When two anomalies meet: Volume and timing effects on earnings announcements

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Abstract

This study investigates the joint effect of trade volume and report timing on earnings announcement premiums. We find that high trading volume effect adds to early announcement effect but not vice versa. After controlling for firm characteristics, late timing and high trade volume have a positive joint effect; stocks with late announcements and low trade volume earn the largest but short-lived premium. We cannot find evidence to support the notion that early announcements result in superior premiums; the unusual volume effect is much greater in magnitude, longevity, and significance than the timing effect.

KEYWORDS

announcement premium, announcement timing, earnings announcement, trade volume

JEL CLASSIFICATIONS

G12, G14

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1 INTRODUCTION

The earnings announcement premium is defined as the tendency of stock prices to increase in periods of close proximity to a firm's earnings announcement date. Volume and timing effects are two channels predicting the premium. On the one hand, unusual trading volume preannouncement accounts for the premium, as it carries information on changes in visibility and risk to stocks, such as divergence in investor opinion and firm fundamentals. On the other hand, announcement timeliness has proven to be a signal for the content of an earnings announcement, owing to the tendency of firms to delay the release of negative information and the propensity for earlier announcing firms to be more sensitive to movements in the market. The literature indicates that both early timing and high trade volume are associated with superior returns, whereas late timing and low trade volume individually relate to inferior returns. However, the earnings announcement literature has yet to sufficiently examine timing and unusual trade volume *simultaneously* as joint effects.

This study examines three basic issues. We examine whether a long portfolio of stocks that exhibits both unusually high trade volumes and early announcements earns a higher (or lower) abnormal return than portfolios based purely on unusually high trade volume or early announcements alone. We also examine whether a long portfolio of stocks with both unusually high (low) trade volumes and late (early) announcements earns a higher abnormal return than a portfolio based on either unusually high trade volume or early announcements alone. Lastly, we examine whether a long portfolio of stocks with both unusually low trade volumes and late announcements earns a higher abnormal return than a portfolio based on either unusually high trade volume or early announcements alone.

This study contributes to the literature in three aspects. First, we find that the premium on announcements preceded by unusually high trading volume adds on to the premium on early announcements but not vice versa, which provides the insight that positive pricing information, carried by high trade volumes, is superior to the information carried by early announcements. Second, we find strong evidence from the subsample of stocks with late (early) announcements and high (low) volume that unusually high trade volumes cause greater earnings announcement premiums than does the announcement timing. An investment strategy based on announcing stocks that exhibit both unusually high volume and early timing cannot outperform a portfolio that is based purely on announcing stocks that exhibit unusually high trade volume. However, it does outperform a portfolio based purely on early announcing stocks. This indicates that high trade volume carries superior information compared with early timing and, accordingly, has stronger power to predict the announcement premiums. Lastly, we find that after controlling for firm characteristics, the positive timing effect of early anouncement on returns disappears—that is, the difference between premiums of a long portfolio with early earnings announcement and one with late announcement is statistically insignificant. Even so, a late announcement can turn around the negative news from a low trading volume and result in a top level of abnormal returns within a very short event window.

The rest of the paper is organized as follows. Section 2 reviews the literature. Section 3 develops hypotheses. Section 4 outlines the data and empirical methodology. Section 5 presents the empirical results. Section 6 concludes.

2 LITERATURE REVIEW

The earnings announcement premium was first discovered by Beaver (1968) and followed by a multitude of papers that utilize a wide variety of asset pricing techniques to demonstrate its prevalence (Ball & Kothari, 1991; Penman, 1984).

Trade volume is one channel explaining this announcement premium. Kandel and Pearson (1995), Gervais, Kaniel, and Mingelgrin (2001), and Frazzini and Lamont (2007) document a direct relation between trade volume surrounding these announcements and the announcement premium. The literature offers two common explanations for the *high* volume return premium.

The risk explanation: The high-volume return premium compensates for the risk assumed by holding a stock that has high investor opinion divergence (Banerjee & Kremer, 2010; Garfinkel & Sokobin, 2006). This notion arises from the idea that trade volume is motivated by the disagreement among investors regarding a stock's fair price. Varian (1985) argues that those investors taking long positions among the high trade volume absorb such a divergence risk. See also Kim and Verrecchia (1991) and Lerman, Livnat, and Mendenhall (2008).

The visibility explanation: Miller (1977) proposes that the increase in a stock's trade volume can attract the attention of optimistic investors who are likely to convince themselves of the value of taking a long position. Gervais, Kaniel, and Mingelgrin (2001) provide evidence consistent with this high-volume return premium. However, trade volume alone does not indicate whether informed investors prefer long or short positions. If the high trade volume is filled by pessimistic investors attempting to liquidate their holdings, then the followers could end up being disappointed. This notion is also supported by the findings of Ertan, Karolyi, Kelly, and Stoumbos (2016), who suggest that firms with high preannouncement returns are likely to attract excessively optimistic investors who have over-extrapolated the upcoming announcement premium.

Akbas (2016) takes a unique approach in contrasting unusually *low* trading volume as a signal of negative changes in firm fundamentals. Specifically, Akbas highlights the effect of unusually *low* trading volumes in the week preceding an earnings announcement as likely signals of negative earnings surprises, especially if the firms exhibit short-selling constraints. Akbas suggests that if trade volume does reflect investor opinion divergence, then unusually low volumes should suggest a consensus on the intrinsic value of a stock. However, if there are short-selling constraints preventing inside investors from trading on their negative information, this consensus can be understood as impotent and, thus, signals unfavorable earnings surprises and negative returns.

Announcement timeliness is considered as another channel. Kross and Schroeder (1984) characterize early (late) as before (after) the expected announcement date and found that the abnormal returns for early announcing firms are significantly higher. Additionally, Cohen, Dey, Lys, and Sunder (2007) employ a similar timing criteria to show that early announcements are more likely to carry positive news. Savor and Wilson (2016) develop a novel timing criterion by judging whether a firm announcement falls in the first or the last quartile of the given announcement quarter, and confirmed the robustness of the timing effect. The literature proposes three other explanations for the timing anomaly.

The beta explanation: The rationale is that firms announcing earlier in a fiscal quarter tend to have higher betas, making their returns more sensitive to movements in the market (Patton & Verardo, 2012). Savor and Wilson (2016) argue that earnings news can be decomposed into market-wide and firm-specific components. Investors cannot separate the market-wide one from the other, and as such, investors are more responsive to announcements from early announcing stocks, resulting in a higher systematic risk (and hence, a higher risk premium) with these stocks.

The insider trade explanation: Management tends to delay the announcement of bad news to enable insiders to liquidate holdings at a higher price (Trueman, 1990). Therefore, early announcements usually carry good news and subsequently lead to superior return premiums.

The manipulation explanation: A relatively long audit process delays the release of bad news due to negative developments such as restatements (Chambers & Penman, 1984) and, late reporters have a tendency to require more time to manipulate their earnings to make the succeeding announcements appear superior (Chai & Tung, 2002). These two theories focus on why negative earnings surprises tend to be late. One may consider that positive earnings could also be delayed on the premise that firms gain a strategic advantage in considering their competitor announcements before potentially manipulating and disclosing their own. If this were the case, the propensity for bad news to be late would be stronger than that for good news to be early. Begley and Fischer (1998) emphasize that the relation between early (late) announcements and good (bad) news is not strictly monotonic.

To our knowledge, the literature has yet to sufficiently combine the trading volume anomaly with the timing anomaly. Although Savor and Wilson (2016) control for the aggregate trade volume (without separating firms into groups by unusually high and low trade volume), in studying the timing effect on announcement premiums, they find no statistically significant relation. This is because a mixture of stocks exhibiting unusually high and low trade volumes offsets their potential signals of firm performance. Furthermore, including normal trade volumes can dilute the information content of the signals.

3 SAMPLE SELECTION

Our data samples include common stocks listed on the NYSE, NASDAQ, and Amex that made at least four quarterly earnings announcements within the sample period from the first fiscal quarter of 1980, through the last fiscal quarter of 2019. As the analysis requires quarterly lagged variables of firm characteristics, the earnings announcement sample begins in the second fiscal quarter of 1980.

We follow the common practice of excluding stocks with a quarter-end price of less than five dollars to avoid results driven by illiquid stocks. This also excludes events with missing daily trading volume data in either the reference or the event period.

COMPUSTAT provides the following: report dates of quarterly earnings, quarter-end book value of equity, common shares outstanding, basic earnings per share excluding extraordinary items (*EPS)*, and closing price. Daily holding period return, share trade volume, and number of shares outstanding are from CRSP. The risk-free rate (proxied by one-month Treasury bills) and common risk factors such as market excess return, small minus big market capitalization returns (*SMB*), high minus low book-to-market returns (*HML*), and up minus down returns (*UMD*) are from WRDS Fama-French & Liquidity Factors. Earnings per share median analyst forecasts and actuals are from I/B/E/S, and the percentage of stock under institutional ownership is from the Thomson Financial 13F Filings.

4 RESEARCH METHOD

In this section, we describe the methodology employed in studying the joint effects of volume and timing on the earnings announcement premium. This includes volume and timing criteria specification, event study design, announcement premium calculation and earnings surprise measure selection, control variables construction, portfolio analysis, and regression analysis.

4.1 Volume and timing criteria

We classify each stock's earnings announcement for each quarter according to certain volume and timing criteria. We use these criteria to sort firms for portfolio analysis and create dummy variables for regression analysis based on this classification. Following Gervais, Kaniel, and Mingelgrin (2001) and Akbas (2016), we first denote the announcement day as day zero, and then define *event period* as day [–6, –2], overall five trading days preceding the announcement, and define *event volume* as the average of stock daily turnover during the event period. Second, we define *reference period* as day [–61, –12], overall 50 days preceding the event period. We then calculate the daily turnover distribution over the reference period to identify unusual trade volume preceding an earnings announcement by finding where the event-period volume falls in the distribution of the reference-period volume.

In particular, we define *daily turnover* as in Equation (1):

$$Daily\ Turnover \triangleq \frac{Daily\ Total\ Shares\ Traded}{Common\ Shares\ Outstanding}, \tag{1}$$

For each fiscal quarter, we classify a stock as one with unusually high (low) trade volume if its event-period averaged daily turnover falls into the top (bottom) quintile of the corresponding reference-period daily turnover distribution.

We also classify stocks by their timeliness. Adopting the approach of Savor and Wilson (2016), we classify a stock as one with early (late) announcement if its announcement date falls into the earliest (latest) quintile of the trading days in a fiscal quarter .[1] We observe the similar volume and timing effects using alternative timing criteria. For example, earlier studies such as Kross and Schroeder (1984), Penman (1984), and Cohen, Dey, Lys, and Sunder (2007) classify stocks as early or late based on whether their announcement is made before or after an expected announcement date. These studies calculate expected announcement dates via various methods of analyzing previous announcement timing. However, as noted by Savor and Wilson (2016), these expected dates were often incorrect. Other studies, such as Savor and Wilson (2016), identify timeliness based on the relative phase of an *expected* announcement date in a fiscal quarter rather than an *actual* announcement date.

Compared with these expected announcement date models, our setting has four advantages. First, all firms making announcements on the same day have the same timeliness (early, late, or reference). That enables our model to circumvent the critique of Cohen, Dey,

[1] The results of this study are robust to the use of quartiles to define early and late timing.

Lys, and Sunder (2007), who state that a biased earnings announcement premium observed in many studies is due to the combined portfolio of different types of announcers. Second, even though Savor and Wilson (2016) take an expected announcement date approach, they claim that their findings are even stronger when using actual, instead of expected, earnings announcement dates. Third, again, as commented by Savor and Wilson (2016), these expected dates are often incorrect; the earnings announcement premium as calculated could be biased based on expected announcement dates could be biased. Fourth, as indicated by studies such as Kaniel, Liu, Saar, and Titman (2012) and Akbas (2016), the actions of informed agents in the week preceding the actual announcement day are more likely to capture unusual volume catalyzed by insider trading. Thus, actual announcement dates present themselves as the more suitable option through which to concurrently analyze the effects of volume and timing.

Once we identify unusual trade volume and timelines, we classify firm stocks jointly for each quarter. Only those announcements that meet the criteria of unusual volume and early (or late) time concurrently are considered for the analysis.

4.2 Event study

We design an event study to investigate the joint effects of trading volume and timing. We define the announcement premium as the cumulative abnormal return (*CAR*) earned on stocks making quarterly earnings announcements. Every quarter, we find the daily abnormal returns (*AR*) of each announcing stock in the event window [–1, 25]. *AR* is given by the difference between stock actual return and expected return:

$$AR_{i,t} = r_{i,t} - \mathbb{E}(r_{i,t}), \tag{2}$$

where $AR_{i,t}$ and $r_{i,t}$ denote the abnormal return and actual return, respectively, of stock i at time t. $\mathbb{E}(r_{i,t})$ is the expected return of stock i at time t, benchmarked by the four-factor model of Carhart (1997), which regresses stock returns on common risk factors identified by Fama and French (1993), plus a momentum factor,[2]

$$r_{i,t} - rf_t = a_i + \beta_i(r_{m,t} - rf_t) + s_i SMB_t + h_i HML_t + m_i UMD_t + e_i \quad (3)$$

where $r_{i,t} - rf_t$ is stock excess return on the 30-day Treasury bill rate, and $r_{m,t} - rf_t$ is the excess return of the value weighted market portfolio on the 30-day Treasury bill rate. SMB, HML, and UMD are size, book-to-market, and momentum factors, respectively. We estimate the coefficients s_i, h_i, and m_i for stock i based on reference-period (i.e., day [–61, –12]) sample.[3] The expected returns surrounding quarterly earnings announcements is

$$\mathbb{E}(r_{i,t}) = rf_t + a_i + \beta_i(R_{m,t} - rf_t) + s_i SMB_t + h_i HML_t + m_i UMD_t. \quad (4)$$

We analyze quarterly announcement premiums through *CAR*. The *CAR* of stock i is computed over various event windows, where the event day zero is set to the actual quarterly announcement date. *CAR* is the sum of *AR* over a given period specified by the window $[t_1, t_2]$ at a given quarter q:

$$CAR_{i,q}[t_1, t_2] = \sum_{t=t_1}^{t_2} AR_{i,q,t}. \quad (5)$$

We measure *CAR* over three event windows defined by [–1, 1], [–1, 10], and [–1, 25] on a quarterly basis. All event windows are set to begin one day before the report date to avoid

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[2] This study has been repeated using multiple asset pricing models with no significant changes in results. The Carhart (1997) four-factor model was selected as it controls for momentum to ensure that the announcement premiums identified are not simply the product of recent returns. For consistency with Akbas (2016), versions of all tables where *CAR* is constructed via the market model are available upon request from the authors.

[3] Construction of the coefficients given by Carhart (1997) enables the depiction of a firm's exposure to the given risk factors. Therefore, they are subject to incorrect estimation if a prior earnings announcement exists in the reference period that causes return anomalies.

the effects of information leakages and insider trading preceding the announcement.[4] As the announcements must meet the criteria of both unusual volume and early (or late) timing concurrently, the sample space is reduced dramatically when analyzing interaction stocks. Therefore, we select the four-factor model to avoid the abnormal returns being driven by size, book-to-market, or momentum effects that have not been diversified in a given interaction portfolio. For robustness, we also consider another two quarterly announcement premiums measures from the perspective of earnings surprises.

4.3 Earnings announcement premium measures

Apart from *CAR*, we also use quarterly earnings surprise as an alternative measure of the dependent variable in portfolio and regression analysis. We employ two measures of quarterly earnings surprise: the standardized unexpected earnings (*SUE*) and the standardized unexpected earnings via analyst forecasts (*SUEAF*).[5] The *SUE* of announcing firm i for quarter q is defined as the earnings per share (EPS) in the announcement quarter q minus the EPS in the corresponding quarter from the previous fiscal year (i.e., $q-4$), divided by the quarter-end stock price, P, at $q-4$:

$$SUE_{i,q} = \frac{EPS_{i,q} - EPS_{i,q-4}}{P_{i,q-4}}. \quad (6)$$

To make the EPS at quarter q comparable to the previous year's benchmark, we adjust the lagged variables $EPS_{i,q-4}$ and $P_{i,q-4}$ for any stock splits and dividends occurring

[4] Akbas (2016), Berkman, Dimitrov, Jain, Koch, and Tice (2009), and Lerman, Livnat, and Mendenhall (2008) also start their event windows at –1.

[5] *CAR*, *SUE*, and *SUEAF* are common measures in the assessment of earnings announcement performance. See Akbas (2016), Lerman, Livnat, and Mendenhall (2008), Berkman, Dimitrov, Jain, Koch, and Tice (2009), and Garfinkel and Sokobin (2006).

in the period $[q-4,q]$. To ensure the sample comprises consistently announcing firms, we follow Akbas (2016) in excluding outliers on a quarterly basis by deleting observations in the top and bottom 1% and the stocks missing EPS data in between quarters q and $q-4$.

The *SUEAF* of announcing firm i for quarter q is defined by the actual EPS in the announcement quarter q minus the analysts' median consensus forecasts of EPS for the quarter q, divided by the quarter-end stock price at $q-4$:

$$SUEAF_{i,q} = \frac{EPS_{i,q} - Median\ Analyst\ EPS_{i,q}}{P_{i,q-4}}. \quad (7)$$

To avoid observations where the consensus among analysts is severely inaccurate due to unavailable information or unforeseen economic circumstances, we follow Akbas (2016) in excluding the top and bottom 1% of *SUEAF* observations to eliminate outliers. The *SUEAF* is only measurable for the stocks that are followed by analysts, whose fundamental interests are high market cap firms. Thus, the *SUEAF* sample is approximately half the size of the *SUE* sample and primarily comprises larger firms.

4.4 Control variables

We discuss the controls as follows. First, similar to Fama and French (1992), we control log firm size (*SIZE*) and log book-to-market ratio (*BM*). This is because the literature shows that earnings announcement premiums can be accentuated in firms that are small (Penman, 1984) and can exhibit higher book-to-market ratios (Savor and Wilson, 2016). *SIZE* is the market value of equity given by the product of common shares outstanding and the most recent previous quarter-end price. *BM* is the book-to-market ratio of equity, attained by using the most recent quarter-end book value and the aforementioned market value of equity. Only firms with positive book values are included in our sample. Given that this study focuses on quarterly earnings announcements, *SIZE* and *BM* are calculated on a quarterly basis; both variables are transformed into log form in regressions. The regression analysis conducted in this study replicates the volume analysis as well as the timing effect in the literature separately and then adds variables based on announcement timing to the volume analysis in Akbas (2016) for interaction analysis. Therefore, following Akbas (2016), we also include the following control variables.

Second, we control log institutional ownership (*IO*) calculated as the ratio of the common shares owned by institutions versus the total common shares outstanding.[6] Cohen, Dey, Lys, and Sunder (2007) argue that earnings announcement premium is due to the short-sale constraints limiting arbitrage. *IO* is a proxy for short-sale constraints, as institutions provide the majority of stock loan supply (Nagel, 2005). Unusually, a low trade volume is constituted by insiders who are unable to trade off negative information (Diamond & Verrecchia, 1987), and therefore, it signals negative earnings surprises among firms with low institutional ownership (Akbas, 2016).

Third, we also control log average daily turnover (*ADTR*) over the reference period [–61, –12] to purify the effects from unusual trading volume. We control return volatility (*VOL*), calculated as the standard deviation of the returns over the windows [–11, –2], for the information uncertainty effect (Barber, De George, Lehavy, & Trueman, 2013). We also

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[6] Akbas (2016) highlights the 1978 amendment to the Securities and Exchange Act of 1934, where institutional ownership in excess of 10,000 shares or $20,000 market value is required to be filed in 13F reports with the Securities and Exchange Commission on a quarterly basis. Therefore, any missing values of *IO* are set to zero under the assumption that if a firm did have institutional ownership, it would have been reported and readily available in the Thomson Financial 13F filings. This assumption is commonly made in the literature (Akbas, 2016; Berkman, Dimitrov, Jain, Koch, and Tice, 2009; Nagel, 2005).

control *RET_5* and *RET_50* acting as proxies for momentum, as future stock returns tend to be a function of recent returns (Jegadeesh & Titman, 1993); *RET_5* represents the 5-day cumulative return for reference period [–6, –2], and *RET_50* represents the 50-day cumulative return for reference period [–61, –12].

Finally, we control lagged value of dependent variable (*LAG*), considering that previous announcement premiums and earnings surprises could have been shown to predict future premiums and surprises (Chan, Jegadeesh, & Lakonishok, 1996). We control bid ask spread as a proxy for transaction cost. We also include a time variable to detrend any time-specific confounding variables that are not included in the study.

4.5 Portfolio analysis

We form portfolios based on the volume and timing criteria outlined. The performance of each portfolio is assessed based on the announcement premiums, measured by *CAR* over the windows [–1, 1], [–1, 10], and [–1, 25] in Section 5.2. The earnings surprise measures (*SUE* and *SUEAF*) are outlined in Section 4.3. We report the time series of weighted average of each portfolio's performance, where weightings correspond to the number of stocks in each quarterly portfolio.

First, we conduct a paired t-test on the announcement premium and earnings surprise differences between the *HIGH* (or *LOW*) and *EARLY* (or *LATE*) portfolios to identify significant differences in portfolio performance, where the stocks residing in volume quintiles 1 and 5 comprise the *LOW* and *HIGH* portfolios, respectively, and similarly, where stocks residing in timing quintiles 1 and 5 comprise the *EARLY* and *LATE* portfolios, respectively.

Second, we form interaction portfolios with stocks that in a given quarter are classified in a top or bottom quintile in both volume and timing portfolio sorts. In other words, if an announcement exhibits unusually high (or low) volume preceding an earnings announcement and is simultaneously considered early (or late), it is sorted into the same interaction portfolio. Interaction portfolios are formed via all possible combinations of volume and timing classifications. We create four portfolios labeled *EARLY_HIGH*, *LATE_LOW*, *LATE_HIGH*, and *EARLY_LOW*.

Lastly, we examine the interaction effects between volume and timing on quarterly earnings announcements. First, we calculate *t*-statistics to infer whether announcement premiums and earnings surprises are significantly different from zero. We then conduct portfolio comparisons via paired *t*-tests on each possible dual combination of portfolios to determine whether the performances of interaction portfolios are significantly different from those of portfolios based on just volume or timing. When conducting paired *t*-tests on portfolios that share stocks in a given quarter, all *t*-tests are conducted using Newey and West (1987) adjusted standard errors to control for the potential effects of heteroskedasticity and autocorrelation.

4.6 Regression analysis

Following Akbas (2016), we estimate quarterly weighted Fama and MacBeth (1973) regressions using announcement premiums and earnings surprises as the dependent variables.

First, we conduct the following cross-sectional regressions every quarter. We exclude the control variables *SIZE*, *BM*, and *RET_50* from any regression measuring the announcement premium. This is because the dependent variable in these regressions is *CAR*, which has been constructed using the Carhart (1997) four-factor model as the benchmark for expected returns. As such, the effects of size, book-to-market, and momentum premiums are already captured when generating expected returns, and hence, abnormal returns are considered abnormal after controlling for these effects. However, *RET_5* remains in the *CAR* regressions because it captures event-period returns for the window [–6, –2]. This is a proxy for preannouncement momentum, which was not captured by the four-factor model estimated over the window [–61, –12].

$$Premium_{i,q} = \alpha_{i,q} + \beta_{1,q}(HIGH_{i,q}) + \beta_{2,q}(LOW_{i,q}) + \beta_{3,q}(EARLY_{i,q}) + \beta_{4,q}(LATE_{i,q}) + \beta_{5,q}(IO_{i,q}) + \beta_{6,q}(ADTR_{i,q}) + \beta_{7,q}(VOL_{i,q}) + \beta_{8,q}(RET\_5_{i,q}) + \beta_{9,q}(LAG_{i,q}) + \beta_{10,q}(TIME_{i,q}) + \beta_{11,q}(B/A\_Spread)_{i,q}) + \varepsilon_{i,q}, \tag{8}$$

and

$$Surprise_{i,q} = \alpha_{i,q} + \beta_{1,q}(HIGH_{i,q}) + \beta_{2,q}(LOW_{i,q}) + \beta_{3,q}(EARLY_{i,q}) + \beta_{4,q}(LATE_{i,q}) + \beta_{5,q}(SIZE_{i,q}) + \beta_{6,q}(BM_{i,q}) + \beta_{7,q}(IO_{i,q}) + \beta_{8,q}(ADTR_{i,q}) + \beta_{9,q}(VOL_{i,q}) + \beta_{10,q}(RET\_5_{i,q}) + \beta_{11,q}(RET\_50_{i,q}) + \beta_{12,q}(LAG_{i,q}) + \beta_{13,q}(TIME_{i,q}) + \beta_{14,q}(B/A\_Spread)_{i,q}) + \varepsilon_{i,q}. \tag{9}$$

We then report the weighted average of the quarterly cross-sectional coefficients, where the weightings correspond to the number of observations in each quarterly cross-sectional regression. $Premium_{i,q}$ refers to the *CAR* of stock i at quarter q, and $Surprise_{i,q}$ refers to the *SUE* or *SUEAF* of firm i at quarter q. $HIGH$ (LOW) is a dummy variable that equals one if stock i's event-period volume has been classified as unusually high (low). $EARLY$ ($LATE$) is a dummy variable that equals one if stock i's report date has been classified as early (late). The remainder of the variables are controls for firm characteristics and are outlined in the previous section.

Following the estimation of the regressions given by Equations (8) and (9), we then perform regressions that are fully specified with all possible combinations of volume and timing interactions. The coefficient estimation for the interaction term allows for the assessment of whether certain volume and timing effects are independent or related. The following regressions are also performed:

$$Premium_{i,q} = \alpha_{i,q} + \beta_{1,q}(HIGH_{i,q}) + \beta_{2,q}(LOW_{i,q}) + \beta_{3,q}(EARLY_{i,q}) + \beta_{4,q}(LATE_{i,q}) + \beta_{5,q}(EARLY\_HIGH_{i,q}) + \beta_{6,q}(LATE\_HIGH_{i,q}) + \beta_{7,q}(EARLY\_LOW_{i,q}) + \beta_{8,q}(LATE\_LOW_{i,q}) + \beta_{9,q}(IO_{i,q}) + \beta_{10,q}(ADTR_{i,q}) + \beta_{11,q}(VOLA_{i,q}) + \beta_{12,q}(RET\_5_{i,q}) + \beta_{13,q}(LAG_{i,q}) + \beta_{14,q}(TIME_{i,q}) + \beta_{15,q}(B/A\_Spread)_{i,q}) + \varepsilon_{i,q}, \quad (10)$$

and

$$Surprise_{i,q} = \alpha_{i,q} + \beta_{1,q}(HIGH_{i,q}) + \beta_{2,q}(LOW_{i,q}) + \beta_{3,q}(EARLY_{i,q}) + \beta_{4,q}(LATE_{i,q}) + \beta_{5,q}(EARLY\_HIGH_{i,q}) + \beta_{6,q}(LATE\_HIGH_{i,q}) + \beta_{7,q}(EARLY\_LOW_{i,q}) + \beta_{8,q}(LATE\_LOW_{i,q}) + \beta_{9,q}(SIZE_{i,q}) + \beta_{10,q}(BM_{i,q}) + \beta_{11,q}(IO_{i,q}) + \beta_{12,q}(ADTR_{i,q}) + \beta_{13,q}(VOLA_{i,q}) + \beta_{14,q}(RET\_5_{i,q}) + \beta_{15,q}(RET\_50_{i,q}) + \beta_{16,q}(LAG_{i,q}) + \beta_{17,q}(TIME_{i,q}) + \beta_{18,q}(B/A\_Spread)_{i,q}) + \varepsilon_{i,q}. \quad (11)$$

The above regressions allow for examining the effects of stocks that exhibit any of the dual combinations of unusual volume and announcement timing. The interaction dummy variables labeled $EARLY\_HIGH$, $LATE\_HIGH$, $EARLY\_LOW$, and $LATE\_LOW$ equal one if both their associated volume and timing variables equal one. The net effect of an announcement considered both early and low is given by the sum of the estimated coefficients corresponding to the variables $EARLY$, LOW, and $EARLY\_LOW$. A positive (negative) interaction coefficient indicates a positive (negative) joint effect.

5 ANALYSIS RESULTS

In this section, we present the main results from three aspects: first, we discuss how announcement premiums and earnings surprises are correlated; second, we use average CAR to rank and compare portfolios formed based on announcement volume and timing criteria; and third, we discuss the joint effects of volume and timing.

5.1 Descriptive summary

Table 1 presents a descriptive summary. Panel A shows sample distribution by announcement type for all common stocks listed on the NYSE, NASDAQ, and Amex. Panel B presents the average of quarterly intraclass correlations (ICC) on volume (denoted as ICC_V) or timing (denoted as ICC_T), respectively. Both ICC_V and ICC_T are always positive regardless of whether they are measured at the full-sample level or industry level. They are not large as they do not exceed 50%: the overall ICC_V (ICC_T) is 6.74% (3.85%) and the industry-specific ICC_V (ICC_T) ranges from 0.02% (2.02%) to 40.52% (34.27%). This suggests that the volume and timing effects of firms within an industry tend to move together to some extent, but their comovements vary across industries.

There is not a particular industry that has an outstandingly high or low trading volume, or that tends to make an extraordinarily early or late announcement. Panel C summarizes the days on average for a firm change from EARLY to LATE (HIGH to LOW) and vice versa. Panel D gives the sample-based ex post transition rate at which a firm transits from a particular volume (or timing) quintile to another. It is noteworthy that 41.52% of the quintile 2 early announcements will stay, while the other transition rates are all less than 10%.

Table 2 presents time-series averages of quarterly summary statistics for CAR, SUE, and SUEAF sample firm characteristics. Panel A summarizes firm characteristics for the *CAR* sample that runs from the second fiscal quarter of 1980 to the last fiscal quarter of 2019. We report CAR for three event windows, defined by [–1, 1], [–1, 10], and [–1, 25]. The *CAR* sample has the largest number of observations with 279,669 announcements. *CAR* is the primary measure in this study, as is most commonly used in the recent literature to capture both the volume and timing effect.[7] *CAR* is also a measure of return premiums and thus allows for the assessment of feasible investment strategies. Within the sample, an average of 1,759 stocks announces their earnings each quarter. The mean *CAR* for the [–1, 1] window is 0.19% at the 1% level and depletes over longer investment horizons. As we approach 10 days post announcement, the mean *CAR* falls to 0.11% at the 1% level and further to 0.01% and becomes insignificant over 25 days. This is consistent with the notion that the market does not immediately realize the implications that earnings announcements have on stock prices (Bernard & Thomas, 1989; Cowen, Groysberg, & Healy, 2006; Cready & Gurun, 2010). Also, the market tends to overreact to the announcement, but the market learns and takes less than 25 days to digest the implication and correct the overreaction. The *CAR* sample also has the lowest mean (median) for *SIZE* at 4.13. This is because the *SUE* and *SUEAF* samples are based on measures that contain variations of EPS. These variables are generally more accessible for larger firms. Conversely, the construction of *CAR* simply requires a stock's daily returns to measure its exposure to the risk factors given by the four-factor model of Carhart (1997). Daily returns are readily accessible for a wider variety of firms. This is likely why the *CAR* sample has the largest number of observations and the smallest mean *SIZE*.

[7] Akbas (2016) and Savor and Wilson (2016) both use varying definitions of CAR to analyze unusual trading volume and announcement timeliness, respectively.

Panel B shows firm characteristics for the *SUE* sample over the same period. The *SUE* sample contains 241,774 quarterly announcements with an average of 1,521 stocks per quarter. The mean *SUE* is 0.27%, indicating that the average difference between the current EPS and the EPS from the corresponding fiscal quarter one year prior is 0.27% of the quarter-end price one year ago. Panel C depicts firm characteristics for the *SUEAF* sample. Owing to the data availability, this sample runs from the second fiscal quarter of 1985 to the last fiscal quarter of 2019, and has the least amount of observations, totaling 122,848 quarterly announcements with an average of 884 stocks per quarter. The mean *SUEAF* is 5.09%, which suggests that the mean difference between the actual EPS and the median analyst forecast EPS is 5.09% of the quarter-end price one year prior. Additionally, the *SUEAF* sample has the least amount of observations, as the construction of the variable requires analyst forecast data, which means a stock must be followed by at least one analyst to be included in the sample. These firms are typically larger and *SUEAF* is only measurable for firms of higher market capitalization. Thus, as expected, the *SUEAF* sample has the largest mean *SIZE* of 5.58.

Table 3 shows time-series averages of quarterly correlation coefficients between the *CAR*, *SUE*, and *SUEAF* measures. These correlation coefficients are computed on a subsample of stocks that have all three measures available. As expected, *CAR* [–1, 1], [–1, 10], and [–1, 25] have the highest correlations among each other as they are the same variable calculated over different event windows. The correlation coefficient between *CAR* [–1, 1] and *CAR* [–1, 10] is 0.72, and the correlation of *CAR* [–1, 1] and *CAR* [–1, 25] is lower at 0.55; they are all statistically significant at the 1% level. This indicates that either the market is adjusting to the information content of the quarterly earnings announcement, or new information is often entering the market over the longer event window. Out of all the *CAR* measures, *SUE* and *SUEAF* are most highly correlated with *CAR* [–1, 1], with statistically significant coefficients of 0.09 and 0.05, respectively. This result is consistent with Kothari, Lewellen, and Warner (2006) and Livnat and Mendenhall (2006) in that returns in closer proximity to the announcement are reflective of earnings surprises. The correlation coefficient between *SUE* and *SUEAF* is 0.16 and statistically significant at the 1% level. The relatively lower correlations between these variables and the *CAR* measures (i.e., 0.05 and 0.09, respectively) suggest that *CAR* captures factors other than just the announcement's earnings value. Additionally, the correlation between *SUE* (*SUEAF*) and *CAR* deteriorates as the event window increases. This is consistent with the well-established notion that earnings surprises have limited explanatory power on the abnormal returns surrounding earnings announcements (Landsman & Maydew, 2002; Lev, 1989; Liu & Thomas, 2000; Ryan & Zarowin, 2003).

5.2 Portfolio performance ranking and comparison

We classify stocks into volume quintiles (1–5) in Table 4, based on where the event-period volume ranks in the distribution of reference-period volume. Event-period volume is defined by the average daily turnover in the [–6, –2] window, and reference-period volume is defined by the daily turnovers in the window [–61, –12]. Stocks are classified as *LOW* if event-period volume falls into quintile 1 and *HIGH* if it falls into quintile 5. *HIGH* minus *LOW* indicates the premium (or surprise difference) between volume quintiles 5 and 1. The weightings for quarterly average *CAR* correspond to the number of observations in each quintile per quarter. Announcement premiums are measured by *CAR*—that is, the CAR over the three event-period windows [–1, 1], [–1, 10], and [–1, 25] (in %). By analogy, we classify stocks into timing quintiles (1–5) in Table 5, where stocks are classified as *EARLY* if event-period timing falls into quintile 1 and *LATE* if it falls into quintile 5.

By comparing Tables 4 and 5, we find that the importance of the volume effect is evident as indicated by the significant *HIGH* minus *LOW* premium of *CAR* across all three windows in Panel A of Table 4, while the timing effect is noted, as none of the *EARLY* minus *LATE* premiums of *CAR* is significant (see Panel A, Table 5). In addition, *HIGH* (*LOW*) has been appropriately reflected in analysts' reports, as indicated by the insignificance of the average earnings surprises (*SUE*, *SUEAF*) in *HIGH* minus *LOW* (see Panel B, Table 4). On the contrary, *EARLY* (*LATE*) has not been adequately considered by the analysts, as average earnings surprises (*SUE*, *SUEAF*) in *EARLY* minus *LATE* are both significant (see Panel B, Table 5).

We rank and compare the time-series average *CAR* of various volume, timing, and interaction portfolios over event windows [–1, 1], [–1, 10], and [–1, 25] and present the results in Table 6. Interaction portfolios are composed of the announcing stocks that concurrently meet the criteria of unusual volume and early or late timing. The *CAR* of each portfolio is in bold and displayed on the cross diagonal of the matrix. The difference in average *CAR* between the column and row portfolios is reported at each intersection.

Panel A of Table 6 indicates that the joint effect does not result in a larger abnormal return. The abnormal return on *EARLY_HIGH* minus *EARLY* is 0.11, and that of *EARLY_HIGH* minus *HIGH* is 0.15; however, neither of them is statistically significant. Surprisingly, for event window [–1, 1], the *LATE_LOW* outperforms the *EARLY_HIGH* portfolio by 0.32%, and shows the highest *CAR* of 0.80%, significantly different from zero at the 1% level. Furthermore, *LATE_LOW* outperforms all the other portfolios right after the announcements are made but fluctuates most actively in the following days among all portfolios. This is likely because the portfolio has an average of only six stocks per quarter. Therefore, much of the firm-specific risk in the portfolio remains undiversified.

Panel B ranks the average *CAR* of each portfolio over the [–1, 10] window. In 10 days after the announcement, it is the *LATE_HIGH* portfolio that retains the most superior average *CAR* of 1.03% and statistical significance at the 1% level. *LOW* remains the worst-performing portfolio, with an average *CAR* of 1.51%, significant at the 1% level. The *LATE_HIGH*, *EARLY_HIGH*, and *HIGH* portfolios are the top three portfolios, outperforming the rest. This implies that the announcement premium is being driven predominately by the high volume premium. The same fact was observed for the [–1, 25] window in Panel C, where a majority of portfolios based on stocks classified with unusually high volume are significantly different from those portfolios that are not so based. Additionally, none of the portfolios containing unusually high trade volume stocks is different significantly from any other. These results indicate that unusual volume dominates the earnings announcement premium with a long holding period.

For all event windows, the *LOW* portfolio earns a negative average *CAR* with increasing levels of magnitude and significance, as the event window is extended (see Panels A, B, and C). However, the *LOW* portfolio is no longer the most inferior portfolio as *EARLY_LOW* reports the lowest average *CAR* of –0.92%, significantly different from zero at the 1% level. A possible explanation is that the market tends to react more strongly to early announcers (Savor & Wilson, 2016). When early announcements are accompanied by unusually low trade volume, the market may overreact to the announcement by not fully realizing the negative implications of the information content. Thus, an *EARLY_LOW* becomes the most inferior portfolio with respect to *CAR* over the [–1, 25] window.

The above results are depicted in Figure 1, which displays the average CARs on portfolios, based on volume and timing and their combinations for the window [–1, 25]. In sum, the implication of portfolio analysis is that among the volume and timing effects, unusual trade volume is the defining factor in earnings announcement premiums. However, the portfolio approach neglects to control firm characteristics when considering volume and timing interactions. This is explored in the next subsection.

5.3 Joint-effect regression analysis result

We extend the analysis on volume and timing interaction effects through regressions using *CAR* over different event windows as the dependent variables.[8] The regression analysis allows for the isolation of volume and timing effects after controlling for various firm characteristics. Every quarter, we perform cross-sectional regressions using volume, timing, and interaction variables to explain the variations in the announcement premium. Table 7 presents the weighted average of each coefficient, where the weightings correspond to the number of observations used in each quarterly cross-sectional regression. In particular, the coefficients for *HIGH* and *LOW* are both significant across all event windows with/without considering the interactive items. This indicates that the volume effect dominates after controlling for institutional ownership (*IO*), average daily turnover for the reference period (*ADTR*), return volatility (*VOLA*), short-term preannouncement momentum (*RET_5*), and the lagged *CAR* from the previous quarterly earnings announcement (*LAG*).

The *EARLY_HIGH* coefficient is negative and statistically significant at the 5% or 10% level across three event windows, suggesting that the premiums on early and high announcers offset each other. The net effect of an announcement that is considered both early and high is given by the sum of the *HIGH*, *EARLY*, and *EARLY_HIGH* coefficients. Over the [–1, 1] window, the net effect is 0.191 + 0.182 – 0.324 = 0.049. While an *EARLY_HIGH* announcement has a net positive effect on the announcement premium, the majority of the

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[8] We first replicate the volume and timing effects separately and find that after firm characteristics, time trend, and transaction cost are controlled for, the volume effect retains, but the timing effect does not. Both *HIGH* and *LOW* are significant at the 1% level for CAR across all windows and for *SUE* and *SUEAF* as well. In addition, *EARLY* and *LOW* are insignificant across all models except for CAR over the [–1, 25] window. See Tables A.1 and A.2, which are available in the supporting materials section online.

positive effects of early and high announcements cancels each other out. Ultimately, the net effect of an early and high announcement is positive but lower than that of the isolated effects of an announcement that is considered either just early (0.182) or just high (0.191). In other words, early and high premiums do not accumulate. Similar conclusions can be drawn from the [–1, 10] and [–1, 25] windows. A possible explanation for this much weakened joint effect is that the high announcement trade volume is driven by the informed trading of insiders (Kaniel, Liu, Saar, & Titman, 2012). If these insiders have the power to determine the timing of information disclosure, they may announce early to gain a first-mover advantage in their respective industries. Conversely, insiders may not want to report earnings early in order to gather information on competitors prior to their announcement. Thus, although unusually high volume and early timing can each signal positive information, when occurring concurrently, the information is redundant. The weakened joint effect of early and high announcements is also supported in Figure 1. The average *CAR* of the *EARLY_HIGH* portfolio given by the line with triangle marker outperforms largely (marginally) the *EARLY* (*HIGH*) portfolio depicted by the line with circle (diamond) marker.

The *LATE_LOW* coefficient is significantly positive and grows in magnitude over each event window. The magnitude of this positive coefficient is the largest of all interaction effects in the regression (see Table 7). The net effect of an announcement that is considered both late and low is given by the sum of the *LATE*, *LOW*, and *LATE_LOW* coefficients. Thus, the net effect of a late and low announcement over the [–1, 1] window is given by –0.284 – 0.231 + 1.210 = 0.695. The *LATE_LOW* interaction effect is sufficiently positive to counteract the sum of the negative *LOW* and negative *LATE* main effects of an announcement for [–1, 1] window. After controlling for the effect of various firm characteristics, late and low arise as positive complementary effects on the earnings announcement premium. Figure 1 shows that immediately after the announcement date, the *LATE_LOW* portfolio represented by the line with filled-square outperforms all the others. However, as we mention in Section 5.2, because the portfolio had an average of only six stocks per quarter, it could be the case that much of the firm-specific risk in the portfolio remains undiversified.

The complementary nature of late and high announcements is depicted by the line of *LATE_HIGH* with square markers in Figure 1. The *LATE_HIGH* portfolio appears to exhibit the most severe market under-reaction. *LATE_HIGH* stocks earn a similar average *CAR* to other portfolios based on unusually high trade volume in the [–1 1] window. However, over the [–1, 10] and [–1, 25] windows, *LATE_HIGH* earns the most superior average *CARs* of 0.97% and 1.37%, respectively. Both results are statistically significant at the 1% level. The *LATE_HIGH* dummy variable is highly significant and positive over all the windows. In short, after considering the impact of firm characteristics on abnormal returns, the joint effect of late and high portfolios is positive.

The *EARLY_LOW* average *CAR* is depicted by the line with filled-triangle marker in Figure 1. The average initial reaction on the announcement day is marginally positive. This is followed by a consistently negative drift from an average *CAR* of zero to –0.92% over the [–1, 25] window and is statistically significant at the 1% level. However, the *EARLY_LOW* coefficient is negative within the *CAR* regression given in Table 7 but is not significant.

6 CONCLUSIONS

We investigate the joint effects of unusual trade volume and timing on the earnings announcement premium. We confirm that positive (negative) return premiums are strongly related to unusually high (low) trade volume in the week preceding an earnings announcement. This finding is consistent with studies such as Akbas (2016), Garfinkel and Sokobin (2006), and Frazzini and Lamont (2007). After controlling for firm characteristics, we could not find evidence to support Savor and Wilson (2016) who find that firms announcing earlier in the fiscal quarter tend to generate superior premiums. Of the joint volume and timing effects, it is the unusually high volume that retains the significant impact on the earnings announcement premium, whether combined with a late or early announcement timing, and, it is the unusually late announcement timing that retains the significant impact, whether combined with a high or low trading volume.

The primary contribution of this study is the evidence that early announcement premiums do not enhance the high volume premium. Earnings announcements that are classified as both early and with high volume do not outperform announcements that are classified high volume only. However, early and high announcers do tend to outperform announcers that are just early. This is consistent with the notion that the volume effect is greater than the timing effect. This implies that the early premium does not add to the high-volume premium when observed simultaneously. These results remain robust to portfolio analysis and regression analysis with the inclusion of several control variables. Conversely, the joint effect of late and high-volume announcements appears to be positive. A portfolio of stocks classified as both late and high volume earns the most superior abnormal returns after the three days surrounding the announcement date. The regression analysis provides significant evidence for the notion that the joint effect on premiums of late and high portfolio trading volume earnings announcements is positive.

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TABLE 1
Sample distribution

Panel A presents sample distribution by announcement type. The sample contains common stocks listed on the NYSE, NASDAQ, and Amex. Stocks are classified into volume quintiles (1–5) based on where event-period volume ranks in distribution of reference-period volume. Event-period volume is defined by the average daily turnover in the [–6, –2] window, and reference-period volume is defined by the daily turnovers in the window [–61, –12]. Stocks are classified as LOW (HIGH) if event-period volume falls into quintile 1 (quintile 5). Stocks are classified into timing quintiles (1–5) according to which trading day quintile the announcement date falls in the given fiscal quarter. Stocks are classified as EARLY (LATE) if the number of days lapsed between the end of the reporting quarter and the earnings announcement date is within quintile 1 (quintile 5). Interactive items such as EARLY_HIGH represent that a stock's quarterly earnings announcement is classified by both the specified volume and timing conditions. Panel B presents the average of quarterly intracorrelations of volume effect (ICC_V) and that of timing effect (ICC_T) for different industries, respectively. Panel C summarizes the days between announcement-type transitions. Panel D gives the sample-based ex post transition rate.

Panel A: Sample distribution by announcement type

Classification	Number of observations	
Other	162,501	
EARLY	35,443	
LATE	13,381	
HIGH	43,673	
LOW	24,671	
EARLY_HIGH		7,563
EARLY_LOW		2,944
LATE_HIGH		3,011
LATE_LOW		899
Total	279,669	

Panel B: Averaged intra-class correlation (ICC) by industry

Industry	SIC code	# of obs.	ICC_V	ICC_T
Agriculture, Forestry and Fishing	0100-0999	772	40.52%	34.27%
Mining, Construction	1000-1999	15,498	13.72%	11.00%
Manufacturing	2000-3999	103,615	6.15%	2.02%
Transportation, Communications, Electric, Gas and Sanitary service	4000-4999	27,983	17.73%	15.40%
Wholesale Trade, Retail Trade	5000-5999	24,785	8.66%	7.48%
Finance, Insurance and Real Estate	6000-6199	61,487	19.49%	14.97%
Services	7000-8999	39,644	6.04%	7.18%
Public Administration and non-classifiable	9000-9999	5,828	0.02%	7.04%
Overall ICC		279,612	6.74%	3.85%

Panel C: Days between announcement type transition					
	# of obs.	mean	STD	min	max
EARLY to LATE	1,573	157.07	303.06	55	3,831
LATE to EARLY	1,494	205.45	320.34	5	5,319
LOW to HIGH	5,288	170.52	283.74	19	6,196
HIGH to LOW	5,567	152.46	269.19	14	5,383

Panel D: Transition rate matrix:
Sample Period 1980:Q2-2019:Q4 (159 Quarters)
Average # of Stocks per Quarter: 1,759
# of Observations: 279,669

Timing quintile	1	2	3	4	5
1(EARLY)	7.16%	3.90%	0.91%	0.31%	0.59%
2	3.79%	41.52%	7.30%	2.34%	0.58%
3	0.89%	7.57%	8.07%	1.76%	0.99%
4	0.30%	2.45%	1.85%	2.31%	0.59%
5(LATE)	0.56%	0.58%	1.12%	0.61%	1.96%
Volume quintile	1	2	3	4	5
1(LOW)	1.18%	2.05%	2.47%	2.42%	1.98%
2	1.99%	4.01%	5.00%	5.01%	3.87%
3	2.46%	4.98%	6.43%	6.42%	4.99%
4	2.52%	5.04%	6.44%	6.55%	4.84%
5(HIGH)	2.08%	3.93%	4.92%	4.82%	3.61%

TABLE 2

Summary statistics for CAR, SUE, and SUEAF

This table presents time-series averages of quarterly summary statistics for CAR, SUE, and SUEAF sample firm characteristics. All three samples comprise of common stocks listed on the NYSE, NASDAQ, and Amex. Panel A contains summary statistics for the CAR sample, where CAR is the cumulative abnormal return over the three event-period windows [–1, 1], [–1, 10], and [–1, 25] (in %). Panel B contains summary statistics for the SUE sample, where SUE (standardized unexpected earnings) is the difference between EPS in quarters q and q-4, divided by the quarter-end price at q-4 (in %). Panel C contains summary statistics for the SUEAF sample, where SUEAF is the difference between the median analyst forecast for the EPS and the actual EPS in quarter q, divided by the quarter-end price at q-4 (in %). SIZE is the stock's market value of equity (in billions), BM is the book-to-market ratio calculated at the quarter-end preceding the quarterly earnings announcement. IO is the percentage of institutional ownership of the firm's shares as reported in the 13F filings. RET_50 is the reference-period return (in %) calculated over the 50-day window [–61, –12]. RET_5 is the reference-period return (in %) calculated over the 5-day window [–6, –2]. VOLA is the standard deviation of daily returns (in %) over the 10-day window [–11, –2]. ADTR is the average daily turnover (in %) for the reference-period window [–61, –12]. LAG is the surprise measure or announcement premium in the preceding quarter. TIME is calculated by (DATE-01/01/1980)/(365*40). B/A spread represents the bid ask spread.

Panel A: CAR Sample Sample Period 1980:Q2-2019:Q4 (159 Quarters) Average # of Stocks per Quarter: 1,759, # of Observations: 279,669								
	Mean	t-stat	Median	STD	P10	P25	P75	P90
CAR [-1, 1]	0.19***	13.32	0.08	7.62	-7.34	-3.02	3.41	7.99
CAR [-1, 10]	0.11***	4.98	0.08	11.86	-12.49	-5.54	5.73	12.79
CAR [-1, 25]	0.01	0.44	0.02	17.80	-18.91	-8.53	8.58	18.93
SIZE	4.13***	122.20	0.50	17.88	0.05	0.14	1.89	6.94
BM	0.60***	761.66	0.52	0.42	0.18	0.31	0.79	1.11
IO	0.49***	726.52	0.50	0.36	0.00	0.15	0.82	1.00
ADTR	0.63***	340.89	0.37	0.98	0.08	0.17	0.78	1.41
VOLA	2.42***	689.10	1.95	1.86	0.90	1.29	2.97	4.40
RET_5	0.32***	26.36	0.12	6.45	-5.82	-2.45	2.94	6.64
RET_50	3.63***	102.59	3.42	18.71	-15.14	-5.39	12.65	23.39
TIME	1.04***	2149.79	1.02	0.26	0.67	0.85	1.25	1.38
B/A_SPREAD	1.47***	30.10	0.75	25.90	0.25	0.42	1.40	2.50
LAG[-1, 1]	0.28***	18.43	0.11	8.06	-7.23	-3.00	3.49	8.14
LAG[-1, 10]	0.14***	4.99	0.09	15.05	-12.49	-5.55	5.82	12.93
LAG[-1, 25]	-0.04	-0.82	0.07	24.32	-19.17	-8.60	8.68	19.14

Panel B: SUE Sample Sample Period 1980:Q2-2019:Q4 (159 Quarters) Average # of Stocks per Quarter: 1,521, # of Observations: 241,774								
	Mean	t-stat	Median	STD	P10	P25	P75	P90
SUE	0.27***	40.25	0.16	3.32	-1.52	-0.38	0.67	1.88
SIZE	4.54***	118.08	0.57	18.90	0.06	0.16	2.15	7.88
BM	0.60***	732.90	0.52	0.40	0.19	0.32	0.79	1.11
IO	0.52***	707.84	0.54	0.36	0.00	0.17	0.85	1.00
ADTR	0.62***	329.47	0.38	0.94	0.08	0.17	0.79	1.40
VOLA	2.33***	653.65	1.89	1.75	0.88	1.27	2.85	4.21
RET_5	0.33***	25.91	0.13	6.18	-5.62	-2.38	2.89	6.46
RET_50	3.57***	99.77	3.45	17.58	-15.40	-5.12	12.35	22.57
TIME	1.05***	2004.91	1.08	0.26	0.67	0.86	1.26	1.38
B/A_SPREAD	1.54***	27.16	0.75	27.81	0.25	0.43	1.45	2.59
LAG_SUE	0.32***	46.91	0.17	3.36	-1.49	-0.37	0.69	1.96

Panel C: SUEAF Sample Sample Period 1985:Q2-2019:Q4 (139 Quarters) Average # of Stocks per Quarter: 884, # of Observations: 122,848								
	Mean	t-stat	Median	STD	P10	P25	P75	P90
SUEAF	5.09***	41.56	0.03	0.43	-0.46	-0.08	0.19	0.66
SIZE	5.58***	96.73	0.99	20.23	0.15	0.34	3.22	10.52
BM	0.54***	519.94	0.47	0.36	0.17	0.29	0.71	0.98
IO	0.61***	648.17	0.67	0.33	0.00	0.38	0.89	1.00
ADTR	0.81***	296.98	0.57	0.96	0.16	0.30	1.02	1.69
VOLA	2.40***	470.48	1.94	1.79	0.93	1.31	2.91	4.32
RET_5	2.99***	16.25	0.21	6.44	-5.95	-2.54	3.05	6.64
RET_50	3.14***	60.30	3.33	18.27	-16.84	-5.75	12.29	22.73
TIME	1.14***	2033.75	1.15	0.20	0.87	1.00	1.28	1.38
B/A_SPREAD	1.63***	28.51	0.97	20.06	0.32	0.52	1.75	3.03
LAG_SUEAF	5.25***	42.39	0.03	0.43	-0.44	-0.08	0.20	0.70

TABLE 3

Announcement premium and earnings surprise measure correlation matrix

This table presents time-series averages of correlation coefficients between all announcement premium and earnings surprise measures. Announcement premiums are measured by CAR, the cumulative abnormal return over the three event-period windows [–1, 1], [–1, 10], and [–1, 25] (in %). Earnings surprises are measured by SUE and SUEAF. SUE (standardized unexpected earnings) is the difference between EPS in quarters q and q-4, divided by the quarter-end price at q-4 (in %). SUEAF is the difference between the median analyst forecast for the EPS and the actual EPS in quarter q, divided by the quarter-end price at q-4 (in %). The sample is comprised of stocks where the CAR, SUE, and SUEAF measures are all available.

Joint Sample Correlation Matrix
Sample Period 1985:Q2-2019:Q4 (139 Quarters)

	CAR [-1, 1]	CAR [-1, 10]	CAR [-1, 25]	SUE	SUEAF
CAR [-1, 1]	1.00	0.72***	0.55***	0.09***	0.05***
		(87.80)	(46.76)	(5.78)	(3.22)
CAR [-1, 10]	0.72***	1.00	0.79***	0.05***	0.03**
	(87.80)		(130.74)	(3.80)	(2.02)
CAR [-1, 25]	0.55***	0.79***	1.00	0.01	0.01
	(46.76)	(130.74)		(1.10)	(0.93)
SUE	0.09***	0.05***	0.01	1.00	0.16***
	(5.18)	(3.80)	(1.10)		(8.36)
SUEAF	0.05***	0.03***	0.01	0.16***	1.00
	(3.22)	(2.02)	(0.93)	(8.36)	

TABLE 4

Announcement premiums and earnings surprises in volume portfolios

This table presents the time-series averages of announcement premiums and earnings surprises on portfolios based on trade volume preceding quarterly earnings announcements. Stocks are classified into volume quintiles (1–5) based on where event-period volume ranks in distribution of reference-period volume. HIGH minus LOW indicates the average premium or surprise difference between volume quintile 5 and 1. Weightings correspond to the number of observations in each quintile per quarter. Announcement premiums are measured by CAR, the cumulative abnormal return over the three event-period windows [–1, 1], [–1, 10], and [–1, 25] (in %). The CAR sample contains 279,669 observations over the period 1980:Q2 to 2015:Q4. Earnings surprises are measured by SUE and SUEAF. SUE (standardized unexpected earnings) is the difference between EPS in quarters q and q-4, divided by the quarter-end price at q-4 (in %). The SUE sample contains 241,774 observations over the period 1980:Q2 to 2019:Q4. SUEAF is the difference between the median analyst forecast for the EPS and the actual EPS in quarter q, divided by the quarter-end price at q-4 (in %). The SUEAF sample contains 122,848 observations over the period 1985:Q2 to 2019:Q4. Each sample contains common stocks listed on the NYSE, NASDAQ, and Amex. Newey and West (1987) adjusted *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Average Announcement Premiums in Volume Quintiles

Volume Quintile	Average CAR [-1, 1]	Average CAR [-1, 10]	Average CAR [-1, 25]
5 (HIGH)	0.3536***	0.5865***	0.7938***
	(6.24)	(8.32)	(8.4)
4	0.2893***	0.3495***	0.3323***
	(5.18)	(5.17)	(3.09)
3	0.1508***	-0.019	-0.174**
	(3.97)	(-0.36)	(-2.16)
2	0.0748	-0.181**	-0.511***
	(1.71)	(-2.54)	(-4.91)
1 (LOW)	-0.026	-0.484***	-0.758***
	(-0.44)	(-3.47)	(-4.01)
HIGH minus LOW	0.38***	1.07***	1.56***
	(4.58)	(6.85)	(7.34)

Panel B: Average Earnings Surprises in Volume Quintiles

Volume Quintile	Average SUE	Average SUEAF
5 (HIGH)	0.2886***	0.045906***
	(2.94)	(3.30)
4	0.2993***	0.044067***
	(3.24)	(3.30)
3	0.2818***	0.05176***
	(3.17)	(3.33)
2	0.2389**	0.056112***
	(2.57)	(3.32)
1 (LOW)	0.2138*	0.061103***
	(1.85)	(3.88)
HIGH minus LOW	0.075	-0.0152
	(0.49)	(0.72)

TABLE 5

Announcement premiums and earnings surprises in timing portfolios

This table presents the time-series averages of announcement premiums (CAR [–1, 1], CAR [–1, 10], and CAR [–1, 25]) and earnings surprises (SUE and SUEAF) on portfolios based on quarterly announcement timing. Stocks are classified into timing quintiles (1–5) according to which trading day quintile the announcement date falls in the given fiscal quarter. EARLY minus LATE indicates the average premium or surprise difference between timing quintile 1 and 5. Weightings correspond to the number of observations in each quintile per quarter. Announcement premiums are measured by CAR, the cumulative abnormal return over the three event-period windows [–1, 1], [–1, 10], and [–1, 25] (in %). The CAR sample contains 279,669 observations over the period 1980:Q2 to 2015:Q4. Earnings surprises are measured by SUE and SUEAF. The SUE sample contains 241,774 observations over the period 1980:Q2 to 2019:Q4. SUEAF is the difference between the median analyst forecast for the EPS and the actual EPS in quarter q, divided by the quarter-end price at q-4 (in %). The SUEAF sample contains 122,848 observations over the period 1985:Q2 to 2019:Q4. Each sample contains common stocks listed on the NYSE, NASDAQ, and Amex. Newey and West (1987) adjusted *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Average Announcement Premiums in Timing Quintiles			
Timing Quintile	Average CAR [-1, 1]	Average CAR [-1, 10]	Average CAR [-1, 25]
5 (LATE)	0.3438***	0.4717***	0.457*
	(4.21)	(3.07)	(1.84)
4	0.1443**	0.0804	0.3095**
	(2.05)	(0.78)	(2.02)
3	0.0264	-0.152**	-0.301***
	(0.49)	(-1.97)	(-2.78)
2	0.1966***	0.1163**	0.0022
	(5.29)	(1.91)	(0.03)
1 (EARLY)	0.3977***	0.3827***	0.146
	(4.52)	(3.54)	(1.50)
EARLY minus LATE	0.054	-0.089	-0.23
	(0.45)	(-0.47)	(-0.82)

Panel B: Average Earnings Surprises in Timing Quintiles		
Timing Quintile	Average SUE	Average SUEAF
5 (LATE)	0.1176*	0.0985**
	(1.71)	(2.59)
4	0.2997	0.03834***
	(1.5)	(3.77)
3	0.2307	0.0478***
	(1.56)	(3.63)
2	0.2865***	0.0542***
	(3.26)	(11.67)
1 (EARLY)	0.3061***	0.03079***
	(8.2)	(2.61)
EARLY minus LATE	0.189**	0.067*
	(2.41)	(1.70)

TABLE 6

Announcement premiums in volume, timing, and interaction portfolios

The matrixes use average cumulative abnormal returns (CARs) to rank and compare portfolios formed based on announcement volume and timing criteria. Portfolios are formed every quarter, and average CAR is calculated using a quarterly weighted time-series average over several event windows. Weightings correspond to the number of observations in each portfolio per quarter. The criteria of volume and timing portfolios HIGH/LOW and EARLY/LATE are given in Tables 3 and 5, respectively. Portfolios EARLY_HIGH, EARLY_LOW, LATE_HIGH, and LATE_LOW are formed by the stocks that exist in both the volume and timing portfolios identified. The CAR of each portfolio is in bold and displayed on the cross diagonal of the matrix. Intersections between two different portfolios contain the difference in CAR between the given portfolios, identified by column and row. When calculating the difference in portfolio CAR, stocks that appear in both portfolios are removed. Panels A, B, and C correspond to CAR event windows [–1, 1], [–1, 10], and [–1, 25], respectively. Newey and West (1987) adjusted *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Average CAR [–1, 1] return difference matrix

PORTFOLIO	LATE_LOW	EARLY_HIGH	LATE_HIGH	EARLY	HIGH	LATE	EARLY_LOW	LOW
LATE_LOW	**0.80*****							
	(3.69)							
EARLY_HIGH	0.32	**0.48*****						
	(1.27)	**(3.69)**						
LATE_HIGH	0.35*	0.02	**0.46*****					
	(1.28)	(0.12)	**(2.81)**					
EARLY	0.41*	0.11	0.06	**0.40*****				
	(1.73)	(0.69)	(0.32)	**(4.52)**				
HIGH	0.45*	0.15	0.11*	0.04	**0.35*****			
	(2.0)	(1.06)	(0.63)	(0.43)	**(6.24)**			
LATE	0.49**	0.14**	0.15**	0.054	0.04	**0.34*****		
	(2.11)	(0.89)	(0.78)	(0.45)	(0.34)	**(4.21)**		
EARLY_LOW	0.80***	0.47**	0.45**	0.43**	0.35**	0.34*	**0.01**	
	(2.91)	(2.25)	(1.94)	(2.28)	(1.98)	(1.82)	**(0.04)**	
LOW	0.86***	0.51***	0.48***	0.46***	0.38***	0.36***	0.04*	**–0.03**
	3.77	(3.53)	(2.78)	(4.24)	(4.58)	(3.44)	(0.21)	**(–0.44)**
Average # of obs. per quarter	6	48	19	223	275	84	19	155

Panel B: Average CAR [–1, 10] return difference matrix

PORTFOLIO	LATE_HIGH	EARLY_HIGH	HIGH	LATE	EARLY	LATE_LOW	EARLY_LOW	LOW
LATE_HIGH	**1.03*****							
	(3.85)							
EARLY_HIGH	0.34**	**0.68*****						
	(1.09)	**(4.07)**						
HIGH	0.47*	0.11	**0.59*****					
	(1.69)	(0.63)	**(8.32)**					
LATE	0.72**	0.21	0.25	**0.47*****				
	(2.32)	(0.93)	(1.45)	**(3.07)**				
EARLY	0.64**	0.38*	0.27**	0.09	**0.38*****			
	(2.24)	(1.9)	(2.07)	(0.47)	**(3.54)**			

LATE_LOW	0.88*	0.54**	0.44	0.34	0.23*	**0.15**		
	(1.82)	(1.23)	(1.07)	(0.8)	(0.56)	**(0.38)**		
EARLY_LOW	1.60***	1.26***	1.16***	1.04***	1.04***	0.72	**–0.48*****	
	(4.57)	(4.45)	(4.89)	(3.8)	(4.1)	(1.57)	**(–3.47)**	
LOW	1.51***	1.17***	1.07***	1.00***	0.94***	0.65	0.1	**–0.57****
	(5.02)	(5.35)	(6.85)	(4.68)	(5.07)	(1.55)	(0.36)	**(–2.52)**
Avg. # of obs. per quarter	19	48	275	84	223	6	19	155

Panel C: Average CAR [–1, 25] return difference matrix

PORTFOLIO	LATE_HIGH	EARLY_HIGH	HIGH	LATE	LATE_LOW	EARLY	LOW	EARLY_LOW
LATE_HIGH	**1.23*****							
	(3.28)							
EARLY_HIGH	0.37	**0.86*****						
	(0.81)	**(3.26)**						
HIGH	0.46	0.08	**0.79*****					
	(1.2)	(0.28)	**(8.4)**					
LATE	1.00**	0.41	0.54*	**0.46***				
	(2.18)	(1.12)	(1.92)	**(1.84)**				
LATE_LOW	0.98	0.61	0.54	0.22	**0.26**			
	(1.36)	(0.91)	(0.87)	(0.33)	**(0.42)**			
EARLY	1.01**	0.82***	0.74***	0.23	–0.04	**0.22**		
	(2.51)	(2.71)	(4.37)	(0.82)	(–0.06)	**(1.50)**		
LOW	1.99***	1.62***	1.56***	1.26***	–1.05	1.06***	**–0.76*****	
	(4.73)	(4.98)	(7.34)	(3.91)	(–1.64)	(4.23)	**(–4.01)**	
EARLY_LOW	2.15***	1.78***	1.71***	1.38***	1.18*	1.24***	0.18	**–0.92*****
	(4.39)	(4.34)	(5.22)	(3.43)	(1.72)	(3.57)	(0.48)	**(–2.93)**
Avg. # of obs. per quarter	19	48	275	84	6	223	155	19

TABLE 7

Volume and timing interactions on announcement premiums

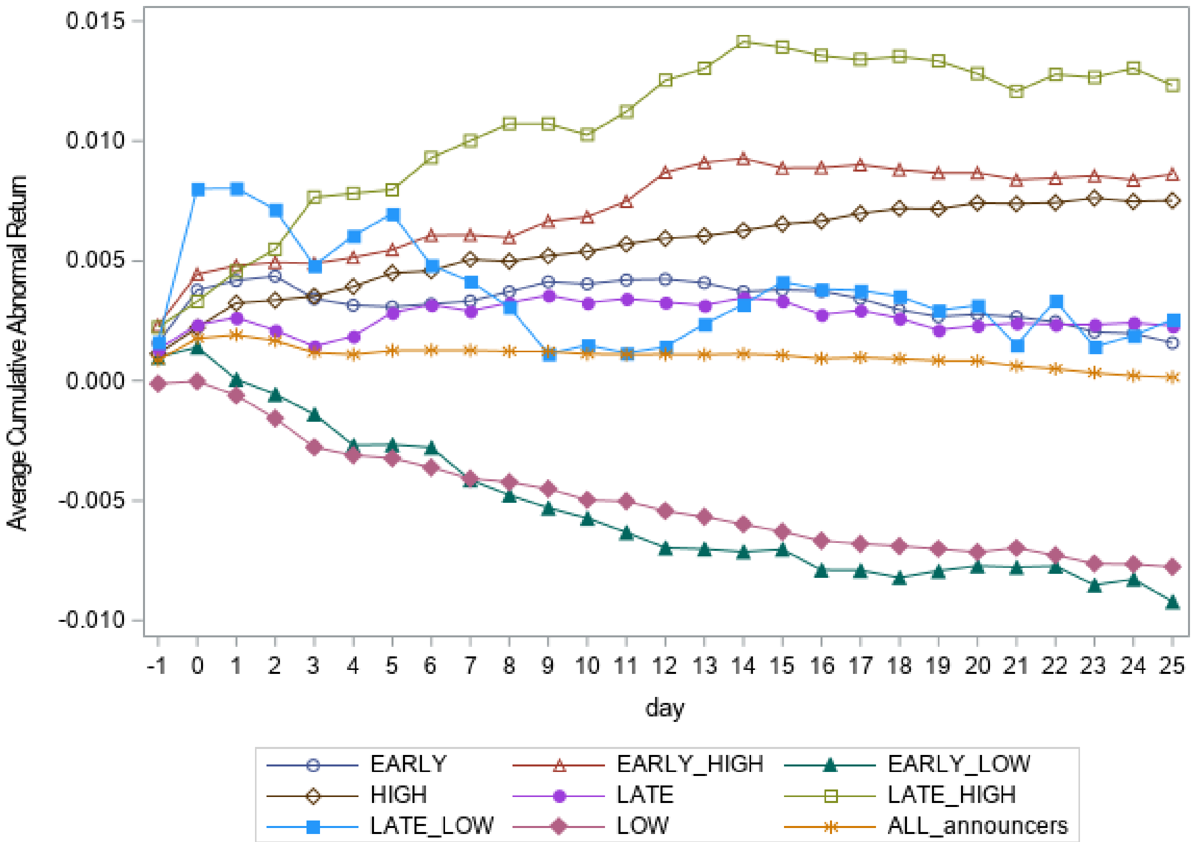
This table presents quarterly weighted Fama and MacBeth (1973) regression coefficients using announcement premiums as dependent variables. Weightings correspond to the number of observations used in each quarterly cross-sectional regression. Announcement premiums are measured by CAR, the cumulative abnormal return over the three event-period windows [–1, 1], [–1, 10], and [–1, 25] (in %). The sample contains common stocks listed on the NYSE, NASDAQ, and Amex. HIGH, LOW, EARLY, LATE, EARLY_HIGH, EARLY_LOW, LATE_HIGH, and LATE_LOW are dummy variables that equal one if the stock's quarterly earnings announcement is classified as the corresponding specified condition. The remaining control variables are defined in Table 2. A log transformation is performed on ADTR, and the average daily turnover for the reference period [–61, –12]. Coefficient estimates are multiplied by 100. Newey and West (1987) adjusted *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	CAR [–1, 1] (1)	CAR [–1, 1] (2)	CAR [–1, 10] (3)	CAR [–1, 10] (4)	CAR [–1, 25] (5)	CAR [–1, 25] (6)
Intercept	5.397	4.967	12.794	12.678	14.084	14.223
	(0.87)	(0.80)	(1.20)	(1.21)	(0.75)	(0.77)
HIGH	0.161***	0.191***	0.476***	0.516***	0.663***	0.707***
	(3.15)	(3.54)	(5.65)	(5.82)	(6.22)	(5.97)
LOW	–0.188***	–0.231***	–0.535***	–0.562***	–0.546***	–0.633***
	(–2.73)	(–2.84)	(–4.26)	(–4.36)	(–3.28)	(–3.56)
EARLY	0.085	0.182**	0.064	0.242*	–0.020	0.195
	(1.60)	(2.28)	(0.66)	(1.67)	(–0.13)	(0.85)
LATE	0.024	–0.284	–0.248	–0.702	–0.705	–1.133
	(0.16)	(–1.60)	(–0.68)	(–1.59)	(–1.22)	(–1.77)
EARLY_HIGH		–0.324*		–0.555**		–0.776*
		(–1.79)		(–2.1)		(–1.88)
EARLY_LOW		–0.335		–0.867		–1.148
		(–0.92)		(–1.53)		(–1.46)
LATE_HIGH		0.875**		1.408**		1.243*
		(2.15)		(2.48)		(1.70)
LATE_LOW		1.210***		1.425**		1.492**
		(2.93)		(2.27)		(2.01)
IO	0.762***	0.765***	1.567***	1.572***	2.385***	2.389***
	(9.05)	(9.10)	(11.35)	(11.39)	(12.27)	(12.21)
LOG_ADTR	–0.270***	–0.271***	–0.543***	–0.545***	–0.870***	–0.870***
	(–11.61)	(–11.59)	(–11.44)	(–11.48)	(–11.69)	(–11.75)
VOLA	5.513***	5.663***	6.726	6.922	14.347	14.579*
	(3.21)	(3.31)	(1.56)	(1.61)	(1.65)	(1.68)
RET_5	–6.671***	–6.683***	–9.660***	–9.652***	–9.232***	–9.195***
	(–8.64)	(–8.65)	(–8.98)	(–8.98)	(–5.95)	(–5.94)
LAG	–0.517	–0.522	–7.686***	–7.705***	–16.909***	–16.920***
	(–1.55)	(–1.57)	(–18.57)	(–18.58)	(–17.61)	(–17.60)
TIME	–7.450	–7.071	–16.254*	–16.182*	–18.046	–18.210
	(–1.33)	(–1.26)	(–1.77)	(–1.8)	(–1.1)	(–1.12)
B/A_SPREAD	0.035	0.003	–0.081**	–0.081***	–0.221***	–0.221***

	(0.17)	(0.17)	(–2.77)	(–2.74)	(–4.32)	(–4.30)
Adj. R^2	1.123%	1.182%	2.098%	2.125%	5.019%	5.037%
# of obs.	279,669	279,669	279,669	279,669	241,774	122,848
Sample period	1980:Q2–2019:Q4	1980:Q2–2019:Q4	1980:Q2–2019:Q4	1980:Q2–2019:Q4	1980:Q2–2019:Q4	1985:Q2–2019:Q4
# of quarters	159	159	159	159	159	139

FIGURE 1

Average cumulative abnormal return on volume, timing, and interaction portfolios



This graph depicts the average cumulative abnormal return for portfolios formed based on volume and timing criteria over the event window [–1, 25]. Portfolios are formed every quarter and average CAR is calculated using a quarterly weighted time-series average over several event windows. Weightings correspond to the number of observations in each portfolio per quarter. The criteria of volume and timing portfolios HIGH/LOW and EARLY/LATE as well as the interaction portfolios EARLY_HIGH, EARLY_LOW, LATE_HIGH, and LATE_LOW are given in Table 1.

ONLINE TABLES

TABLE A.1

Unusual volume signaling announcement premiums and earnings surprises

This table presents quarterly weighted Fama and MacBeth (1973) regression coefficients using announcement premiums and earnings surprises as dependent variables. Weightings correspond to the number of observations used in each quarterly cross-sectional regression. Announcement premiums are measured by CAR, the cumulative abnormal return over the three event-period windows [–1, 1], [–1, 10], and [–1, 25] (in %). Earnings surprises are measured by SUE and SUEAF. SUE (standardized unexpected earnings) is the difference between EPS in quarters q and q-4, divided by the quarter-end price at q-4 (in %). SUEAF is the difference between the median analyst forecast for the EPS and the actual EPS in quarter q, divided by the quarter-end price at q-4 (in %). Each sample contains common stocks listed on the NYSE, NASDAQ, and Amex. A stock's event-period volume over the window [–6, –2] is classified unusually high (low) if it falls in the top (bottom) 20% of its reference-period volume over the window [–61, –12]. LOW is a dummy variable that equals one if a stock's event-period volume is classified as unusually low. HIGH is a dummy variable that equals one if a stock's event-period volume is classified as unusually high. The remaining control variables are defined in Table 1. Log transformations are applied to SIZE, BM, and ADTR. CAR regressions do not include the SIZE, BM, or RET_50 control variables because the CAR variable has been constructed with respect to size, book-to-market, and momentum premiums. Coefficient estimates are multiplied by 100. Newey and West (1987) adjusted *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	CAR [-1, 1] (1)	CAR [-1, 10] (2)	CAR [-1, 25] (3)	SUE (4)	SUEAF (5)
Intercept	6.141	12.642	14.376	-4.376	56.695
	(1.00)	(1.21)	(0.80)	(-0.61)	(0.90)
HIGH	0.167***	0.486***	0.674***	-0.015	0.278
	(3.24)	(5.81)	(6.30)	(-1.07)	(0.48)
LOW	-0.196***	-0.538***	-0.545	-0.061**	0.137
	(-2.84)	(-4.30)	(-3.31)***	(-2.14)	(0.45)
IO	0.780***	1.593***	2.395***	0.113***	2.599***
	(9.12)	(11.38)	(12.24)	(2.90)	(2.83)
ADTR	-0.270***	-0.545***	-0.874***	0.011	1.207***
	(-11.65)	(-11.49)	(-11.75)	(0.37)	(3.12)
VOLA	5.443***	6.593	14.343	2.991	-5.083
	(3.21)	(1.53)	(1.64)	(1.28)	(-0.33)
RET_5	-6.597***	-9.503***	-9.019***	1.523***	-3.023
	(-8.53)	(-8.75)	(-5.77)	(8.48)	(-0.96)
LAG	-0.512	-7.660***	-16.888***	28.270***	44.162***
	(-1.54)	(-18.56)	(-17.58)	(20.29)	(12.32)
TIME	-7.944	-15.921**	-18.085	3.998	-35.968
	(-1.46)	(-1.78)	(-1.14)	(0.68)	(0.76)
B/A_SPREAD	0.004	-0.080***	-0.220***	0.018**	-0.185**

	(0.22)	(-2.75)	(-4.31)	(2.54)	(-2.08)
SIZE	-	-	-	-0.002***	-0.005
	-	-	-	(-3.06)	(-0.86)
BM	-	-	-	-0.069	-3.364***
	-	-	-	(-0.85)	(-3.20)
RET_50	-	-	-	1.252***	-0.422
	-	-	-	(7.73)	(-0.47)
Adj. R^2	1.087%	2.033%	4.914%	10.184%	26.693%
# of obs.	279,669	279,669	279,669	241,774	122,848
Sample Period	1980:Q2-2019:Q4	1980:Q2-2019:Q4	1980:Q2-2019:Q4	1980:Q2-2019:Q4	1985:Q2-2019:Q4
# of Quarters	159	159	159	159	139

TABLE A.2

Timing as predictor of announcement premiums and earnings surprises

This table presents quarterly weighted Fama and MacBeth (1973) regression coefficients using announcement premiums and earnings surprises as dependent variables. Weightings correspond to the number of observations used in each quarterly cross-sectional regression. Announcement premiums are measured by CAR, the cumulative abnormal return over the three event-period windows [–1, 1], [–1, 10], and [–1, 25] (in %). Earnings surprises are measured by SUE and SUEAF. SUE (standardized unexpected earnings) is the difference between EPS in quarters q and q-4, divided by the quarter-end price at q-4 (in %). SUEAF is the difference between the median analyst forecast for the EPS and the actual EPS in quarter q, divided by the quarter-end price at q-4 (in %). Each sample contains common stocks listed on the NYSE, NASDAQ, and Amex. A stock's quarterly earnings announcement is classified as early (late) if the date of the announcement falls in the first (last) quintile of the given fiscal quarter. EARLY and LATE dummy variables are constructed accordingly. The remaining control variables are defined in Table 1. Log transformations are applied to SIZE, BM, and ADTR. CAR regressions do not include the SIZE, BM, or RET_50 control variables because the CAR variable has been constructed with respect to size, book-to-market, and momentum premiums. Coefficient estimates are multiplied by 100. Newey and West (1987) adjusted *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	CAR [-1, 1] (1)	CAR [-1, 10] (2)	CAR [-1, 25] (3)	SUE (4)	SUEAF (5)
Intercept	5.659	13.349	15.485	-5.310	28.760
	(0.92)	(1.25)	(0.82)	(-0.71)	(0.42)
EARLY	0.089	0.080	-0.001	0.068**	0.435
	(1.64)	(0.81)	(-0.01)	(2.0)	(1.03)
LATE	0.031	-0.211	-0.661	-0.018	0.052
	(0.21)	(-0.58)	(-17.68)***	(-0.18)	(0.05)
IO	0.771***	1.598***	2.424***	0.1051***	2.575***
	(9.14)	(11.17)	(12.17)	(2.85)	(2.80)
ADTR	-0.286***	-5.87***	-0.923***	0.008	0.842***

	(-12.03)	(-10.97)	(-11.51)	(0.28)	(3.56)
VOLA	6.699***	10.164**	18.912**	3.076	9.053
	(3.72)	(2.34)	(2.16)	(1.35)	(0.75)
RET_5	-6.525***	-9.363***	-8.917***	1.527***	-1.308
	(-8.68)	(-9.04)	(-5.90)	(8.46)	(-0.51)
LAG	-0.505	-7.682***	-16.917***	28.256***	44.156***
	(-1.53)	(-18.66)	(-17.68)	(20.34)	(12.32)
TIME	-7.773	-17.042*	-19.572	4.791	-18.089
	(-1.39)	(-1.86)	(-1.18)	(0.78)	(-0.36)
B/A_SPREAD	0.004	-0.080***	-0.220***	0.0174**	-0.198**
	(0.18)	(-2.71)	(-4.27)	(2.42)	(-2.14)
SIZE	-	-	-	-0.002***	-0.006
	-	-	-	(-3.18)	(-0.99)
BM	-	-	-	-0.065	-3.387***
	-	-	-	(-0.81)	(-3.22)
RET_50	-	-	-	1.257***	-0.401
	-	-	-	(7.75)	(-0.44)
Adj. R^2	1.10%	2.027%	4.95%	10.208%	26.810%
# of obs.	279,669	279,669	279,669	241,774	122,848
Sample Period	1980:Q2-2019:Q4	1980:Q2-2019:Q4	1980:Q2-2019:Q4	1980:Q2-2019:Q4	1985:Q2-2019:Q4
# of Quarters	159	159	159	159	139