert Table 9**]

4.4 Alternative Moneyness

Our current findings are based on at-the-money short-term maturity call options, as they are the most actively traded. In this section, we investigate whether our documented return predictability extends to options with varying moneyness. At the end of each month, for each underlying stock, we select both out-of-the-money and in-the-money options. We then sort the stocks into quintile portfolios based on the AMC measure and calculate the average return for each portfolio.

For each moneyness group, we compute the average return to delta-neutral call writing across all call options on a particular stock within that group. Subsequently, we calculate the stock-value-weighted average return to delta-neutral call writing across all stocks belonging to the top (bottom) decile when sorted by one of the stock characteristics. Panel A of Table 10 reports the portfolio sorting results.

For in-the-money options, the return spread is -0.34% for calls and -0.28% for puts. For out-the-money options, the return spread is -1.11% for calls and -1.01% for puts. The return spreads of OTM options are larger than ATM options and return spreads of ITM options are smaller than ATM options. Though the return magnitudes vary across options with different moneyness, the negative association between AMC and delta-hedged option return is persistent.

[**Insert Table 10**]

4.5 Alternative Option Return Calculations

Our main variable of interest is the buy-and-hold return to delta-hedged position. In this subsection, we also calculate the option returns using different ways. First, option delta fluctuates everyday and we calculate the daily-rebalanced option return to better isolate the effect of stock price change. Specifically, at the end of each month, we enter a position with one call or put option hedged by delta shares of the underlying stock and then we adjust the number of underlying shares according to the daily deltas. The dollar gains of the daily-rebalanced position is calculated as follows:

$$\Pi\left(t_0, t_N\right) = O_{t_N} - O_{t_0} - \sum_{n=0}^{N-1} \Delta_{O,t_n}\left[S_{t_{n+1}} - S_{t_n}\right] - \sum_{n=0}^{N-1} \frac{a_n r_{t_n}}{365}\left[O_{t_n} - \Delta_{O,t_n} S_{t_n}\right], \tag{6}$$

Then, we scale it by $\Delta_t S_t - C_t$ for calls and $P_t - \Delta_t S_t$ for puts, respectively, to calculate the returns.

Second, we also calculate the raw return, which is simply the change in raw option price.

Lastly, we calculate the straddle return. Straddles are formed as a combination of one call and one put option on the same underlying firm and have same striking price and time to maturity. We select the most at-the-money pair of call and put options and form vanilla straddle positions. To avoid directional exposure to the underlying stocks, we follow Gao, Xing, and Zhang (2018) and form delta-neutral straddle portfolios. The delta-neutral straddle returns are computed as the weighted average of the raw returns of the call and put options as follows:

$$r_{i,t}^{Straddle} = w_{i,t} r_{i,t}^{Call} + (1 - w_{i,t}) r_{i,t}^{Put}, \tag{7}$$

where $r_{i,t}^{Call}(r_{i,t}^{Put})$ is the raw return of call (put) options for firm i in month t. The weight $w_{i,t}$ is given by the following equation:

$$w_{i,t} = \frac{-\Delta_{i,t}^{Put}}{\Delta_{i,t}^{Call} - \Delta_{i,t}^{Put}}, \tag{8}$$

where $\Delta_{i,t}^{Call}(\Delta_{i,t}^{Put})$ is the delta of call (put) options.

In a manner consistent with the sorting procedure used in the baseline analysis, we sort the stocks into quintile portfolios and calculate the average return for daily-rebalanced positions, raw options, and straddles for each group. Panel B of Table 10 presents the results based on these alternative option return measures. The return spread for daily-rebalanced positions is -0.67% for call options and -0.59% for put options. The return spread for raw option positions is -4.32% for call options and -6.90% for put options. Additionally, the return spread for raw option positions is -4.51% for vanilla straddles and -6.28% for delta-neutral straddles. The results show that the negative association between abnormal media coverage and option return is robust across different option return definitions.

4.6 Alternative Media Coverage Measures

In our baseline analysis, we count the number of media coverage using the observations with a relevance score of 100. A relevance score of 100 ensures that the given news story is highly correlated with the corresponding firm. To show that the results are not sensitive to the cutoff, we construct alternative measures of abnormal media coverage measures using the relevance score of 75 and 90 as cutoffs. Panel A of Table 11 presents the portfolio sorting results. The results are similar to those from our baseline estimates.

Furthermore, we categorize the media coverage into firm-initiated and media-initiated. We define the news as firm-initiated if the article is classified as press release and there are no other firms mentioned on the same news and the rest is defined as media-initiated news. Then we construct abnormal media coverage measure based on firm-initiated news and media-initiated news separately. The results are reported in Panel B of Table 11. The return spread sorted on firm-initiated news is -0.43% and -0.42% for calls and puts, while the return spread sorted on firm-initiated news is -0.72% and -0.68% for calls and puts. The results suggest that investors react more to media-initiated news.

4.7 Heterogeneous Tests

In this subsection, we conduct several heterogeneity tests to explore which factors will affect the return predictive power of AMC. First, we construct the measure CSS_STD, which represents the standard deviation of the news sentiment across different news articles. A higher CSS_STD value indicates a higher level of disagreement and ambiguity in the news coverage. We begin by sorting firms into terciles based on CSS_STD. Within each tercile, we further sort the stocks into five groups according to the AMC measure. As CSS_STD increases, the return spread sorted on AMC rises from 0.49% to 0.93% for calls and from 0.45% to 0.83% for puts, suggesting that the effect of abnormal media coverage on option returns is stronger when there is higher ambiguity in the news.

Second, we investigate whether the relationship between AMC and option return is stronger for more lottery-like firms. Our analysis so far shows that the return predictability of AMC is likely to be driven by the trading of retail investors. Since retail investors often trade options because of the higher embedded leverage, the effect of AMC on option return may be particularly strong for lottery-like stocks. We use the MAX measure to proxy for lottery-like features and double sort on MAX and AMC. As MAX increases, the return spread sorted on AMC increases from 0.51% to 0.96% for calls and from 0.41% to 0.91% for puts. The results show that the effect of AMC on option return is stronger for firms with lottery-like features.

Third, we examine whether the effect is stronger for illiquid options. The pricing effect induced by increase in media coverage may be more pronounced if the options are less liquid. We double sort the options on option illiquidity and AMC. The return spread increases from -0.47% to -0.93% for calls and from -0.44% to -0.81% for puts. The effect of AMC on option return is stronger for illiquid firms.

Overall, the results suggest that the effect of AMC on option returns is more pronounced for news coverage with higher levels of disagreement, for more lottery-like firms, and for more illiquid firms.

5 Conclusion

In this paper, we investigate the impact of media coverage in the equity option market. We document that an attention shock measure, abnormal media coverage, significantly predicts future option returns negatively. Importantly, this predictability persists after controlling for several existing option return determinants and is robust under various robustness checks. In addition, we find that the abnormal media coverage influences the option trading behaviors of investors. Specifically, abnormal media coverage is positively associated with contemporaneous option trading propensity and option order imbalance among retail investors, but negatively associated with the order imbalance of professional investors. Furthermore, we show that the "attention-grabbing" effect induced by media coverage does not persist over time. Our finding is aligned with the demand-based option pricing theory. In general, our paper contributes to understanding the role of media coverage in shaping option market dynamics and provides insights into investor behavior and option returns.

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Table 1
Summary Statistics

This table presents the summary statistics of equity option returns, option characteristics, and other variables used in this paper. The sample period is from April 2000 to October 2022. Panel A (B) reports the time-series average of the cross-sectional summary statistics for delta-hedged option returns and the characteristics of call (put) options. A delta-hedged call (put) option portfolio involves buying one contract of an equity call (put) and a short position of Δ shares of the underlying stock, where Δ is the Black-Scholes call (put) option delta. Delta-hedged option return is defined as the total dollar gain of the delta-hedged option portfolio scaled by the absolute value of the cost of the delta-hedged option portfolio at its formation date. *Daily-Rebalanced* (*Buy* & *Hold*) Return is the return of the delta-hedged option portfolio with daily (monthly) rebalancing. *Option bid-ask spread* is the ratio of the difference between ask and bid quotes of option to the midpoint of the bid and ask quotes at the end of each month. *Gamma* (*Vega*) is the Gamma (Vega) from the Black-Scholes model. Panel C reports the time-series average of cross-sectional summary statistics for main variables used in this paper. *AMC* is the abnormal media coverage, measured as the ratio of the current month's media coverage to the average media coverage of the past three months. *MC* is the media coverage for the current month. *Avg_MC_3M* is the average media coverage over the past three months. *CSS* is the The monthly average of the Composite Sentiment Score (CSS) for each firm. *IVOL* is the idiosyncratic volatility. *HV-IV* is the volatility deviation. *AUTO* is the underlying stock's return autocorrelation. *LNPRICE* is the natural logarithm of the underlying stock's price level. *BM* is the natural logarithm of the book-to-market ratio. Detail definition and construction of these variables can be found in the Variable Definition.

Panel A: Summary Statistics for Delta-hedged Call Option Returns and Option Characteristics

	Mean	Standard Deviation	10th Percentile	Lower Quartile	Median	Upper Quartile	90th Percentile
Buy-and-hold Return (%)	-0.28	8.47	-7.06	-4.30	-1.66	1.95	7.57
Option Bid-ask Spread (%)	20.73	22.20	4.81	7.85	13.41	24.39	44.88
Gamma	0.10	0.06	0.04	0.05	0.08	0.13	0.18
Vega	0.14	0.01	0.12	0.14	0.14	0.15	0.15

Panel B: Summary Statistics for Delta-hedged Put Option Returns and Option Characteristics

	Mean	Standard Deviation	10th Percentile	Lower Quartile	Median	Upper Quartile	90th Percentile
Buy-and-hold Return (%)	-0.39	7.18	-6.24	-3.90	-1.59	1.63	6.58
Option Bid-ask Spread (%)	22.02	24.27	4.84	7.89	13.64	25.86	49.09
Gamma	0.10	0.06	0.04	0.05	0.08	0.12	0.18
Vega	0.14	0.02	0.12	0.13	0.14	0.14	0.15

Panel C: Summary Statistics for Important Variables							
	Mean	Standard Deviation	10th Percentile	Lower Quartile	Median	Upper Quartile	90th Percentile
AMC	1.37	2.24	0.31	0.54	0.95	1.52	2.36
MC	45.74	81.54	8.71	16.43	29.65	50.09	83.25
Avg_MC_3M	45.45	73.10	15.15	21.51	31.26	47.20	74.52
CSS	50.04	2.34	47.46	49.20	50.34	51.37	52.25
IVOL	0.02	0.01	0.01	0.01	0.02	0.03	0.04
VRP	0.01	0.12	-0.09	-0.03	0.01	0.06	0.12
ILLIQ	-7.36	1.67	-9.50	-8.54	-7.35	-6.20	-5.21
AUTO	-0.02	0.10	-0.14	-0.08	-0.01	0.05	0.11
SIZE	7.97	1.49	6.16	6.90	7.84	8.93	9.98
BM	-1.06	0.86	-2.17	-1.58	-1.00	-0.46	-0.04

Panel D: Pearson Correlation Matrix of Important Variables										
	AMC	MC	Avg_MC_3M	CSS	IVOL	VRP	ILLIQ	AUTO	SIZE	BM
AMC	1	0.16	-0.11	0.01	0.18	0.03	0.04	0.02	-0.04	0.01
MC		1	0.79	0.01	-0.02	0.03	-0.42	-0.01	0.44	-0.04
Avg_MC_3M			1	0.01	-0.13	0.02	-0.48	-0.01	0.50	-0.04
CSS				1	-0.09	0.03	-0.07	-0.03	0.09	-0.03
IVOL					1	0.07	0.36	0.09	-0.41	-0.05
VRP						1	-0.06	-0.04	0.04	0.00
ILLIQ							1	0.04	-0.94	0.14
AUTO								1	-0.07	-0.01
SIZE									1	-0.12
BM										1

Table 2
Option Portfolios Sorted by Abnormal Media Coverage

This table reports the average monthly returns to the delta-hedged option portfolios sorted by the abnormal media coverage (AMC). At the end of each month, we rank all underlying stocks into quintiles by their AMC. Detailed descriptions of AMC are provided in Section 2.1. The portfolio is held for one month. This table reports the average return to the delta-hedged option portfolio for each quintile, as well as the (5 − 1) return spread (that is, the difference between the returns of the portfolios of the highest and lowest quintiles). We implement three weighting schemes when calculating the average return of each portfolio: equal weighted (EW), dollar open interest value-weighted (Opt-VW), and firm size value-weighted (Stock-VW). We also adjust the average returns using a seven-factor model and report the corresponding alphas. The seven-factor model includes the five stock factors in Fama and French (2015), the momentum factor, and the option factor in Coval and Shumway (2001). The sample period is from April 2000 to October 2022. To adjust for serial correlations, robust Newey and West (1987) t-statistics are reported in brackets. The symbols *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

		1 (Low)	2	3	4	5 (High)	5-1
Panel A: Single portfolio sorting for delta-hedged call option returns							
EW	Raw Return	0.05	-0.15	-0.34	-0.46	-0.72	-0.77***
		(0.36)	(-1.02)	(-2.25)	(-3.07)	(-4.57)	(-8.62)
	7-Factor alpha	0.42	0.17	0.00	-0.06	-0.34	-0.76***
		(2.46)	(1.08)	(0.01)	(-0.36)	(-1.78)	(-7.14)
Opt-VW	Raw Return	-0.09	-0.23	-0.49	-0.67	-0.83	-0.74***
		(-0.63)	(-1.48)	(-3.05)	(-4.64)	(-5.20)	(-5.32)
	7-Factor alpha	0.22	-0.01	-0.12	-0.35	-0.45	-0.67***
		(1.25)	(-0.05)	(-0.69)	(-2.13)	(-2.37)	(-3.48)
Stock-VW	Raw Return	-0.21	-0.34	-0.30	-0.50	-0.58	-0.37***
		(-1.92)	(-3.18)	(-2.52)	(-4.25)	(-4.61)	(-4.75)
	7-Factor alpha	0.06	-0.09	-0.06	-0.20	-0.25	-0.31***
		(0.49)	(-0.86)	(-0.53)	(-1.74)	(-1.66)	(-3.17)
Panel B: Singe Portfolio Sorting for Delta-hedged Put Option Returns							
EW	Raw Return	-0.07	-0.27	-0.46	-0.53	-0.78	-0.71***
		(-0.59)	(-2.15)	(-3.69)	(-4.37)	(-6.02)	(-10.78)
	7-Factor alpha	0.21	-0.00	-0.18	-0.22	-0.47	-0.67***
		(1.54)	(-0.02)	(-1.33)	(-1.58)	(-3.09)	(-8.79)
Opt-VW	Raw Return	0.12	-0.33	-0.41	-0.71	-0.96	-1.07***
		(0.78)	(-2.26)	(-2.47)	(-5.22)	(-6.96)	(-6.80)
	7-Factor alpha	0.32	-0.08	-0.06	-0.38	-0.68	-1.00***
		(2.16)	(-0.52)	(-0.33)	(-2.42)	(-3.96)	(-5.35)
Stock-VW	Raw Return	-0.33	-0.42	-0.50	-0.59	-0.70	-0.37***
		(-3.10)	(-4.44)	(-4.20)	(-5.52)	(-5.86)	(-5.34)
	7-Factor alpha	-0.11	-0.21	-0.28	-0.34	-0.44	-0.33***
		(-1.01)	(-2.16)	(-2.58)	(-3.42)	(-3.30)	(-3.82)

Table 3
Dependent Double Protfolio Sorting

In this table, we investigate whether several stock or option characteristics can individually subsume the predictive power of the *AMC* using dependent double sorts. The constructions of control variables are described in the Variable Definition. We first sort all options into tertiles based on a given control variable. Then, within each tertile, we further sort the options into five portfolios based on the *AMC*. Finally, we average the returns for each *AMC* quintile across groups sorted by the control variable, yielding five control-variable adjusted quintile returns. Then we report the top-minus-bottom return spreads for the control-variable adjusted quintiles. We report the baseline results based on univariate sort (without control) in the first row, followed by the corresponding results after controlling for the variable labeled in each subsequent row. The sample period is from April 2000 to October 2022. To adjust for serial correlations, robust Newey and West (1987) t-statistics are reported in brackets. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Call Options	Put Options
Baseline	-0.77***	-0.71***
	(-8.62)	(-10.78)
Avg_MC_3M	-0.73***	-0.69***
	(-8.16)	(-10.63)
CSS	-0.79***	-0.71***
	(-9.00)	(-10.73)
IVOL	-0.65***	-0.63***
	(-7.71)	(-9.94)
VRP	-0.77***	-0.69***
	(-8.89)	(-11.13)
ILLIQ	-0.73***	-0.65***
	(-8.55)	(-10.40)
OSPREAD	-0.77***	-0.70***
	(-9.27)	(-11.65)
AUTO	-0.76***	-0.70***
	(-8.25)	(-10.38)
SIZE	-0.73***	-0.68***
	(-8.63)	(-10.68)
BM	-0.83***	-0.74***
	(-8.89)	(-10.11)

Table 4
Fama-MacBeth Regressions

This table reports the Fama-Macbeth regression results of the delta-hedged equity option returns on the *AMC*. The constructions of control variables are described in the Variable Definition. The sample period is from April 2000 to October 2022. To adjust for serial correlations, robust Newey and West (1987) t-statistics are reported in brackets. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Call		Put	
	(1)	(2)	(3)	(4)
AMC	-0.18***	-0.19***	-0.18***	-0.19***
	(-6.65)	(-5.34)	(-9.35)	(-6.53)
Avg_MC_3M		0.04		0.05*
		(1.55)		(1.95)
CSS		-0.06**		-0.04**
		(-2.55)		(-2.18)
IVOL		-0.37***		-0.31***
		(-7.48)		(-8.36)
VRP		0.44***		0.37***
		(9.53)		(10.33)
ILLIQ		-0.03		-0.03
		(-0.26)		(-0.33)
OSPREAD		0.12***		0.16***
		(3.02)		(5.21)
AUTO		0.15***		0.11***
		(5.13)		(4.63)
SIZE		-0.19		-0.19*
		(-1.56)		(-1.88)
BM		0.07**		0.03
		(2.14)		(1.14)
Adj.R^2	0.15	2.78	0.14	2.64
Obs	271131	231955	271131	231955

Table 5
Contemporaneous Relationship between Monthly Abnormal Media Coverage and Option Trading Activities

This table reports the monthly trading activities of option portfolios sorted by the AMC. At the end of each month, we rank all underlying stocks into quintiles according to their AMC and investigate their option trading activities during that month. We report several metrics of option trading activities, including monthly option turnover (Turnover), monthly option order imbalance (OIB), and monthly option order imbalance of orders from retail investors and professional investors (Retail OIB and Prof OIB). Detailed definitions and constructions of option trading activity metrics can be found in Section 3.2. We report the average of these metrics for each quintile portfolio, as well as the (5 − 1) spread (that is, the difference between the metrics of the portfolios of the highest and lowest quintiles). All numbers are represented as percentage. To adjust for serial correlations, robust Newey and West (1987) t statistics are reported in brackets. The symbols *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

		1 (Low)	2	3	4	5 (High)	5 - 1
Call	Turnover	4.79	5.16	5.21	6.16	9.03	4.20***
		(15.95)	(24.29)	(37.38)	(22.98)	(21.68)	(8.79)
	OIB	-13.68	-11.07	-8.32	-4.31	0.42	14.10***
		(-10.96)	(-8.29)	(-6.53)	(-3.31)	(0.33)	(26.20)
	Retail OIB	-14.46	-11.90	-8.97	-4.53	0.55	15.00***
		(-10.97)	(-8.41)	(-6.65)	(-3.27)	(0.41)	(27.75)
	Prof OIB	1.17	1.04	0.10	1.44	2.86	1.70
		(0.73)	(0.71)	(0.07)	(1.19)	(2.23)	(1.27)
Put	Turnover	4.78	4.79	5.43	5.81	11.18	6.35***
		(21.51)	(31.37)	(21.04)	(28.89)	(7.25)	(4.29)
	OIB	-18.29	-14.37	-11.47	-8.32	-5.91	12.38***
		(-10.06)	(-9.12)	(-7.06)	(-4.92)	(-3.71)	(22.29)
	Retail OIB	-20.38	-16.46	-13.29	-9.94	-6.91	13.47***
		(-10.76)	(-10.12)	(-7.96)	(-5.77)	(-4.20)	(22.35)
	Prof OIB	6.13	5.84	5.25	6.35	4.05	-2.08
		(4.76)	(6.53)	(4.75)	(5.12)	(2.50)	(-1.56)

Table 6
Intertemporal Relationship between Weekly Abnormal Media Coverage and Option Trading Activities

This table reports the intertemporal relationship between weekly AMC and option trading activities. Row Week 0 reports the contemporaneous relationship. Week 1 reports the relationship between AMC at week t and the option trading activities at week t+1, and so on. The metrics for option trading activities are the same as those in Table 5. Each column in this table contains the spread of option trading behaviors between the highest and lowest quintiles sorted by AMC. All numbers are represented as percentage. To adjust for serial correlations, robust Newey and West (1987) t statistics are reported in brackets. The symbols *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

		Turnover	OIB	Retail OIB	Prof OIB
Call	Week 0	4.16***	13.28***	14.13***	0.96
		(10.66)	(32.61)	(33.94)	(1.39)
	Week 1	0.65***	1.14***	1.12***	-1.80**
		(3.79)	(3.73)	(3.59)	(-2.25)
	Week 2	0.78*	-0.31	-0.38	-0.20
		(1.89)	(-1.10)	(-1.29)	(-0.33)
	Week 3	0.28	-1.44***	-1.52***	-0.14
		(0.78)	(-5.25)	(-5.51)	(-0.28)
	Week 4	0.21	-1.53***	-1.65***	0.04
		(0.85)	(-5.67)	(-6.13)	(0.08)
Put	Week 0	6.35***	10.70***	11.60***	-2.37***
		(5.54)	(27.42)	(28.17)	(-3.00)
	Week 1	-0.18	0.93***	0.85**	-2.37***
		(-0.82)	(2.78)	(2.47)	(-2.70)
	Week 2	-0.31	0.99***	0.77**	0.25
		(-1.48)	(3.26)	(2.45)	(0.33)
	Week 3	-0.42**	-0.63**	-0.87***	-0.37
		(-2.36)	(-2.15)	(-2.92)	(-0.56)
	Week 4	-1.54	-0.53*	-0.81***	0.72
		(-1.34)	(-1.72)	(-2.64)	(1.12)

Table 7
Call Option Portfolios Sorted by Abnormal Media Coverage Divided by News Sentiment

This table reports the average monthly returns of delta-hedged option portfolios sorted by AMC, calculated separately for positive and negative news stories. A news story is classified as positive if its CSS score is strictly higher than 50 and negative if its CSS score is strictly lower than 50. Within each group, the AMC is calculated, representing abnormal positive or negative media coverage, respectively. We then conduct the portfolio sorting tests using these two variables. All returns are expressed as percentages. The sample period is from April 2000 to October 2022. To adjust for serial correlations, robust Newey-West (1987) t-statistics are reported in brackets. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

		1 (Low)	2	3	4	5 (High)	5-1
Positive	Raw Return	-0.20	-0.34	-0.36	-0.52	-0.71	-0.51***
		(-1.37)	(-2.25)	(-2.26)	(-3.66)	(-4.62)	(-7.17)
	Turnover	5.19	5.03	5.56	6.40	8.11	2.90***
		(20.63)	(37.90)	(32.31)	(20.14)	(20.32)	(6.86)
	OIB	-11.14	-8.63	-6.15	-3.85	0.78	11.92***
		(-8.96)	(-6.43)	(-5.22)	(-3.10)	(0.66)	(20.92)
	Retail OIB	-11.88	-9.21	-6.72	-4.23	0.52	12.40***
		(-9.35)	(-6.78)	(-5.56)	(-3.34)	(0.43)	(21.68)
	Prof OIB	5.18	4.51	2.29	-0.86	-2.58	-7.76***
		(1.64)	(1.63)	(0.89)	(-0.34)	(-1.13)	(-3.30)
Negative	Raw Return	-0.22	-0.29	-0.44	-0.56	-0.57	-0.38***
		(-1.48)	(-1.84)	(-3.00)	(-3.56)	(-3.70)	(-4.08)
	Turnover	5.29	5.27	5.55	6.30	7.92	2.59***
		(21.88)	(35.80)	(26.18)	(17.85)	(22.38)	(6.65)
	OIB	-8.28	-8.14	-6.64	-4.67	-1.24	7.05***
		(-6.87)	(-6.40)	(-5.19)	(-3.71)	(-1.07)	(14.55)
	Retail OIB	-8.90	-8.75	-7.14	-5.12	-1.57	7.34***
		(-7.24)	(-6.72)	(-5.52)	(-3.98)	(-1.32)	(14.96)
	Prof OIB	4.08	3.89	3.60	-0.10	-1.44	-5.52***
		(1.46)	(1.40)	(1.35)	(-0.04)	(-0.67)	(-3.25)

Table 8
The Role of Earnings Announcements

Table 8 presents the average monthly returns of delta-hedged option portfolios sorted by the AMC, after controlling for the influence of earnings announcements. In Panel A, we exclude all observations from months containing earnings announcements. In Panel B, when calculating the AMC, we exclude all news stories categorized under "Earnings". All returns are expressed in percentage. The sample period spans from April 2000 to October 2022. To adjust for serial correlations, robust Newey-West (1987) t-statistics are reported in brackets. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Remove Observations with Earnings Announcements							
Call	Raw Return	0.08	0.07	-0.12	-0.09	-0.36	-0.44***
		(0.53)	(0.50)	(-0.89)	(-0.63)	(-2.23)	(-4.67)
	7-Factor alpha	0.45	0.38	0.12	0.26	-0.01	-0.47***
		(2.41)	(2.28)	(0.85)	(1.54)	(-0.08)	(-4.20)
Put	Raw Return	-0.07	-0.07	-0.26	-0.29	-0.51	-0.44***
		(-0.55)	(-0.61)	(-2.19)	(-2.38)	(-3.84)	(-6.63)
	7-Factor alpha	0.22	0.16	-0.06	-0.01	-0.24	-0.46***
		(1.48)	(1.16)	(-0.47)	(-0.08)	(-1.65)	(-6.11)
Remove News Stories Related with Earnings							
Call	Raw Return	-0.08	-0.20	-0.28	-0.41	-0.63	-0.55***
		(-0.54)	(-1.32)	(-1.96)	(-2.90)	(-3.99)	(-7.54)
	7-Factor alpha	0.30	0.16	0.05	-0.05	-0.26	-0.56***
		(1.76)	(0.96)	(0.28)	(-0.30)	(-1.35)	(-6.66)
Put	Raw Return	-0.19	-0.29	-0.44	-0.48	-0.72	-0.53***
		(-1.55)	(-2.38)	(-3.53)	(-4.04)	(-5.66)	(-9.51)
	7-Factor alpha	0.11	-0.01	-0.17	-0.19	-0.41	-0.51***
		(0.73)	(-0.06)	(-1.22)	(-1.39)	(-2.81)	(-8.46)

Table 9
The Effect of AMC on Option Returns after Controlling for Attention Proxies

This table reports the Fama-Macbeth regression results with 7 attention proxies as additional controls. Other control variables are the same as those in Table 4. The constructions of attention proxies and control variables are described in the Variable Definition. The sample period is from April 2000 to October 2022. To adjust for serial correlations, robust Newey and West (1987) t-statistics are reported in brackets. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Call		Put	
	(1)	(2)	(3)	(4)
AMC	-0.18***	-0.20***	-0.20***	-0.20***
	(-5.68)	(-6.11)	(-7.75)	(-6.87)
Abvol	-0.16***	0.01	-0.12***	0.06**
	(-4.96)	(0.20)	(-5.38)	(2.52)
Abret	-0.00	0.00	-0.01	-0.00
	(-0.27)	(0.27)	(-0.58)	(-0.29)
Ret_12_1	-0.12***	-0.10**	-0.11***	-0.09***
	(-2.83)	(-2.47)	(-3.44)	(-2.57)
High52	-0.03	-0.06	-0.11*	-0.16***
	(-0.40)	(-0.93)	(-1.85)	(-3.09)
AC	-0.03	0.03	-0.05*	0.03
	(-1.05)	(0.74)	(-1.95)	(0.79)
I_w	-0.34***	-0.18**	-0.26***	-0.11
	(-4.96)	(-2.29)	(-4.13)	(-1.52)
I_l	-0.23***	-0.06	-0.10	0.07
	(-2.80)	(-0.74)	(-1.53)	(0.87)
Controls	No	Yes	No	Yes
Adj.R^2	1.98	4.00	1.82	3.84
Obs	237582	208944	237582	208944

Table 10
Alternative Option Samples and Return Constructions

This table presents the portfolio sorting results for delta-hedged returns for options with different moneyness and alternative definitions of returns. Panel A reports the results for portfolio sorting of in-the-money (ITM) and out-of-the-money (OTM) options. Panel B reports the results for raw option returns, vanilla straddle returns, and delta-neutral straddle returns. The sample period is from April 2000 to October 2022. To adjust for serial correlations, robust Newey and West (1987) t statistics are reported in brackets. The symbols *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Portfolio Sorting for ITM and OTM Options							
ITM	Call	-0.14	-0.27	-0.32	-0.37	-0.48	-0.34***
		(-1.40)	(-2.75)	(-3.43)	(-4.30)	(-4.95)	(-4.64)
	Put	-0.21	-0.21	-0.30	-0.41	-0.49	-0.28***
		(-3.09)	(-3.04)	(-4.64)	(-6.24)	(-7.29)	(-5.12)
OTM	Call	0.45	0.12	-0.10	-0.40	-0.66	-1.11***
		(1.96)	(0.53)	(-0.42)	(-1.92)	(-2.82)	(-6.95)
	Put	-0.14	-0.56	-0.65	-0.88	-1.14	-1.01***
		(-0.63)	(-2.46)	(-2.82)	(-4.14)	(-4.77)	(-6.47)
Panel B: Portfolio Sorting for Different Types of Option Returns							
Daily	Call	0.27	0.10	-0.01	-0.18	-0.40	-0.67***
		(1.98)	(0.69)	(-0.09)	(-1.32)	(-2.62)	(-11.98)
	Put	0.11	-0.02	-0.16	-0.28	-0.49	-0.59***
		(1.05)	(-0.18)	(-1.47)	(-2.55)	(-4.31)	(-14.23)
Raw Return	Call	7.66	6.41	5.49	4.95	3.34	-4.32***
		(2.78)	(2.39)	(2.05)	(1.84)	(1.26)	(-4.11)
	Put	-4.93	-6.98	-9.30	-10.11	-11.83	-6.90***
		(-1.49)	(-2.13)	(-2.92)	(-3.16)	(-3.75)	(-7.16)
Straddle	Vanilla	0.28	-1.10	-2.17	-3.02	-4.23	-4.51***
		(0.38)	(-1.36)	(-2.58)	(-3.75)	(-4.72)	(-9.25)
	Delta-Neutral	1.09	-0.51	-2.66	-3.05	-5.19	-6.28***
		(1.08)	(-0.46)	(-2.46)	(-2.78)	(-4.40)	(-9.17)

Table 11
Alternative Media Coverage Measures

This table presents the portfolio sorting results for delta-hedged returns using alternative abnormal media coverage measures. Panel A reports the results of abnormal media coverage measure with different relevance score for the corresponding firm. Panel B reports the results for firm-initiated and media-initiated news. The sample period is from April 2000 to October 2022. To adjust for serial correlations, robust Newey and West (1987) t statistics are reported in brackets. The symbols *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

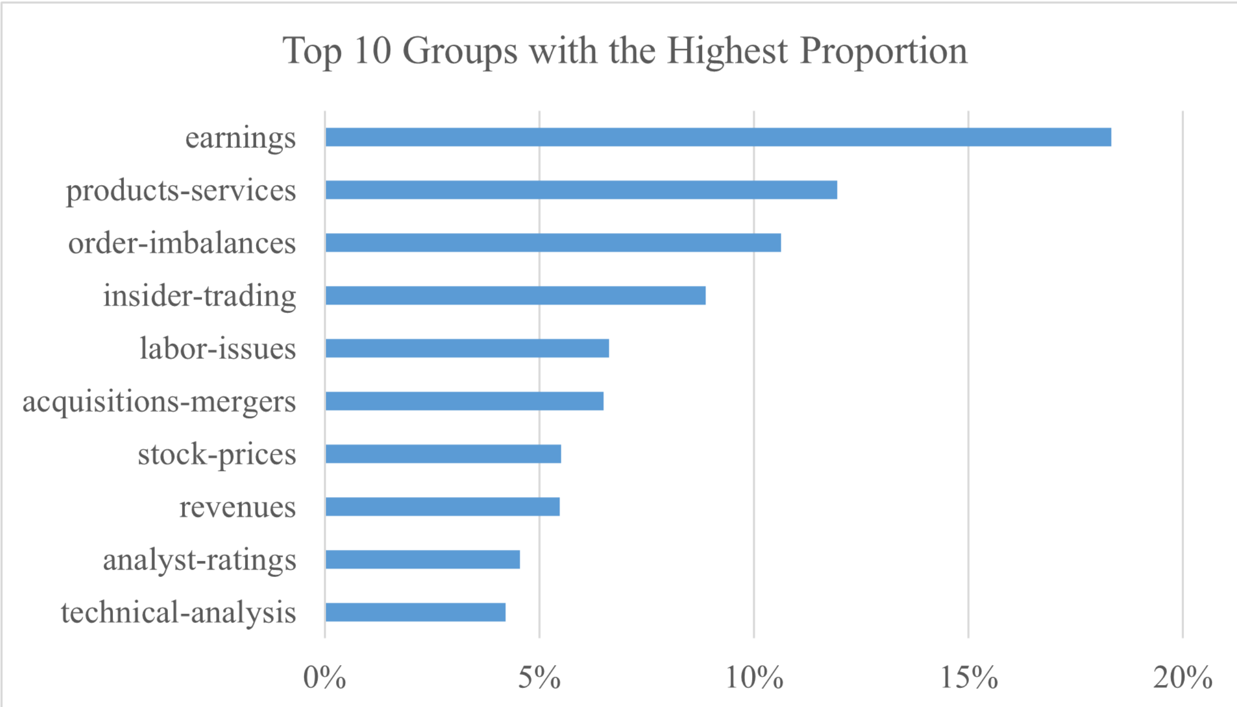
Panel A: Abnormal Media Coverage Measures Based on Different Relevance Cutoff							
Relevance>=75	Call	0.06	-0.16	-0.30	-0.43	-0.71	-0.77***
		(0.43)	(-1.14)	(-2.12)	(-2.96)	(-4.40)	(-9.20)
	Put	-0.06	-0.29	-0.40	-0.51	-0.79	-0.73***
		(-0.47)	(-2.39)	(-3.33)	(-4.16)	(-6.18)	(-11.16)
Relevance>=90	Call	0.07	-0.15	-0.31	-0.42	-0.73	-0.80***
		(0.50)	(-1.05)	(-2.24)	(-2.86)	(-4.47)	(-8.90)
	Put	-0.05	-0.28	-0.44	-0.50	-0.79	-0.74***
		(-0.38)	(-2.25)	(-3.65)	(-4.07)	(-6.08)	(-10.61)
Panel B: Firm-inititaed and Media-inititaed News							
Firm-initiated	Call	-0.11	-0.11	-0.41	-0.48	-0.60	-0.43***
		(-0.67)	(-0.51)	(-2.84)	(-3.20)	(-3.91)	(-5.04)
	Put	-0.21	-0.46	-0.46	-0.57	-0.68	-0.42***
		(-1.63)	(-3.34)	(-3.61)	(-4.50)	(-5.33)	(-6.19)
Media-initiated	Call	0.01	-0.18	-0.30	-0.50	-0.69	-0.72***
		(0.06)	(-1.21)	(-1.98)	(-3.44)	(-4.37)	(-8.05)
	Put	-0.09	-0.29	-0.43	-0.57	-0.76	-0.68***
		(-0.79)	(-2.39)	(-3.35)	(-4.76)	(-5.91)	(-10.47)

Table 12
Heterogeneous Effect of AMC on option return

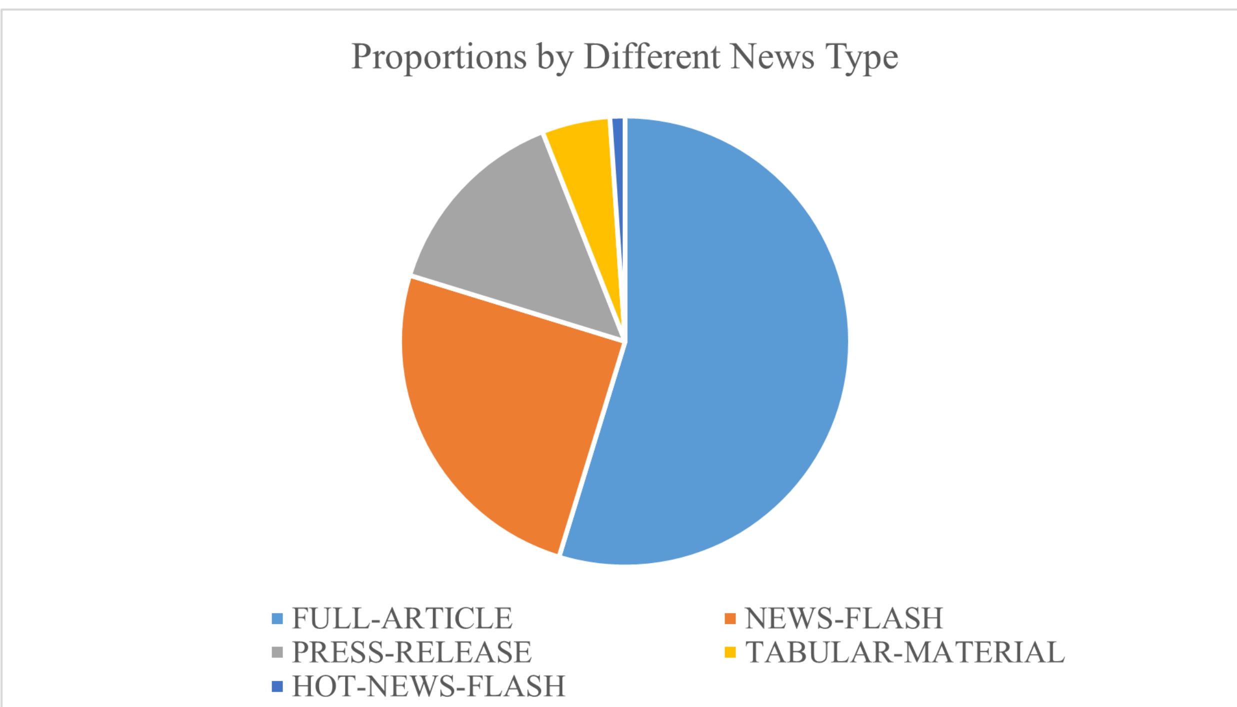
This table presents the heterogeneous effect of AMC on option return. We first sort the firms into three groups based on CSS_STD, ILLIQ, and MAX. Then within each tercile, we sort the options into quintiles based on AMC and report the return spread in each tercile. The sample period is from April 2000 to October 2022. To adjust for serial correlations, robust Newey and West (1987) t statistics are reported in brackets. The symbols *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

		Low	Medium	High	H - L
CSS_STD	Call	-0.49***	-0.71***	-0.93***	-0.44**
		(-4.14)	(-5.43)	(-6.62)	(-2.40)
	Put	-0.45***	-0.64***	-0.83***	-0.39**
		(-4.55)	(-5.85)	(-7.25)	(-2.44)
ILLIQ	Call	-0.51***	-0.77***	-0.96***	-0.45***
		(-5.64)	(-4.93)	(-7.05)	(-2.94)
	Put	-0.41***	-0.73***	-0.91***	-0.50***
		(-5.09)	(-6.48)	(-8.36)	(-4.06)
MAX	Call	-0.47***	-0.81***	-0.93***	-0.46***
		(-4.97)	(-6.88)	(-5.84)	(-2.93)
	Put	-0.44***	-0.74***	-0.81***	-0.37***
		(-5.61)	(-7.72)	(-6.52)	(-2.60)

Figure 1. Composition of News Stories



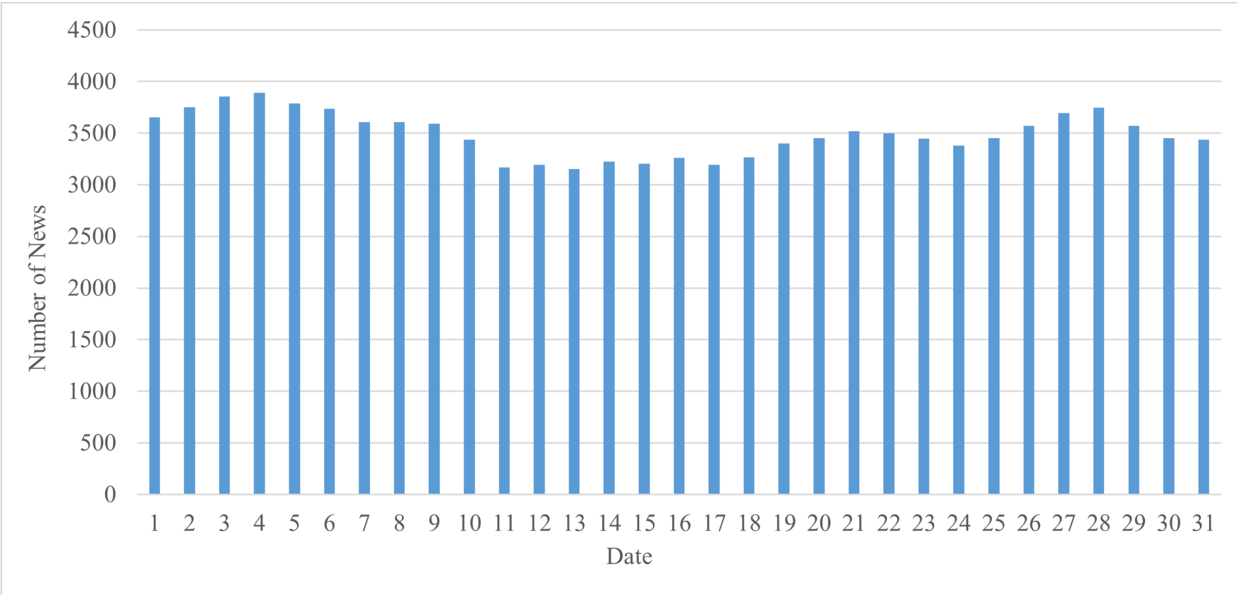
(a) By Topic



(b) By Type

This figure presents the composition of news stories included in our sample. Panel (a) reports the ten most frequent topics of news stories, as identified using the "Group" variable in Ravenpack News Analytics. Panel (b) shows the proportion of each type of news story in our sample.

Figure 2. News Distribution by Dates



This figure presents the news distribution by date in our sample. The number in the horizontal axis represents the day in each month and the vertical axis represents the number of news coverage.

Appendix for Meida Coverage and Option Returns

Variable Definition

	Important Variables
AMC	Abnormal media coverage, defined as the ratio of the current month's media coverage to the average media coverage of the past three months.
MC	Media coverage, defined as the number of news headline covering a given firm. We obtain news headline data from RavenPack News Analytics. We only keep records that have a relevance score of 100 to ensure that the media coverage data is highly pertinent to the respective firm, providing a focused and relevant dataset for our analysis.
CSS	The monthly average of the Composite Sentiment Score (CSS) for each firm, calculated using all stories (with relevance score of 100) covering that firm. The CSS is a sentiment score that ranges from 0 to 100, representing the overall sentiment of a news story. We obtain the CSS from RavenPack News Analytics.
IVOL	Idiosyncratic volatility, defined as the standard deviation of daily return residuals from regressions of daily returns on the Fama-French 3-factor model over the previous month, following Ang et al. (2006). We require at least 15 observations for the regression.
HV-IV	Volatility deviation, defined as the difference between realized volatility and implied volatility following Goyal and Saretto (2009). Realized volatility is the standard deviation of daily realized stock returns over the past year. Implied volatility is the average of ATM call and put implied volatility with 30-day maturity, obtained from the Volatility Surface dataset of OptionMetrics IvyDB database.
OSPREAD	The bid-ask spread of the option contract, defined as the difference of quoted ask price and bid price scaled by the option's mid-price.
Gamma	The sensitivity of an option's delta to the change in the underlying stock price, obtained from the OptionMetrics IvyDB database.
Vega	The sensitivity of an option's price to its implied volatility, obtained from the OptionMetrics IvyDB database.
AUTO	Underlying stock's return autocorrelation, defined as the first-order return autocorrelation of the underlying stock calculated over the past 6 months.
SIZE	The natural logarithm of the firms' market capitalization
BM	The natural logarithm of the book-to-market ratio.

	Attention Measures
Abret	Abnormal return, calculated as the ratio of the return of the current month to the average return over the past 12 months.
Abvol	Abnormal trading volume, calculated as the ratio of the trading volume of the current month to the average trading volume over the past 12 months.
Ret_12_1	Cumulative return, calculated as the cumulative return over the past 12 months.
High52	Nearness to the 52-week high, calculated as the ratio of the stock price at the end of the current month over the highest stock price over the past 52 weeks.
AC	Analyst coverage, defined as the number of analysts following the firm.
I_w	Indicator for daily winners. Iw is set to 1 if the stock is among the top 80 winners at least once (but never among the 80 losers) during the month and 0 otherwise.
I_l	Indicator for daily losers. Il is set to 1 if the stock is among the top 80 losers at least once (but never among the 80 winners) during the month and 0 otherwise.

Table A1
Sample Coverage of Underlying Stocks

Table A1 provides details about the stock-month sample for the underlying stocks covered in our analysis. Panel A reports the time-series summary statistics of our sample coverage and Panel B reports the time-series average of cross-sectional distributions. Panel C reports the time-series average of a Fama-French 12-industry distribution for the sample of stocks covered in our analysis and full CRSP sample. Percent coverage of stock universe (EW) is the number of sample stocks, divided by the total number of CRSP stocks. The percent coverage of the stock universe (VW) is the total market capitalization of sample stocks divided by the total market value of all CRSP stocks. Firm size is the firm's market capitalization. Book-to-market is the fiscal year-end book value of common equity divided by the calendar year-end market value of equity. Institutional ownership is the percentage of common stocks owned by institutions in the previous quarter. Analyst coverage is the number of analysts following the firm in the previous month. The sample period is from April 2000 to October 2022.

Panel A: Time-Series Distribution (271 Monthly Obs.)

April 2000–October 2022	Mean	Standard Deviation	10th Percentile	Lower Quartile	Median	Upper Quartile	90th Percentile
Stock % coverage of stock universe (EW)	13.50	2.88	8.72	12.21	14.00	15.31	16.60
Stock % coverage of stock universe (VW)	43.74	6.68	35.84	39.23	44.11	48.35	51.35
Stock % traded at NYSE/AMEX	54.91	3.96	49.85	52.22	55.10	57.57	59.73
Stock % included in S&P500 index	29.70	5.86	23.38	25.60	28.86	32.87	37.33
Stock % already included in last month	67.42	6.66	58.90	63.72	68.30	71.80	75.22

Panel B: Time-Series Average of Cross-Sectional Distributions (271,131 Stock-Month Obs.)

April 2000–October 2022	Mean	Standard Deviation	10th Percentile	Lower Quartile	Median	Upper Quartile	90th Percentile
Firm Size in billions	11.09	35.11	0.48	1.01	2.62	7.91	22.76
Firm size CRSP percentile (%)	77.68	14.47	56.75	68.65	80.62	89.46	94.03
Firm book-to-market CRSP percentile (%)	34.68	24.74	5.49	13.73	30.02	52.38	72.50
Institutional Ownership (%)	0.68	0.18	0.45	0.60	0.73	0.81	0.86
Analyst Coverage	9.76	5.93	3.30	5.25	8.50	13.03	17.93

Panel C: Time-Series Average of Industry Distribution (%)

FF-12 Industry	Option sample	CRSP sample	FF-12 Industry	Option Sample	CRSP sample
Consumer nondurables	4.96	4.70	Telecom	1.78	2.66
Consumer durables	2.56	2.21	Utilities	2.68	2.25
Manufacturing	9.99	8.99	Wholesale	12.34	8.59
Energy	4.35	3.76	Healthcare	13.73	12.48
Chemicals	3.02	2.06	Finance	10.24	20.89
Business Equipment	22.72	17.76	Others	11.62	13.64

Table A2
Predictability of AMC Using Alternative Reference Period

This table presents the predictability of AMC using alternative reference periods for delta-hedged option returns. The row labeled "MC" displays the portfolio sorting results based on raw media coverage. The rows labeled "AMC_1M", "AMC_6M", "AMC_9M", and "AMC_12M" show the portfolio sorting results using abnormal media coverage, calculated by dividing the media coverage in the current month by the average media coverage over the past 1, 6, 9, and 12 months, respectively. To adjust for serial correlations, robust Newey and West (1987) t-statistics are reported in brackets. The symbols *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Predictability of AMC Using Alternative Reference Period for Call Options							
		1 (Low)	2	3	4	5 (High)	5-1
Call	MC	0.08	-0.26	-0.42	-0.49	-0.57	-0.65***
		(0.52)	(-1.65)	(-2.72)	(-3.29)	(-4.45)	(-7.83)
	AMC_1M	-0.06	-0.23	-0.30	-0.34	-0.60	-0.54***
		(-0.42)	(-1.64)	(-2.05)	(-2.28)	(-3.93)	(-6.96)
	AMC_6M	0.11	-0.17	-0.27	-0.47	-0.71	-0.82***
		(0.71)	(-1.15)	(-1.80)	(-3.19)	(-4.63)	(-10.03)
	AMC_9M	0.12	-0.18	-0.27	-0.52	-0.74	-0.83***
		(0.78)	(-1.21)	(-1.91)	(-3.53)	(-5.06)	(-10.73)
	AMC_12M	0.11	-0.16	-0.36	-0.57	-0.72	-0.81***
		(0.73)	(-1.03)	(-2.55)	(-3.88)	(-4.74)	(-10.44)
Panel B: Predictability of AMC using Alternative Reference Period for Put Options							
Put	MC	-0.08	-0.35	-0.46	-0.59	-0.65	-0.58***
		(-0.62)	(-2.57)	(-3.56)	(-4.86)	(-6.11)	(-8.94)
	AMC_1M	-0.15	-0.33	-0.41	-0.47	-0.68	-0.53***
		(-1.26)	(-2.76)	(-3.49)	(-3.84)	(-5.52)	(-8.67)
	AMC_6M	-0.02	-0.29	-0.41	-0.52	-0.79	-0.77***
		(-0.17)	(-2.43)	(-3.25)	(-4.30)	(-6.23)	(-11.69)
	AMC_9M	-0.03	-0.31	-0.38	-0.56	-0.83	-0.78***
		(-0.21)	(-2.54)	(-3.07)	(-4.45)	(-6.92)	(-12.99)
	AMC_12M	-0.04	-0.29	-0.44	-0.61	-0.79	-0.74***
		(-0.31)	(-2.25)	(-3.58)	(-5.02)	(-6.42)	(-12.19)

Table A3
Correlation Matrix

This table reports the correlation matrix between AMC and various attention proxies.

	Ratio3	Abret	Abvol	Past_return	High52	Anal.Cov.	Iw	Il
Ratio3	1	0.00	0.25	0.01	0.00	-0.02	0.12	0.09
Abret		1	0.00	0.00	0.01	0.00	0.01	-0.01
Abvol			1	0.14	-0.08	-0.04	0.09	0.11
Past_return				1	0.29	-0.09	0.00	0.03
High52					1	0.05	0.01	-0.22
Anal.Cov.						1	-0.06	-0.03
Iw							1	-0.14
Il								1