Asymmetric Timeliness and the Resolution of Investor Disagreement and Uncertainty at Earnings Announcements

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Abstract

This study finds that higher asymmetric timeliness decreases the speed with which equity investor disagreement and uncertainty at earnings announcements resolve. These findings indicate that a potential cost of asymmetric timeliness is less transparent earnings, which impedes equityholders’ ability to discern the valuation implications of earnings when they are announced. We also find that during the earnings announcement period after the initial price reaction to the announcement, firms with higher levels of asymmetric timeliness have positive stock returns and higher levels of stock purchases by insiders.
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1. Introduction

This study examines whether earnings with greater asymmetric timeliness is associated with a decrease in the speed with which equity investor disagreement and uncertainty at earnings announcements resolve. Asymmetric timeliness is a property of accounting earnings that recognizes good news on a less timely basis than bad news. Although prior studies find evidence of benefits to equityholders of firms with earnings that exhibit asymmetric timeliness, there is less evidence relating to costs to equityholders. One potential cost is less earnings transparency, which increases the time it takes investors to assess the valuation implications of earnings when they are announced. We predict and find evidence of such costs, in that higher asymmetric timeliness is associated with a decrease in the speed with which equity investor disagreement and uncertainty at earnings announcements resolve. We also predict and find that firms with higher levels of asymmetric timeliness have positive stock returns and higher levels of stock purchases by insiders during the earnings announcement period after the initial price reaction to the announcement.

One of the most widely documented empirical regularities in the accounting literature is the asymmetric timeliness of earnings, which is evidenced by a larger response coefficient for negative return than for positive return in an earnings-return regression. Many studies view this as evidence of conservative accounting practices, the benefits of which have been widely discussed in the literature. For example, prior literature concludes that conservatism helps to minimize contracting costs between debtholders and the firm, and to reduce managers’ incentives and ability to manipulate accounting amounts. Thus, conservatism benefits both debtholders and equityholders. However, the literature also provides evidence that asymmetric
timeliness of earnings varies by industry and over time, which is consistent with there being costs to conservative accounting that offset benefits.

We address our research question by developing a measure of asymmetric timeliness of earnings that varies cross-sectionally and intertemporally, and testing whether the measure has a significantly negative relation with measures reflecting the speed with which investor disagreement and uncertainty at earnings announcements resolve. Finding a negative relation implies that investor disagreement and uncertainty resolve more slowly with higher levels of asymmetric timeliness. Our measure of asymmetric timeliness is based on the Basu (1997) asymmetric timeliness coefficient, and uses a two-step estimation approach adapted from Barth, Konchitchki, and Landsman (2013). Our resolution measures are based on earnings announcement equity trading volume and stock return volatility, which are two commonly employed measures of information content. Specifically, our measures are the ratios of the sums of daily volume and volatility during the initial earnings announcement period to those in the full announcement period, where the initial (full) period is the four (22) days beginning one day before the annual earnings announcement. Lower ratios indicate that investor disagreement and uncertainty resolve more slowly.

We test our predictions by estimating the relation between our resolution measures and our asymmetric timeliness measure, including two sets of controls. Findings from tests that include as controls size, the equity book-to-market ratio, leverage, and analyst following are based on 37,305 annual earnings announcements associated with fiscal year ends from 1994 to 2011; findings from tests that include additional controls are based on 23,150 earnings announcements.

The findings from our tests are consistent with the prediction that asymmetric timeliness
is significantly negatively related to both resolution measures. These findings indicate that asymmetric timeliness is associated with a delay in the time it takes for resolution of investor disagreement as reflected in trading volume, and a delay in the time it takes for average investor beliefs to update fully as reflected in equity volatility.

Because higher asymmetric timeliness requires investors to spend more time interpreting the information in earnings announcements and information processing is costly, we expect the price adjustments to announcements of earnings with greater asymmetric timeliness also to be delayed. Specifically, if earnings is less timely for good news, it will take investors longer to determine the extent of good news than to determine the extent of bad news. As a result, stock returns during the full earnings announcement period but after the initial announcement period will be more positive for firms with earnings that exhibit more asymmetric timeliness. Thus, we test whether firms with earnings that exhibit higher levels of asymmetric timeliness have positive stock returns after the initial announcement period, and find that they do. This finding suggests that insiders can take advantage of the positive price adjustment by purchasing the firm’s shares and we find evidence that they do.

Because the inferences we draw from our primary findings could be affected by the two-step estimation approach we use to construct our measure of asymmetric timeliness, we implement an alternative approach to test our predictions. In particular, we estimate the Basu (1997) relation permitting the asymmetric timeliness coefficient to vary with each of our resolution measures. These findings support our inferences that asymmetric timeliness decreases the speed with which investor disagreement and uncertainty at earnings announcements resolve.

The remainder of this paper is organized as follows. Section 2 discusses the basis for our predictions and related research. Section 3 develops the research design, Section 4 describes the
sample, and Section 5 presents the results. Section 6 develops an alternative approach to test our predictions and presents the related findings. Section 7 concludes the study.

2. Basis for Predictions and Related Research

Basu (1997) and subsequent studies (Ball, Kothari, and Robin, 2000; Qiang, 2007; Beaver, Landsman, and Owens, 2012) find evidence of asymmetric timeliness of earnings for US firms. Basu (1997) adopts the view that return reflects the change in the firm’s economics and thus a firm has good (bad) news when return is positive (negative). Asymmetric timeliness results from accounting earnings recognizing good news on a less timely basis than bad news. This can occur if accounting earnings is conservative, i.e., earnings lags good news, or aggressive, i.e., earnings anticipates good news. Regardless of the source, to the extent that a firm’s earnings exhibits asymmetric timeliness, earnings more closely reflects the change in the firm’s economics when its return is negative than when its return is positive. Hence, Basu (1997) measures asymmetric timeliness by a larger coefficient for negative than for positive annual return in an earnings-return regression. Basu (1997) and most subsequent studies interpret asymmetric timeliness as evidence of conservatism.\(^1\)

Ball et al. (2000) and Ball, Robin, and Wu (2003), among others, find evidence of asymmetric timeliness for firms in several other countries, where the extent of asymmetric timeliness depends on a variety of institutional factors. Taken together, these studies show that asymmetric timeliness generally is higher for US firms, which is interpreted as indirect evidence that conservatism is beneficial because the US is generally viewed as having the most efficient capital market in the world. Other studies find that asymmetric timeliness has increased in the US in the past few decades (Watts, 2003; Beaver et al. 2012), which the studies interpret as

\(^1\) Lawrence, Sloan, and Sun (2015) suggests that asymmetric timeliness reflects curtailments of operations as well as conservatism.
evidence that the demand for conservative accounting continues to increase.

Several studies identify benefits to equityholders from conservative accounting. Watts (2003) explains that conservative accounting helps minimize conflicts between debtholders and equityholders, thereby enabling more efficient contracting, which results in benefits to equityholders in the form of lower debt costs. LaFond and Watts (2008) posits that conservatism reduces a manager’s incentives and ability to manipulate accounting amounts, thereby reducing information asymmetry between firm insiders and outside equity investors. This results in higher equity values. LaFond and Watts (2008) finds support for this supposition by providing evidence that information asymmetry is significantly negatively related to asymmetric timeliness of earnings after controlling for other demands for conservatism. D’Augusta, Bar-Yosef, and Prencipe (2012) finds that asymmetric timeliness reduces investor disagreement at earnings announcements as measured by lower daily trading volume in the three-day announcement period than in the pre-announcement period. The study interprets this finding as evidence that conservatism improves informational efficiency. However, other studies (Beaver, 1968; Kim and Verrecchia, 1991; Landsman and Maydew, 2002) interpret lower trading volume as lower information content. Regardless, D’Augusta et al. (2012) does not examine the speed with which equity investor disagreement at earnings announcements resolves, which is a focus of our study.²

Kim, Li, Pan, and Zuo (2013) builds on LaFond and Watts (2008) by predicting that accounting conservatism reduces financing costs in seasoned equity offerings (SEOs) because conservatism mitigates the negative impact of information asymmetry. New investors engage in less price protection when new shares are issued and therefore are willing to pay higher prices

² Using a measure of conservatism not based on asymmetric timeliness, Penman and Zhang (2013) finds that conservative accounting reveals information about the riskiness of the firm and thus the appropriate discount rate to apply to the firm’s expected cash flows.
for the shares. Consistent with predictions, Kim et al. (2013) finds that issuers with higher conservatism—using a measure based in part on asymmetric timeliness—experience less negative equity returns at SEO announcements. Louis, Sun, and Urcan (2012) finds that conservatism benefits equityholders by providing incentives for more efficient real investment decisions by managers. Using various proxies for conservatism, including asymmetric timeliness, Louis et al. (2012) finds that the equity market values an additional dollar of cash holdings more for firms with greater accounting conservatism, which suggests that conservatism is associated with a more efficient use of cash. Francis, Hasan, and Wu (2013) finds that firms with more conservative accounting, as reflected by greater asymmetric timeliness, had less significant losses in equity values during the 2009 financial crisis. Balakrishnan, Watts, and Zuo (2013) finds a similar result, and concludes that accounting conservatism improved borrowing capacity, reduced underinvestment, constrained managerial opportunism, and enhanced firm value. Finally, García Lara, García Osma, and Penalva (2011) provides evidence that asymmetric timeliness is associated with lower implied cost of capital.

Other research suggests that conservatism is associated with costs for debtholders and equityholders. Regarding debtholders, Gigler, Kanodia, Sapra, and Venugopalan (2009) shows analytically that accounting conservatism can decrease the efficiency of debt contracts if it results in unwarranted covenant violations. Regarding equityholders, costs can arise from the increase in investor uncertainty regarding the valuation implications of a firm’s earnings associated with higher conservatism. Mensah, Song, and Ho (2004) finds evidence that analysts’ earnings forecast errors and dispersion of analysts’ forecasts are positively associated with the Penman and Zhang (2002) measure of accounting conservatism. These findings suggest that conservative accounting makes it more difficult for analysts to forecast earnings. However,
Mensah et al. (2004) does not address whether more conservative accounting makes it more difficult for investors to discern the valuation implications of earnings when they are announced.

We contribute to the literature as it relates to equity markets by predicting and providing evidence that asymmetric timeliness decreases the speed with which investor disagreement and uncertainty at earnings announcements resolve. When the difference between the positive and negative return coefficient in the earnings-return relation is large, the range of the implied appropriate earnings multiple is large. The greater is the difference, the less transparent is the firm’s earnings, which results in investors having to take more time to assess the valuation implications of earnings.

Because information processing is costly, we expect the price adjustments to announcements of earnings with greater asymmetric timeliness to be delayed. Specifically, if earnings are less timely for good news, it will take investors longer to determine the extent of good news than to determine the extent of bad news. As a result, we predict that during the earnings announcement period after the initial price reaction to the announcement, firms with higher levels of asymmetric timeliness have positive stock returns. If this is the case, then insiders potentially can take advantage of the positive price adjustment by purchasing the firm’s shares. Thus, we also predict that after the initial price reaction to the earnings announcement there will be more net purchases of shares by insiders for firms with more asymmetric timeliness.

3. Research Design

3.1 Measure of Asymmetric Timeliness of Earnings

Most asymmetric timeliness studies base their measure on Basu (1997). The Basu (1997) measure is the incremental coefficient on negative annual equity return from a regression, as
specified by Equation (1), of annual earnings on equity return that permits the coefficients to differ for positive and negative return.

\[ X_{i,y} = \beta_0 + \beta_1 D_{i,y} + \beta_2 R_{i,y} + \beta_3 D_{i,y} \times R_{i,y} + \nu_{i,y}, \]

where \( X \) is earnings per share before extraordinary items and discontinued operations deflated by beginning of year price, \( R \) is annual stock return beginning three months after the start of the year, \( DR \) is an indicator variable that equals one if \( R \) is negative and zero otherwise, and \( i \) and \( y \) refer to firm and year.\(^3\) We measure annual stock return beginning three months after year end so that the return includes the earnings announcement period.\(^4\) Basu (1997) adopts the view that return reflects the change in the firm’s economics and refers to positive and negative equity returns as good and bad news. Basu (1997) finds that the incremental coefficient for negative return is significantly positive and concludes that bad news is incorporated into earnings on a more timely basis. Thus, the larger is the incremental coefficient on negative return, \( \beta_3 \), the less timely is earnings when the firm experiences good news.\(^5\) \( \beta_3 \) is referred to as the asymmetric timeliness coefficient.

Typically, the asymmetric timeliness coefficient is based on a cross-sectional regression for a group of firms, which assumes that all firms in the group have the same coefficients at a

\(^3\) We assign a firm-year observation to year \( y \) based on the calendar year of the firm’s fiscal year end.

\(^4\) One way to ensure that annual return period includes the announcement period is to end the annual return period 20 days after the firm’s earnings announcement. We do not use this approach to avoid overlapping annual return intervals. Another way is to eliminate from the sample those observations for which the earnings announcement period ends after the annual return period. Untabulated findings relating to our primary tests of the relation between asymmetric timeliness and the speed with which investor disagreement and uncertainty at earnings announcements resolve reveal that eliminating the 17% (7%) of such observations from our tests based on the smaller (larger) set of controls does not alter our inferences.

\(^5\) Basu (1997) also measures asymmetric timeliness based on the ratio of the sum of the positive and negative return coefficients to the positive return coefficient, i.e., \( (\beta_0 + \beta_1) / \beta_2 \). This measure is also employed by Givoly and Hayn (2000), Ryan and Zarowin (2003), and Beaver et al. (2012), among others, although the incremental coefficient typically is the primary focus. We do not use the ratio measure because most of our sample years are post-1996, after which Ryan and Zarowin (2003) finds that the positive return coefficient is negative and insignificantly different from zero. Givoly and Hayn (2000) and Ryan and Zarowin (2003) offer as an explanation the greater presence of younger, less profitable, and high growth firms in post-Basu (1997) sample years.
point in time if the regression is estimated annually, and across time if a panel of data is used. However, as Khan and Watts (2009) notes, empirical research on conservatism using an asymmetric timeliness metric requires the metric to exhibit both cross-sectional and intertemporal variation. Thus, to test whether higher asymmetric timeliness decreases the speed with which investor disagreement and uncertainty at earnings announcements resolve, we need to modify the Basu (1997) measure to obtain a measure of asymmetric timeliness that varies cross-sectionally and intertemporally. Our measure of asymmetric timeliness, ATC, is based on the Basu (1997) asymmetric timeliness coefficient, and is adapted from the two-step estimation approach of Barth et al. (2013).6

Our measure for each firm-year is the sum of the asymmetric timeliness coefficients, $\beta_3$, from that firm-year’s earnings-return relation given by Equation (1) estimated in the two steps.7 The first $\beta_3$ we use to construct ATC is that from annual estimations of Equation (1) by industry. We use the industry classifications in Barth, Beaver, and Landsman (1998). By construction, this component of ATC is the same for all firms for a given industry-year. There is a strong industry component to the earnings-return relation as a result of accounting practices likely being

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6 Khan and Watts (2009) develops a firm-year measure of conservatism, CSCORE, by expressing the asymmetric earnings timeliness coefficient as a linear function of firm size, the equity market-to-book ratio, and leverage. Although CSCORE is a firm-year measure, size, the book-to-market ratio, and leverage are key control variables in our tests of the relation between asymmetric timeliness and EA_VOLM and EA_VOLA. Untabulated findings from estimations of Equations (5) and (6) that include our estimate of CSCORE in place of ATC but exclude the four control variables reveal that our estimate of CSCORE has a significantly negative relation with EA_VOLM and EA_VOLA (coefficients $=-0.02$ and $-0.03$; t-statistics $=-2.93$ and $-2.99$). However, additional untabulated findings from estimations of Equations (5) through (8) that include our estimate of CSCORE in place of ATC reveal the CSCORE coefficient is insignificantly different from zero in all four equations (coefficients $\approx$ near 0.00 in all cases; t-statistics $=-0.25, 0.25, 0.10$, and 0.48). Although these results are not surprising in light of the fact that CSCORE is constructed from the three of the four key control variables, the results reveal that CSCORE is not a viable measure of asymmetric timeliness for our tests.

7 When estimating Equation (1) we eliminate firm-year observations that have both negative earnings and positive return. We do so because such observations do not fit the logic underlying the Basu (1997) measure of asymmetric timeliness. In particular, Figure 2 in Basu (1997, p.12), which depicts the hypothesized association between earnings and return under conservatism, presumes a positive relation between earnings and return. Of note is that Figure 2 includes observations for all sign combinations of earnings and return except observations that have negative earnings and positive return, i.e., those observations in Quadrant IV.
similar within industries (Barth, Beaver, Hand, and Landsman, 1999; 2005). However, as Barth et al. (2013) notes, estimating the earnings-return relation by industry is not likely to capture fully differences across firms in the earnings-return relation (Barth et al., 2005).

The second $\beta_3$ we use to construct $ATC$ is that from annual estimations of Equation (1) by portfolio, where portfolio membership is based on the residuals from the industry regressions. We use five portfolios for each year, where, for example, the first portfolio is comprised of the quintile of observations from each annual industry regression with the most negative residuals. Thus, the portfolio regressions capture cross-sectional differences in the earnings-return relation that are not captured fully by industry estimation. Also, the portfolios are industry-neutral because each portfolio has the same industry composition. Thus, differences in $\beta_3$ from the portfolio regressions cannot be attributed to differences in industry membership. Note that forming portfolios based on residuals from the industry regressions does not effectively group firms ex ante according to the magnitude of their earnings. First, although for our sample the untabulated cross-industry mean correlation between earnings and residuals from the annual industry-by-industry earnings-return regressions is 83%, the untabulated mean cross-portfolio correlation from the annual portfolio-by-portfolio regressions is only 24%. Second, untabulated findings from annual regressions based on portfolios explicitly ranked on earnings reveal little explanatory power; the mean (across 18 years) adjusted $R^2$ is only 4%.

Our asymmetric timeliness measure for firm $i$ in year $y$, $ATC_{i,y}$, is the sum of the $\beta_3$ s from Equation (1) pertaining to firm $i$’s industry and industry-neutral earnings-return regressions in year $y$, which we label $ATCI$ and $ATCIN$. Thus,

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8 As Barth et al. (2013) notes in a different research context, selection of the optimal number of portfolios is an empirical matter reflecting a tradeoff between precision of estimation and forcing otherwise different groups of firms to have the same asymmetric timeliness coefficient.
\[ ATC_{i,y} = ATCI_{j,y} + ATCIN_{p,y}, \] (2)

where \( j \) and \( p \) denote industry and portfolio.

3.2 Asymmetric Timeliness and Earnings Announcement Volume and Volatility

Prior research commonly employs equity trading volume and stock return volatility at earnings announcements as measures of earnings information content. Theoretical and empirical studies suggest that the greater the information content in an earnings announcement, the greater are volume and volatility (Beaver, 1968; Bamber, 1986; 1987; Karppoff, 1987; Holthausen and Verrecchia, 1990; Kim and Verrecchia, 1991; Landsman and Maydew, 2002). Although Holthausen and Verrecchia (1990) shows that both volume and volatility are influenced by informativeness and investor disagreement, we interpret equity trading volume as primarily measuring the extent to which an announcement generates diversity in opinions across investors. The greater the information content of an announcement, the more likely investors will interpret the content dissimilarly, and thus the more they will trade as a result of their dissimilar interpretations (Beaver, 1968; Bamber, 1987). We interpret stock return volatility as primarily measuring the extent to which an announcement changes investors’ beliefs on average; the greater the content, the more investors’ beliefs are likely to change on average.

Because the focus of our study is testing whether asymmetric timeliness reduces the speed with which investor disagreement and uncertainty at earnings announcements resolve, we base our tests on adaptations of the two earnings announcement information content measures. If an earnings announcement is informative in terms of resolving diversity of investor opinions and investor uncertainty regarding the information in the announcement, then there will be a spike in trading volume and equity volatility in the days immediately surrounding the announcement. However, if a firm’s earnings is not fully transparent, then volume and volatility
might remain high until investors resolve their disagreement and uncertainty regarding the valuation implications of the announced earnings. Accordingly, we construct our resolution measures as the proportion of trading volume and equity return volatility in the days immediately surrounding the announcement to those in the full announcement period.

We calculate our first resolution measure, \( EA_{\text{VOLM}} \), as the ratio of daily trading volume, \( \text{VOLM} \), summed over the four-day period surrounding the day \( t = 0 \) earnings announcement, \((-1, 2)\), to daily trading volume summed over the interval beginning the day before the earnings announcement and ending 20 days after the announcement, \((-1, 20)\). We refer to the four-day and 22-day periods as the initial and full earnings announcement periods.

\[
EA_{\text{VOLM}}_{t,j} = \frac{\sum_{t=1}^{2} \text{VOLM}_{t,j}}{\sum_{t=1}^{20} \text{VOLM}_{t,j}}
\]  \hspace{1cm} (3)

We calculate our second resolution measure, \( EA_{\text{VOLA}} \), as the ratio of daily equity volatility, \( \text{VOLA} \), summed over the initial earnings announcement period, \((-1, 2)\), to daily equity volatility summed over the full earnings announcement period, \((-1, 20)\).

\[
EA_{\text{VOLA}}_{t,j} = \frac{\sum_{t=1}^{2} \text{VOLA}_{t,j}}{\sum_{t=1}^{20} \text{VOLA}_{t,j}}
\]  \hspace{1cm} (4)

Following prior literature (Beaver, 1968; Landsman and Maydew, 2002), we compute \( \text{VOLA} \) on any given trading day as the square of residual equity return for that day. We calculate the daily residual return as the difference between realized return and expected return based on the Fama and French (1993) three-factor model supplemented with the Carhart (1997) momentum factor, time-varying factor loadings based on 60 months of returns prior to year end, risk-free interest

\[ 9 \text{ The number of days in the earnings announcement period excludes weekends.} \]
rates, and risk premia.\textsuperscript{10} Lower $EA\_VOLM$ and $EA\_VOLA$ indicate that investor disagreement and uncertainty resolve more slowly.

To test whether asymmetric timeliness has a negative relation with the speed with which investor disagreement resolves, as reflected in our trading volume measure, we estimate Equation (5).

$$
EA\_VOLM_{it} = \alpha_0 + \alpha_1 ATC_{it} + \alpha_2 Size_{it} + \alpha_3 BM_{it} + \alpha_4 LeV_{it} + \alpha_5 NUMEST_{it} + \varepsilon_{it} \quad (5)
$$

We predict the $ATC$ coefficient, $\alpha_1$, is negative. To test whether asymmetric timeliness has a negative relation with the speed with which investor uncertainty resolves, as reflected in our equity volatility measure, we estimate Equation (6).\textsuperscript{11}

$$
EA\_VOLA_{it} = \alpha_0 + \alpha_1 ATC_{it} + \alpha_2 Size_{it} + \alpha_3 BM_{it} + \alpha_4 LeV_{it} + \alpha_5 NUMEST_{it} + \varepsilon_{it} \quad (6)
$$

We predict the $ATC$ coefficient, $\alpha_1$, is negative. For both Equations (5) and (6) and Equations (7) through (10) below, we include fixed effects for industry and earnings announcement month-year, and cluster standard errors by firm and earnings announcement month-year.\textsuperscript{12}

Equations (5) and (6) include as controls firm size, the natural logarithm of equity market value, $Size$; the equity book-to-market ratio, $BM$; financial leverage, the ratio of current plus long-term debt to total assets, $LeV$; and $NUMEST$, the natural logarithm of one plus the number of analyst earnings forecasts prior to the earnings announcement. Larger firms provide more disclosure than smaller firms (Atiase, 1985; Freeman, 1987; Lang and Lundholm, 1993; Kasznik and Lev, 1995), which suggests that investors of larger firms may be able to interpret the

\textsuperscript{10}To calculate $EA\_VOLA$ ($EA\_VOLM$) we require a minimum of three non-missing returns (volume) in the initial announcement period, and 18 in the full announcement period. Ending the full announcement period on day 20 after the earnings announcement presumes that investor disagreement and uncertainty resolve by day 20. We also calculate $EA\_VOLA$ and $EA\_VOLM$ assuming alternative earnings announcement periods. See footnote 18.

\textsuperscript{11}For ease of exposition, we use the same notation for coefficients and error terms in Equations (5) through (10). In all likelihood they differ.

\textsuperscript{12}Throughout we use a five percent significance level under a one-sided alternative when we have a signed prediction and under a two-sided alternative otherwise.
valuation implications of the firm’s announced earnings more quickly. Therefore, we expect the
Size coefficient, $\alpha_2$, is negative. Peress (2008) finds that firms with higher equity book-to-
market ratios receive less investor attention and, consistent with this, Hou and Moskowitz (2005)
finds that stock prices of firms with higher equity book-to-market ratios react more slowly to
information. Therefore we expect the BM coefficient, $\alpha_3$, is negative. Because prior literature
shows that leverage is positively associated with conservatism (Watts, 2003; Khan and Watts,
2009), we include leverage to test whether ATC has explanatory power incremental to leverage;
we have no expectation for the sign of its coefficient, $\alpha_4$. Finally, we include NUMEST as a
control for the firm’s information environment at the earnings announcement (Gleason and Lee,
2003). We expect its coefficient, $\alpha_5$, is positive because investors of firms with richer
information may be able to interpret the valuation implications of the firm’s announced earnings
more quickly.

We also estimate versions of Equations (5) and (6) that include additional control
variables, given by Equations (7) and (8).

\[
EA_{VOLM_{ij}} = \alpha_0 + \alpha_i \cdot ATC_{ij} + \alpha_i \cdot Size_{ij} + \alpha_i \cdot BM_{ij} + \alpha_i \cdot Lev_{ij} + \alpha_i \cdot NUMEST_{ij} \\
+ \alpha_i \cdot MOM_{ij} + \alpha_i \cdot DISP_{ij} + \alpha_i \cdot FE_{ij} + \alpha_i \cdot EA_{RET_{ij}} + \alpha_i \cdot NEG_{ij} \\
+ \alpha_i \cdot TURN_{ij} \cdot Pre_{ij} + \alpha_i \cdot ASQRET_{ij} + \epsilon_{ij} \\
(7)
\]

\[
EA_{VOLA_{ij}} = \alpha_0 + \alpha_i \cdot ATC_{ij} + \alpha_i \cdot Size_{ij} + \alpha_i \cdot BM_{ij} + \alpha_i \cdot Lev_{ij} + \alpha_i \cdot NUMEST_{ij} \\
+ \alpha_i \cdot MOM_{ij} + \alpha_i \cdot DISP_{ij} + \alpha_i \cdot FE_{ij} + \alpha_i \cdot EA_{RET_{ij}} + \alpha_i \cdot NEG_{ij} \\
+ \alpha_i \cdot TURN_{ij} \cdot Pre_{ij} + \alpha_i \cdot ASQRET_{ij} + \epsilon_{ij} \\
(8)
\]

MOM is pre-announcement period price momentum, which equals the firm’s equity return for
the first ten months of the current year. We include MOM because prior research establishes a
positive relation between past stock market returns and investor attention (Aboody, Lehavy, and Trueman, 2010). Therefore, we expect that $\alpha_6$ is positive.

Analyst dispersion, $DISP$, and forecast error, $FE$, are indications of uncertainty in advance of the earnings announcement (Barron, Kim, Lim, and Stevens, 1998; Barron and Stuerke, 1998; Zhang, 2006). We define $DISP$ as the standard deviation of analyst forecasts of the current year’s earnings immediately preceding the earnings announcement. To construct $DISP$, we require at least three forecasts. We define $FE$ as the absolute value of the difference between the mean analyst forecast of the current year’s earnings and actual earnings. Both $DISP$ and $FE$ are scaled by beginning-of-year stock price. When constructing $DISP$ and $FE$ we exclude forecasts made more than 120 days before the earnings announcement. If the earnings announcement removes pre-announcement uncertainty, then the investor response may be heightened just after the announcement. If the uncertainty persists, investor response may be dampened. Thus we have no sign expectations for the $DISP$ and $FE$ coefficients, $\alpha_7$ and $\alpha_8$.

We include the earnings announcement return, $EA_RET$, as a control for the signed magnitude of news at the earnings announcement. We define $EA_RET$ as the Fama-French plus momentum factor-adjusted returns in the period $(-1, 2)$ relative to the earnings announcement. We have no expectations for the sign of the $EA_RET$ coefficient, $\alpha_9$. We include an indicator variable, $NEG$, which equals one if the announced earnings is negative and zero otherwise. Brown (2001) posits that it is more difficult for investors to process the valuation implications of announced earnings for firms with losses because loss firms exhibit greater heterogeneity of earnings persistence than profit firms (Damodaran, 1999; Li, 2010). An implication of Brown (2001) is that investors of loss firms need more time to interpret the valuation implications of announced negative earnings. Therefore we expect the $NEG$ coefficient, $\alpha_{10}$, is negative.
TURN\textsubscript{Pre} and ASQRET are average daily share turnover and average squared daily excess return during the pre-announcement period, which we define as the 60 days ending two days before the earnings announcement.\textsuperscript{13} We include TURN\textsubscript{Pre} as a control for pre-announcement trading volume. Because prior research establishes a positive relation between trading volume and investor attention (Barber and Odean, 2008; Hou, Xiong, and Peng, 2009), we expect the TURN\textsubscript{Pre} coefficient, $\alpha_{11}$, is positive. We include ASQRET as a control for pre-announcement return volatility and expect its coefficient, $\alpha_{12}$, is negative.\textsuperscript{14}

### 3.3 Effects of Delayed Resolution

#### 3.3.1 Positive Price Adjustment

Finding that asymmetric timeliness is associated with a delay in the time it takes for resolution of investor disagreement and for average investor beliefs to change fully can be interpreted as indicating that ATC creates a market friction at earnings announcements. That is, higher ATC requires investors to spend more time interpreting the information in earnings announcements. Because information processing is costly, we expect the price adjustments to announcements of earnings with greater asymmetric timeliness also to be delayed. Specifically, if earnings are less timely for good news, it will take investors longer to determine the extent of

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\textsuperscript{13} We compute daily excess returns by subtracting from the realized daily return the expected daily return, which is based on the Fama and French (1993) plus momentum factor-adjusted return model. To compute TURN\textsubscript{Pre} and ASQRET we require a minimum of 45 non-missing days of volume and returns. ASQRET uses factor loadings as of $t - 1$ to calculate excess returns because pre-announcement windows may start prior to the end of the year. Other excess returns use factor loadings as of the end of year $t$.

\textsuperscript{14} Dietrich, Muller, and Riedl (2007), Givoly, Hayn, and Natarajan (2007), and Patatoukas and Thomas (2011) raise concerns about potential bias in the coefficient estimates from the Basu (1997) specification as a measure of asymmetric timeliness. Patatoukas and Thomas (2011) finds that the bias is associated with scale, negative earnings, and equity return volatility. Ball, Kothari, and Nikolaev (2013) finds that the bias is eliminated by inclusion of firm fixed effects in the Basu (1997) estimating equation. We cannot include firm fixed effects in Equation (1) because we estimate the equation by year. However, we include as controls in Equations (7) and (8) Size, a scale proxy, NEG, an indicator for negative earnings, and ASQRET, a measure of equity volatility, as well other firm-level control variables, e.g., Lev. To the extent that inclusion of these controls does not eliminate the effects of bias in the ATC coefficient, it will be more difficult to detect the predicted negative relation between ATC and resolution of investor disagreement and uncertainty at earnings announcements.
good news than to determine the extent of bad news. As a result, stock returns after the initial announcement period will be more positive for firms with earnings that exhibit more asymmetric timeliness. Thus, we predict announcement period stock returns after the initial announcement period, i.e., during days (3, 20), are positively related with ATC.

Although we predict a positive price adjustment for firms with higher ATC, this does not imply a trading strategy based on ATC. Recall that the annual return we use to construct ATC includes the full earnings announcement period. At the time of the earnings announcement, investors have not yet determined fully the annual return and, thus, ATC. Our prediction is that this determination takes more time for firms whose earnings exhibit greater asymmetric timeliness.

We conduct two tests of our prediction. First, we form five portfolios based on the magnitude of ATC. For each portfolio, we calculate the (3, 20) compounded excess return, $ABRET(3\_20)$. We compute excess return by subtracting the expected return based on the Fama and French (1993) three-factor model supplemented with the momentum factor from the raw (3, 20) return, and requiring 15 non-missing observations. We predict higher ATC portfolios earn larger (3, 20) returns and lower ATC portfolios earn smaller (3, 20) returns. Specifically, we test whether the mean $ABRET(3\_20)$ for announcements in the top quintile portfolio is larger than that in the bottom quintile portfolio.

Second, following Core, Guay, and Verdi (2008), we estimate the following annual cross-sectional regression and aggregate coefficients using the Fama and MacBeth (1973) approach.

\[
ABRET(3\_20)_i = a_0 + a_1 ATC_i + a_2 Beta_i + a_3 Size_i + a_4 BM_i + a_5 MOM_i + e_i
\]  

(9)

Because we predict higher ATC is associated with larger (3, 20) returns, we predict that the ATC coefficient, $a_1$, is positive. Equation (9) includes as controls fundamental risk characteristics
identified in prior research to ensure that our inferences regarding the association between 
\( ABRET(3, 20) \) and \( ATC \) are not attributable to the correlation between \( ATC \) and the 
characteristics. The characteristics are \( Size \), \( BM \), \( Beta \), the CAPM beta, and \( MOM \). We have no 
expectations for signs of their coefficients.

### 3.3.2 Insider Trading

If the \( (3, 20) \) announcement period stock returns are positively related with \( ATC \), then 
insiders potentially can take advantage of the positive price adjustment by purchasing the firm’s 
shares. To test whether this is the case, as with positive price adjustment, we conduct two tests. 
First, we form five portfolios based on the magnitude of net insider purchases, \( Insider \_Purch \), 
the number of shares purchased minus the number of shares sold by all of the firm’s insiders 
(Lakonishok and Lee, 2001) during the \( (3, 20) \) period, divided by the firm’s shares outstanding 
as of the end of the year (Jagolinzer, Larcker, Ormazabal, and Taylor, 2014). Following prior 
research (Lakonishok and Lee, 2001; Jagolinzer et al., 2014), we obtain insider stock transaction 
information reported on SEC Form 4, which reports changes in insider ownership, from the 
Thomson Reuters Insider Filing database. We calculate \( Insider \_Purch \) for all firms with insider 
trading activity during the calendar year of the earnings announcement. Insiders comprise a 
firm’s officers and directors, and any beneficial owners of more than ten percent of a class of the 
firm’s equity securities.

We predict higher (lower) \( ATC \) portfolios are associated with larger (smaller) net 
purchases of stock by insiders during the \( (3, 20) \) period. Specifically, we test whether the mean 
\( Insider \_Purch \) for announcements in the top quintile portfolio is larger than that in the bottom 
quintile portfolio.

Second, we estimate the following equation:
Because we predict higher $\text{ATC}$ is associated with larger insider net purchases during the (3, 20) period, we predict that the $\text{ATC}$ coefficient, $\alpha_1$, is positive. Equation (10) includes $\text{Size}$, $\text{BM}$, $\text{MOM}$, and $\text{EA\_RET}$ as controls for determinants of insider purchases identified in prior research (Rozeff and Zaman, 1998; Lakonishok and Lee, 2001), and industry and earnings announcement month-year fixed effects. We base t-statistics on standard errors clustered by firm and earnings announcement month-year.

4. Sample and Descriptive Statistics

We first identify a sample to construct $\text{ATC}$ comprised of firms with fiscal year ends from 1994 to 2011. We refer to this sample as the ATC sample. When constructing the ATC sample, we have four objectives. The first is to minimize the data restrictions we impose to mitigate potential sample selection bias. Therefore, we only require the ATC sample firms to have data available necessary to estimate Equation (1). The second is to minimize the effects of extreme observations on the estimates of $\text{ATC}$. Therefore, we eliminate observations whose earnings and return are in the largest 99% and smallest 1% of the sample each year and with stock price less $5 at year end (Basu, 1997; Khan and Watts, 2009). The third is to ensure there is sufficient power to develop reliable estimates. Therefore, we require ten observations in each industry-year. Fourth, we eliminate observations with both negative earnings and positive return (see footnotes 7 and 15). In addition, following Callen, Segal, and Hope (2010), which develops a firm-year level measure of conservatism, we eliminate financial firms (SIC = 6000 through 6999). These data requirements yield a sample of 52,753 observations that we use to estimate Equation (1). We obtain all of our data from Compustat, CRSP, and I/B/E/S.
The sample we use as the basis for our tests comprises all ATC sample firm-year observations with data necessary to estimate Equations (5) and (6), and for which equity book value is positive (Khan and Watts, 2009). These data requirements yield a sample of 37,305 annual earnings announcement observations. Requiring non-missing data for the additional control variables in Equations (7) and (8) results in a sample of 23,150 annual earnings announcement observations. To eliminate the effects of outliers on our inferences, we winsorize all continuous variables at the 1 and 99 percentile of all sample observations.

Table 1 presents descriptive statistics relating to the ATC sample and estimation of Equation (1). Panel A presents overall distributional statistics combining all industries and years. Panel A reveals ATC averages 0.29, with a standard deviation of 0.09. ATC’s two components, ATCI and ATCIN, each contributes equally, with means of 0.14 and 0.15. In addition, means of X, R, and DR are 0.03, 0.04, and 0.51. Thus, although the average firm-year observation has positive earnings and return, slightly more than half of the firm-year observations have negative return.

Panels B and C present regression summary statistics from Equation (1) estimated by industry and by portfolio based on residuals from the industry estimations. All statistics are based on 18 annual regressions, except for those relating to Other in Panel B. Panel B reveals that, on average, the incremental slope coefficient for negative return, $\beta_3$, which is ATCI, is 0.14,

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15 As we discuss in footnote 7, when estimating Equation (1) we eliminate observations with negative earnings and positive return. Untabulated statistics reveal that these observations are the only earnings and return sign combination for which the correlation between earnings and return is negative. In particular, the Pearson correlation coefficients between earnings and return for the negative/positive, positive/positive, positive/negative, negative/negative, and combinations of earnings/return are −0.09, 0.14, 0.12, and 0.07. Additional untabulated statistics reveal that inclusion of the 4,758 negative/positive observations has a noticeable effect on mean ATC by biasing downward the coefficient on positive return in Equation (1), thereby biasing upward the incremental coefficient for negative return. Mean ATC based on estimations including these observations is 12% higher than mean ATC we employ in our tests. This positive bias in the incremental coefficient for negative return obtains broadly across our industry and portfolio estimations, i.e., for ATCI and ATCIN. In addition, regression explanatory power is, on average, substantially smaller than that associated with estimations of Equation (1) we use to construct ATC.
and ranges from 0.09 for firms in Chemicals to 0.19 for firms in Extractive Industries. In addition, the mean t-statistic for each industry exceeds 1.65 for all but three industries, Chemicals, Food, and Other. On average, the slope coefficient for positive return, $\beta_2$, is 0.02, and ranges from near zero for firms in Other to 0.04 for firms in Chemicals, Food, and Textiles, Printing, and Publishing. In contrast to $\beta_3$, the mean $\beta_2$ t-statistic for each industry exceeds 1.65 for only two industries, Durable Manufacturers and Food. The magnitude of the difference between $\beta_3$ and $\beta_2$ and the general insignificance of $\beta_2$ is consistent with findings in prior research (Givoly and Hayn, 2000; Ryan and Zarowin, 2003).

Turning to the portfolio regressions, Panel C reveals that, on average, the incremental slope coefficient for negative return, $\beta_3$, which is $ATCIN$, is 0.14, and ranges from 0.10 to 0.19 across portfolios. In addition, the mean t-statistic exceeds 1.65 for all portfolios. The slope coefficient for positive return, $\beta_2$, is 0.02, and ranges from 0.01 to 0.03. The mean $\beta_2$ t-statistic exceeds 1.65 for four of the five portfolios, although the t-statistics are substantially smaller than those for $\beta_3$. The overall mean $R^2$ for the portfolio regressions, 0.69, is substantially larger than that for the industry regressions in Panel B, 0.25.

The statistics in Table 1 indicate that there is little relation between earnings and return when return is positive, and a strong positive relation when return is negative. In addition, untabulated findings based on the industry and portfolio findings in Panels B and C indicate there is a significantly negative relation between the mean $\beta_3$ and mean $\beta_2$; the correlations are
−0.21 and −0.34. Taken together, these findings reveal that observing a high ATC is indicative of a weak relation between earnings and return when news is good.\textsuperscript{16}

Table 2 presents descriptive statistics for the variables used in estimating Equations (5) through (8). The statistics for ATC, EA\_VOLM, EA\_VOLA, Size, BM, Lev, and NUMEST are based on 37,305 observations, and the statistics for MOM, DISP, FE, EA\_RET, NEG, TURN\_Pre, and ASQRET are based on 23,150 observations. Most notably, Table 2 reveals that mean (median) ATC is 0.29 (0.29), which is approximately twice the OLS estimate of the asymmetric timeliness coefficient in Beaver et al. (2012), 0.15, which uses a sample period that overlaps with ours. Thus, the two-step approach that sums the asymmetric timeliness coefficients from two regressions yields a mean estimate that is about double a benchmark value. In addition, untabulated statistics reveal that ATC exhibits intertemporal variation; the Pearson correlations between ATC and its first and second lags are 0.08 and −0.03. Means (medians) for EA\_VOLM and EA\_VOLA are 0.25 (0.24) and 0.33 (0.28), which indicates that for both measures the market reaction during the initial announcement period is a substantial portion of the volume and volatility during the full announcement period.

Table 3 presents sample Pearson (Spearman) correlations above (below) the diagonal. Most notably, Table 3 reveals that ATC is significantly negatively correlated with EA\_VOLM and EA\_VOLA—the Pearson (Spearman) correlations between ATC and EA\_VOLM and EA\_VOLA

\textsuperscript{16} As noted Section 2, the weaker relation between earnings and return when news is good than when it is bad, which manifests as higher ATC, could be attributable to conservative or aggressive accounting. To assess whether aggressiveness is a source, we estimated the correlations between earnings in the current period and return in the subsequent period for good news firms, i.e., those with positive return in the current period, for high and low ATC terciles. Untabulated statistics reveal that correlations are 0.09 and 0.08 for the high and low ATC terciles and the difference is not significant based on a regression of net income on lead return for observations with positive contemporaneous return, permitting the return coefficient to differ for observations in the high and low ATC terciles (t-statistic = −0.01). Although the correlations could differ based on returns in further subsequent periods, the untabulated statistics are inconsistent with ATC arising from aggressive accounting.
are $-0.06 (-0.06)$ and $-0.07 (-0.06)$. In addition, many of the control variables are significantly correlated with $ATC$, $EA\_VOLM$, and $EA\_VOLA$.

5. Results

The prediction in Section 2 is that asymmetric timeliness decreases the speed with which investor disagreement and uncertainty at earnings announcements resolve. This prediction suggests that the speed with which information is incorporated into stock prices is lower for firms with higher asymmetric timeliness. To illustrate this, Figure 1 displays the median across firms, separately for observations in the top and bottom $ATC$ terciles, of the absolute cumulative abnormal stock return, $ACAR$, for each day during the full announcement period, as a percentage of $ACAR$ for the full announcement period. Borrowing from Heflin, Subramanyam, and Zhang (2003), we compute $ACAR$ as follows:

$$ACAR_{i,t,s} = ABS\left(\prod_{s=1}^{s+x} (1 + AR_{i,t,s}) - 1\right),$$ \hspace{1cm} (11)$$

where $AR$ is the daily excess return based on the market model for earnings announcement $t$, firm $i$, and day $s$ relative to the earnings announcement day, and $x$ ranges from 0 to 21. By construction, the percentage equals one by the end of the full announcement period, i.e., day 20.

Figure 1 reveals that median percentage $ACAR$ for observations in the top $ATC$ tercile is smaller than that for observations in the bottom $ATC$ tercile for the 12 consecutive days starting on the day of the earnings announcement. Untabulated statistics reveal that the differences in medians are significant for the first eleven days, and insignificant thereafter. This pattern of differences in median percentage $ACAR$ suggests that earnings announcement information is incorporated into stock prices more slowly for firms with higher asymmetric timeliness, and is consistent with our prediction that investor disagreement and uncertainty at earnings
announcements resolve more slowly for firms with higher asymmetric timeliness. We next turn to findings from direct tests of these predictions.

5.1 Asymmetric Timeliness and Earnings Announcement Volume and Volatility

Table 4, Panel A, presents regression summary statistics for the $EA_{VOLM}$ and $EA_{VOLA}$ estimating Equations (5) and (6). The key finding is that, consistent with predictions, the $ATC$ coefficient is significantly negative for both equations. In particular, Panel A reveals that the $ATC$ coefficients (t-statistics) are $-0.03$ and $-0.06$ ($-4.24$ and $-3.47$) in the $EA_{VOLM}$ and $EA_{VOLA}$ equations. These findings are consistent with asymmetric timeliness being associated with a delay in the time it takes for resolution of investor disagreement as reflected in trading volume, and a delay in the time it takes for average investor beliefs to change fully as reflected in equity volatility. In addition, findings relating to $Size$, $BM$, and $NUMEST$ are consistent with expectations, except for $Size$ in the $EA_{VOLA}$ equation. In particular, for the $EA_{VOLM}$ equation, the $Size$, $BM$, and $Lev$ coefficients are significantly negative (coefficients = $-0.01$, $-0.00$, and $-0.01$; t-statistics = $-10.44$, $-8.44$, and $-3.58$) and the $NUMEST$ coefficient is significantly positive (coefficient = $0.02$; t-statistic = $13.54$). For the $EA_{VOLA}$ equation, the $BM$ and $Lev$ coefficients are significantly negative (coefficients = $-0.00$ and $-0.03$; t-statistics = $-7.41$ and $-3.52$), and the $NUMEST$ coefficient is significantly positive (coefficient = $0.03$; t-statistic = $11.64$). Contrary to expectations, the $Size$ coefficient is insignificantly different from zero (t-statistic = $1.15$).

Table 4, Panel B, presents regression summary statistics for the $EA_{VOLM}$ and $EA_{VOLA}$ estimating Equations (7) and (8) that include additional control variables. As in Panel A, Panel B reveals that the $ATC$ coefficient is significantly negative for both equations. The $ATC$ coefficients (t-statistics) are $-0.01$ and $-0.05$ ($-1.98$ and $-2.89$) in the $EA_{VOLM}$ and $EA_{VOLA}$
equations. Thus, our inferences regarding the association between ATC and EA_VOLM and EA_VOLA are unchanged by inclusion of the additional control variables.\textsuperscript{17,18}

Regarding the additional control variables, neither of the MOM coefficients is significantly different from zero (t-statistics = 1.32 and -0.28). Although we have no expectation for sign of the DISP coefficient, it is significantly negative in both estimations (t-statistics = -3.17 and -3.83). Also, the coefficients on FE and TURN_Pre are significantly positive in both estimations (FE t-statistics = 2.76 and 2.73; TURN_Pre t-statistics = 11.73 and 3.72). The EA_RET coefficient is not significantly different from zero in the EA_VOLM estimation and significantly positive in the EA_VOLA estimation (t-statistics = -0.96 and 6.28). The NEG coefficient is significantly negative in both estimations (t-statistics = -4.14 and -2.87). Finally, the ASQRET coefficient is insignificantly positive in the EA_VOLM estimation and significantly negative in the EA_VOLA estimation (t-statistics = 0.58 and -3.93).\textsuperscript{19}

5.2 Effects of Reduced Delayed Resolution

5.2.1 Positive Price Adjustment

Table 5, Panels A and B, presents the results from the portfolio and regression tests of an association between ATC and the (3, 20) period returns described in Section 3.3.1. The findings

\textsuperscript{17} Data requirements for the additional control variables reduce the number of observations by half. Nonetheless, untabulated findings from estimating Equations (5) and (6) on the smaller sample reveal the same inferences for the ATC and the control variable coefficients as revealed in Table 4, Panel A. Most importantly, the ATC coefficients (t-statistics) are -0.03 and -0.07 (-3.55 and -3.70) in the EA_VOLM and EA_VOLA estimations.

\textsuperscript{18} We constructed alternative measures of EA_VOLM and EA_VOLA ending the full announcement period on days 15 and 25. Untabulated findings reveal that the ATC coefficient is significantly negative in all but one alternative estimation of Equations (5) through (8) (t-statistics range from -4.67 to -2.17). The exception is Equation (7) when the full announcement period ends on day 15 (t-statistic = -1.36), which suggests that 15 days does not encompass the full announcement period as it relates to EA_VOLM. We also calculated EA_VOLM and EA_VOLA beginning the initial announcement period on day -14, which allows for preannouncement of earnings news (Skinner, 1997). Untabulated findings reveal inferences identical to those based on tabulated findings.

\textsuperscript{19} To mitigate the possibility that our findings are affected by economic circumstances associated with the current period’s earnings announcement, we re-estimated Equations (5) through (8) replacing ATC with lagged ATC. Lagged ATC is correlated with current period ATC but unaffected by current period economic circumstances. Untabulated findings reveal that inferences based on lagged ATC are the same as those based on the tabulated findings.
in Panel A relating to the portfolio tests reveal that the mean (3, 20) period return in the top quintile portfolio, 0.0061, is significantly positive (t-statistic = 4.59), and that in the bottom quintile portfolio, −0.0010, is insignificantly different from zero (t-statistic = −1.01). In addition, the difference between the two, 0.0072, is significantly positive (t-statistic = 4.24). These findings are evidence of significantly greater positive price adjustment for firms with earnings exhibiting more asymmetric timeliness.

The findings in Panel B relating to estimation of Equation (9) reveal the same inferences as those based on the findings in Panel A by providing evidence of significantly greater positive price adjustment for firms with earnings exhibiting more asymmetric timeliness. In particular, the mean ATC coefficient is significantly positive (coefficient = 0.037; t-statistic = 2.19).

Regarding the control variables, only the coefficient on Size is significantly different from zero (coefficient = 0.001; t-statistic = 2.22).

5.2.2 Insider Trading

Table 6, Panels A and B, presents the results from the portfolio and regression tests of an association between ATC and insider trading described in Section 3.3.2. The findings in Panel A relating to the portfolio tests reveal that the mean net stock purchases by insiders, Insider_Purch, in the top quintile portfolio is −0.78 and that in the bottom quintile portfolio is −1.28. In addition, the difference between the two, 0.50, is significantly positive (t-statistic = 6.67). These findings are evidence of significantly more insider net purchases for firms with earnings exhibiting more asymmetric timeliness.

The findings in Panel B relating to estimation of Equation (10) reveal the same inferences as those based on the findings in Panel A. In particular, the mean ATC coefficient is significantly positive (coefficient = 0.70; t-statistic = 2.29). Regarding the control variables, the
coefficients on $BM$, $MOM$, and $EA_{RET}$ are significantly different from zero ($t$-statistics = 2.52, −13.07, and −10.01).

6. Incremental Asymmetric Timeliness and $EA_{VOLM}$ and $EA_{VOLA}$

Inferences we draw from results based on Equations (5) through (8) in which we regress $EA_{VOLA}$ and $EA_{VOLM}$ on $ATC$ and control variables could be affected by our two-step construction of $ATC$. Therefore, we offer an alternative approach to test our predictions. Specifically, we estimate the following equations that extend Equation (1) to allow the asymmetric timeliness coefficient to vary with $EA_{VOLM}$ and $EA_{VOLA}$.$^{20}$

$$X_{i,y} = \beta_0 + \beta_1 DR_{i,y} + \beta_2 R_{i,y} + \beta_3 DR_{i,y} \times R_{i,y} + \beta_4 EA_{VOLM_{i,y}} \times DR_{i,y} + \beta_5 EA_{VOLM_{i,y}} \times R_{i,y} + \beta_6 EA_{VOLM_{i,y}} \times DR_{i,y} \times R_{i,y} + \text{Controls} + \text{Controls}_\text{Interactions} + \epsilon_{i,y} \quad (12)$$

$$X_{i,y} = \beta_0 + \beta_1 DR_{i,y} + \beta_2 R_{i,y} + \beta_3 DR_{i,y} \times R_{i,y} + \beta_4 EA_{VOLA_{i,y}} \times DR_{i,y} + \beta_5 EA_{VOLA_{i,y}} \times R_{i,y} + \beta_6 EA_{VOLA_{i,y}} \times DR_{i,y} \times R_{i,y} + \text{Controls} + \text{Controls}_\text{Interactions} + \epsilon_{i,y} \quad (13)$$

We estimate two versions of Equations (12) and (13). In the first version, $Controls$ includes the control variables from Equations (5) and (6). In the second version, $Controls$ includes the control variables from Equations (7) and (8), with the exception of $NEG$. We exclude $NEG$ because earnings is the dependent variable, and including $NEG$ effectively partitions observations based on the dependent variable. $Controls_\text{Interactions}$ includes all of the interactions between the control variables and $DR$, $R$, and $DR \times R$. The coefficients on $EA_{VOLM} \times DR \times R$ and $EA_{VOLA} \times DR \times R$, $\beta_6$, are incremental asymmetric timeliness coefficients. We predict $\beta_6$ is negative because we expect higher asymmetric timeliness is

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$^{20}$We are grateful to the editor for suggesting this alternative approach.
associated with a decrease in the speed with which equity investor disagreement and uncertainty at earnings announcements resolve.

Table 7 presents regression summary statistics for the Equations (12) and (13). The key findings are that, as predicted, $\beta_6$ is significantly negative for all estimations. In particular, regarding the $EA_{VOLM}$ interaction, $\beta_6 = -0.15$ and $-0.18$ (t-statistics = $-3.06$ and $-2.79$), and regarding the $EA_{VOLA}$ interaction, $\beta_6 = -0.06$ and $-0.04$ (t-statistics = $-3.76$ and $-2.58$). Taken together, the findings in Table 7 support the inferences we draw from the findings in Table 4 that higher asymmetric timeliness decreases the speed with which equity investor disagreement and uncertainty at earnings announcements resolve.

7. Conclusion

We predict and find that higher asymmetric timeliness decreases the speed with which equity investor disagreement and uncertainty at earnings announcements resolve. These findings indicate that a potential cost of asymmetric timeliness is less transparent earnings, which impedes equityholders’ ability to discern the valuation implications of earnings when they are announced. To test our prediction, we test whether there is a negative relation between a measure of asymmetric timeliness that varies cross-sectionally and intertemporally and two measures of resolution of investor disagreement and uncertainty at earnings announcements. Our measure of asymmetric timeliness is based on the Basu (1997) asymmetric timeliness coefficient, and uses a two-step estimation approach. Our two resolution measures are the ratios of the sums of daily volume and volatility during the initial annual earnings announcement period to those in the full announcement period. Lower ratios indicate that investor disagreement and uncertainty resolve more slowly. Our tests also include controls including size, the equity book-to-market ratio, and leverage.
We also predict that after the initial earnings announcement period but during the full announcement period, firms with higher levels of asymmetric timeliness have positive stock returns and find that they do. This finding suggests that insiders can take advantage of the positive price adjustment by purchasing the firm’s shares and we find evidence that they do. In addition, we implement an alternative approach to test our predictions by estimating the Basu (1997) relation permitting the asymmetric timeliness coefficient to vary with our resolution measures. The findings support our inferences that asymmetric timeliness decreases the speed with which investor disagreement and uncertainty at earnings announcements resolve.

Taken together, the findings in this study provide evidence that although asymmetric timeliness can provide benefits, it also can entail costs associated with the attendant lower transparency of earnings.
References


Penman, S., and X.-J. Zhang. 2013. Book Rate of Return, Risk, and Information Conveyed by Conservative Accounting. Working paper, Columbia University Graduate School of
Business.
Table 1
Descriptive Statistics Relating to Constructing the Asymmetric Timeliness Measure, $ATC$

Panel A: Observations pooled across years and industries ($N = 52,753$)

<table>
<thead>
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<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Std.Dev</th>
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<td>0.29</td>
<td>0.09</td>
</tr>
<tr>
<td>$ATCI$</td>
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<td>0.14</td>
<td>0.07</td>
</tr>
<tr>
<td>$ATCIN$</td>
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<td>0.15</td>
<td>0.05</td>
</tr>
<tr>
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<td>0.05</td>
<td>0.09</td>
</tr>
<tr>
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</table>
Table 1 (continued)
Descriptive Statistics Relating to Constructing the Asymmetric Timeliness Measure, ATC

Panel B: Summary statistics from Basu (1997) equation $X_{i,t} = \beta_0 + \beta_1 R_{i,t} + \beta_2 R_{i,t}^2 + \beta_3 DR_{i,t} \times R_{i,t} + \nu_{i,t}$ estimated by industry by year

<table>
<thead>
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<th>Industry</th>
<th>$\beta_1$ Coefficient</th>
<th>$\beta_1$ t-statistic</th>
<th>$\beta_2$ Coefficient</th>
<th>$\beta_2$ t-statistic</th>
<th>$\beta_3$ Coefficient</th>
<th>$\beta_3$ t-statistic</th>
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<td>1.79</td>
</tr>
<tr>
<td>Extractive Indus.</td>
<td>-0.02</td>
<td>0.04</td>
<td>-1.19</td>
<td>1.29</td>
<td>0.01</td>
<td>0.05</td>
<td>0.75</td>
<td>1.44</td>
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<td>Food</td>
<td>0.00</td>
<td>0.03</td>
<td>0.02</td>
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<td>0.04</td>
<td>0.03</td>
<td>1.77</td>
<td>1.97</td>
</tr>
<tr>
<td>Mining, construction</td>
<td>-0.01</td>
<td>0.03</td>
<td>-0.25</td>
<td>0.95</td>
<td>0.02</td>
<td>0.06</td>
<td>1.06</td>
<td>1.42</td>
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<tr>
<td>Pharmaceuticals</td>
<td>-0.05</td>
<td>0.03</td>
<td>-2.41</td>
<td>1.36</td>
<td>0.02</td>
<td>0.02</td>
<td>0.42</td>
<td>0.43</td>
</tr>
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<td>0.02</td>
<td>-0.51</td>
<td>1.22</td>
<td>0.02</td>
<td>0.01</td>
<td>1.54</td>
<td>1.29</td>
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<td>Services</td>
<td>-0.02</td>
<td>0.02</td>
<td>-1.46</td>
<td>1.72</td>
<td>0.02</td>
<td>0.02</td>
<td>1.02</td>
<td>0.94</td>
</tr>
<tr>
<td>Textiles, printing, publishing</td>
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<td>0.04</td>
<td>-0.30</td>
<td>1.27</td>
<td>0.04</td>
<td>0.03</td>
<td>1.50</td>
<td>1.28</td>
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<td>Transportation</td>
<td>-0.01</td>
<td>0.03</td>
<td>-0.89</td>
<td>1.69</td>
<td>0.02</td>
<td>0.02</td>
<td>0.95</td>
<td>1.90</td>
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<td>Utilities</td>
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<td>0.02</td>
<td>-0.08</td>
<td>1.04</td>
<td>0.03</td>
<td>0.04</td>
<td>1.36</td>
<td>1.86</td>
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<tr>
<td>Other</td>
<td>-0.03</td>
<td>0.00</td>
<td>-0.72</td>
<td>0.03</td>
<td>0.00</td>
<td>0.03</td>
<td>-0.07</td>
<td>0.56</td>
</tr>
<tr>
<td>Mean</td>
<td>-0.01</td>
<td>0.03</td>
<td>-0.88</td>
<td>1.62</td>
<td>0.02</td>
<td>0.03</td>
<td>1.17</td>
<td>1.45</td>
</tr>
</tbody>
</table>

36
Table 1 (continued)
Descriptive Statistics Relating to Constructing the Asymmetric Timeliness Measure, ATC

Panel C: Summary statistics from Basu (1997) equation \( X_{i,t} = \beta_0 + \beta_1 DR_{i,t} + \beta_2 R_{i,t} + \beta_3 DR_{i,t} \times R_{i,t} + v_{i,t} \) estimated by portfolio by year

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>( \beta_1 ) Coefficient</th>
<th>t-statistic</th>
<th>( \beta_2 ) Coefficient</th>
<th>t-statistic</th>
<th>( \beta_3 ) Coefficient</th>
<th>t-statistic</th>
<th>Adj.R(^2)</th>
<th>Mean</th>
<th>Std</th>
<th>Nobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-0.08</td>
<td>0.03</td>
<td>-9.32</td>
<td>4.86</td>
<td>0.01</td>
<td>0.01</td>
<td>0.91</td>
<td>0.96</td>
<td>0.19</td>
<td>0.08</td>
</tr>
<tr>
<td>2</td>
<td>-0.01</td>
<td>0.02</td>
<td>-3.29</td>
<td>5.31</td>
<td>0.01</td>
<td>0.01</td>
<td>4.24</td>
<td>4.35</td>
<td>0.16</td>
<td>0.03</td>
</tr>
<tr>
<td>3</td>
<td>-0.01</td>
<td>0.02</td>
<td>-4.86</td>
<td>6.27</td>
<td>0.02</td>
<td>0.02</td>
<td>5.28</td>
<td>4.69</td>
<td>0.14</td>
<td>0.03</td>
</tr>
<tr>
<td>4</td>
<td>-0.01</td>
<td>0.02</td>
<td>-5.76</td>
<td>5.62</td>
<td>0.02</td>
<td>0.01</td>
<td>5.40</td>
<td>4.22</td>
<td>0.12</td>
<td>0.03</td>
</tr>
<tr>
<td>5</td>
<td>-0.02</td>
<td>0.01</td>
<td>-3.87</td>
<td>2.54</td>
<td>0.03</td>
<td>0.02</td>
<td>3.73</td>
<td>2.98</td>
<td>0.10</td>
<td>0.04</td>
</tr>
<tr>
<td>Mean</td>
<td>-0.03</td>
<td>0.03</td>
<td>-5.42</td>
<td>5.41</td>
<td>0.02</td>
<td>0.02</td>
<td>3.91</td>
<td>3.97</td>
<td>0.14</td>
<td>0.06</td>
</tr>
</tbody>
</table>

\( X \) is earnings before discontinued operations and extraordinary items for firm \( i \) in year \( t \), deflated by lagged price. \( R \) is annual return for firm \( i \), beginning three months after the start of year. \( DR \) is an indicator variable for observations with negative return. In Panels B and C, means and standard deviations are across years. In Panel C, portfolio 1 (5) comprises observations with the most negative (positive) residuals from each industry-year regression in Panel B. Sample of Compustat firms from 1994 through 2011.
Table 2
Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATC</td>
<td>0.29</td>
<td>0.29</td>
<td>0.09</td>
</tr>
<tr>
<td>EA_VOLM</td>
<td>0.25</td>
<td>0.24</td>
<td>0.11</td>
</tr>
<tr>
<td>EA_VOLA</td>
<td>0.33</td>
<td>0.28</td>
<td>0.23</td>
</tr>
<tr>
<td>Size</td>
<td>13.29</td>
<td>13.26</td>
<td>1.93</td>
</tr>
<tr>
<td>BM</td>
<td>1.76</td>
<td>0.53</td>
<td>6.63</td>
</tr>
<tr>
<td>Lev</td>
<td>0.21</td>
<td>0.20</td>
<td>0.17</td>
</tr>
<tr>
<td>NUMEST</td>
<td>1.66</td>
<td>1.79</td>
<td>0.98</td>
</tr>
<tr>
<td>MOM</td>
<td>0.08</td>
<td>0.05</td>
<td>0.38</td>
</tr>
<tr>
<td>DISP</td>
<td>0.24</td>
<td>0.10</td>
<td>0.50</td>
</tr>
<tr>
<td>FE</td>
<td>0.00</td>
<td>0.00</td>
<td>0.01</td>
</tr>
<tr>
<td>EA_RET</td>
<td>0.00</td>
<td>0.00</td>
<td>0.08</td>
</tr>
<tr>
<td>NEG</td>
<td>0.10</td>
<td>0.00</td>
<td>0.30</td>
</tr>
<tr>
<td>TURN_Pre</td>
<td>0.80</td>
<td>0.59</td>
<td>0.68</td>
</tr>
<tr>
<td>ASQRET</td>
<td>0.07</td>
<td>0.04</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Table 2 presents descriptive statistics for the variables used in our tests. ATC is the measure of asymmetric timeliness; EA_VOLM (EA_VOLA) is the ratio of the sum of daily trading volume (return volatility) in the days immediately surrounding the announcement, i.e., days (−1, 2), to the sum of daily trading volume (return volatility) in the full announcement period, i.e., days (−1, 20); Size is the natural logarithm of the market value of equity; BM is the ratio of the book value of equity to the market value of equity; Lev is the ratio of debt to total assets; NUMEST is the natural logarithm of one plus the number of analyst earnings forecasts prior to the earnings announcement; MOM is the firm’s equity return for the first ten months of the year; DISP is the standard deviation of analyst earnings forecasts of current earnings immediately preceding the earnings announcement divided by beginning of year stock price; FE is the absolute value of the difference between the mean analyst forecast of the current year’s earnings and actual earnings divided by beginning-of-year stock price; EA_RET is the four-day signed earnings announcement excess return; NEG is an indicator variable that equals one if the announced earnings is negative and zero otherwise; TURN_Pre is the average daily share turnover during the 60 days preceding the earnings announcement; ASQRET is average squared daily excess return during the 60 days preceding the earnings announcement. The statistics for ATC, EA_VOLM, EA_VOLA, Size, BM, Lev, and NUMEST are based on 37,305 observations, and the statistics for MOM, DISP, FE, EA_RET, NEG, TURN_Pre, and ASQRET are based on 23,150 observations. All continuous variables are winsorized at the 1 and 99 percentiles. The sample comprises annual earnings announcements relating to fiscal years ending 1994 to 2011.
<table>
<thead>
<tr>
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<th>1</th>
<th>2</th>
<th>3</th>
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<th>7</th>
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<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
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<tbody>
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<tr>
<td>2</td>
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<td>0.06</td>
<td>-0.12</td>
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<tr>
<td>6</td>
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<td>-0.12</td>
<td>0.10</td>
<td>0.17</td>
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<tr>
<td>7</td>
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<td>0.04</td>
<td>0.71</td>
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<td>0.05</td>
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</tr>
<tr>
<td>8</td>
<td>-0.10</td>
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<td>0.02</td>
<td>0.21</td>
<td>-0.32</td>
<td>-0.07</td>
<td>0.05</td>
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<tr>
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<td>-0.09</td>
<td>-0.10</td>
<td>-0.28</td>
<td>0.40</td>
<td>0.17</td>
<td>-0.06</td>
<td>-0.10</td>
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<td></td>
</tr>
<tr>
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<td>0.00</td>
<td>0.00</td>
<td>-0.28</td>
<td>0.31</td>
<td>0.09</td>
<td>-0.14</td>
<td>-0.07</td>
<td>0.07</td>
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<td>0.07</td>
<td>0.02</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>-0.07</td>
<td>0.00</td>
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<td>-0.02</td>
<td>-0.04</td>
<td>-0.23</td>
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<td>0.03</td>
<td>-1.10</td>
<td>-0.33</td>
<td>0.25</td>
<td>0.22</td>
<td>-0.06</td>
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<td>0.18</td>
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<td>0.17</td>
<td>-0.01</td>
<td>0.01</td>
<td>0.05</td>
<td>0.00</td>
<td>0.10</td>
<td></td>
<td></td>
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<td>0.14</td>
<td>0.04</td>
<td>-0.07</td>
<td>-0.43</td>
<td>0.08</td>
<td>-0.12</td>
<td>-0.15</td>
<td>-0.22</td>
<td>0.17</td>
<td>0.16</td>
<td>-0.01</td>
<td>0.30</td>
<td>0.32</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 presents sample Pearson (Spearman) correlations above (below) the diagonal. Correlations that are significantly different from zero at the p < 0.05 level are in bold. Variables are defined in Table 2. The correlations are reported for 23,150 observations. The sample comprises annual earnings announcements relating to fiscal years ending 1994 to 2011.
Table 4
Asymmetric Timeliness and Resolution of Investor Disagreement and Uncertainty at Earnings Announcements

Panel A:
\[ EA_{VOLM, t} \] or \[ EA_{VOLA, t} = \alpha_0 + \alpha_1 ATC + \alpha_2 Size + \alpha_3 BM + \alpha_4 Lev + \alpha_5 NUMEST + \varepsilon \]

<table>
<thead>
<tr>
<th>Prediction</th>
<th>EA_VOLM</th>
<th>EA_VOLA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATC</td>
<td>-0.03**</td>
<td>-0.06**</td>
</tr>
<tr>
<td></td>
<td>(-4.24)</td>
<td>(-3.47)</td>
</tr>
<tr>
<td>Size</td>
<td>-0.01**</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>(-10.44)</td>
<td>(1.15)</td>
</tr>
<tr>
<td>BM</td>
<td>-0.00**</td>
<td>-0.00**</td>
</tr>
<tr>
<td></td>
<td>(-8.44)</td>
<td>(-7.41)</td>
</tr>
<tr>
<td>Lev</td>
<td>-0.01**</td>
<td>-0.03**</td>
</tr>
<tr>
<td></td>
<td>(-3.58)</td>
<td>(-3.52)</td>
</tr>
<tr>
<td>NUMEST</td>
<td>0.02**</td>
<td>0.03**</td>
</tr>
<tr>
<td></td>
<td>(13.54)</td>
<td>(11.64)</td>
</tr>
</tbody>
</table>

Observations 37,305 37,305
Adjusted R-squared 0.07 0.11
Table 4 (continued)
Asymmetric Timeliness and Resolution of Investor Disagreement and Uncertainty at Earnings Announcements

Panel B:

\[ EA_{VOLM_{it}} \text{ or } EA_{VOLA_{it}} = \alpha_0 + \alpha_1 ATC_{it} + \alpha_2 Size_{it} + \alpha_3 BM_{it} + \alpha_4 Lev_{it} + \alpha_5 NUMEST_{it} + \alpha_6 MOM_{it} + \alpha_7 DISP_{it} + \alpha_8 FE_{it} + \alpha_9 EA_{RET_{it}} + \alpha_{10} NEG_{it} + \alpha_{11} TURN_{Pre_{it}} + \alpha_{12} ASQRET_{it} + \epsilon_{it} \]

<table>
<thead>
<tr>
<th>Prediction</th>
<th>( EA_{VOLM} )</th>
<th>( EA_{VOLA} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( ATC )</td>
<td>-0.01* (-1.98)</td>
<td>-0.05** (-2.89)</td>
</tr>
<tr>
<td>( Size )</td>
<td>-0.01** (-8.22)</td>
<td>-0.00 (-1.26)</td>
</tr>
<tr>
<td>( BM )</td>
<td>-0.00** (-5.76)</td>
<td>-0.00** (-8.56)</td>
</tr>
<tr>
<td>( Lev )</td>
<td>-0.02** (-4.00)</td>
<td>-0.04** (-3.69)</td>
</tr>
<tr>
<td>( NUMEST )</td>
<td>+ 0.01** (6.77)</td>
<td>0.01** (2.76)</td>
</tr>
<tr>
<td>( MOM )</td>
<td>+ 0.00 (-1.32)</td>
<td>-0.00 (-0.28)</td>
</tr>
<tr>
<td>( DISP )</td>
<td>-0.01** (-3.17)</td>
<td>-0.02** (-3.83)</td>
</tr>
<tr>
<td>( FE )</td>
<td>0.17** (2.76)</td>
<td>0.37** (2.73)</td>
</tr>
<tr>
<td>( EA_{RET} )</td>
<td>-0.01 (-0.96)</td>
<td>0.16** (6.28)</td>
</tr>
<tr>
<td>( NEG )</td>
<td>-0.01** (-4.14)</td>
<td>-0.02** (-2.87)</td>
</tr>
<tr>
<td>( TURN_{Pre} )</td>
<td>+ 0.02** (11.73)</td>
<td>0.01** (3.72)</td>
</tr>
<tr>
<td>( ASQRET )</td>
<td>- 0.01 (0.58)</td>
<td>-0.10** (-3.93)</td>
</tr>
</tbody>
</table>

Observations 23,150 23,150
Adjusted R-squared 0.13 0.13
Table 4, Panel A, presents regression summary statistics for the $EA_{VOLM}$ and $EA_{VOLA}$ estimating Equations (5) and (6), and Panel B presents regression summary statistics for the $EA_{VOLM}$ and $EA_{VOLA}$ estimating Equations (7) and (8). All variables are defined in Table 2. The t-statistics based on standard errors clustered by firm and earnings announcement month-year are in parentheses. All regressions include untabulated industry and earnings announcement month-year fixed effects. ** and * indicate significance at the 1% and 5% levels; significance levels reflect a one-sided alternative when we have a signed prediction and a two-sided alternative otherwise. The sample comprises annual earnings announcements relating to fiscal years ending 1994 to 2011.
Table 5
Announcement Returns after the Initial Announcement Period and Asymmetric Timeliness

Panel A: By ATC portfolios

<table>
<thead>
<tr>
<th>Quintile</th>
<th>N</th>
<th>Mean ABRET(3-20)</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>q1</td>
<td>7,472</td>
<td>-0.0010</td>
<td>-1.01</td>
</tr>
<tr>
<td>q2 to q4</td>
<td>22,380</td>
<td>0.0039</td>
<td>5.91**</td>
</tr>
<tr>
<td>q5</td>
<td>7,453</td>
<td>0.0061</td>
<td>4.59**</td>
</tr>
<tr>
<td>Difference (q5 – q1)</td>
<td></td>
<td>0.0072</td>
<td>4.24**</td>
</tr>
</tbody>
</table>

Panel B: Fama and MacBeth (1973) statistics from annual regressions of

\[ ABRET(3-20)_i = \alpha_0 + \alpha_1 ATC_i + \alpha_2 Beta_i + \alpha_3 Size_i + \alpha_4 BM_i + \alpha_5 MOM_i + \epsilon_i \]

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Prediction</th>
<th>Mean</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATC</td>
<td>+</td>
<td>0.037</td>
<td>2.19*</td>
</tr>
<tr>
<td>Beta</td>
<td></td>
<td>-0.003</td>
<td>-0.82</td>
</tr>
<tr>
<td>Size</td>
<td></td>
<td>0.001</td>
<td>2.22*</td>
</tr>
<tr>
<td>BM</td>
<td></td>
<td>0.000</td>
<td>0.95</td>
</tr>
<tr>
<td>MOM</td>
<td></td>
<td>-0.005</td>
<td>-1.46</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

Table 5, Panel A, presents mean (3, 20) announcement period returns, \( ABRET(3\_20) \), for portfolios based on the quintile rank of \( ATC \). Observations in the first quintile, q1, comprise the first portfolio, observations in the second through fourth quintiles, q2 to q4, comprise the second portfolio, and the observations in the fifth quintile, q5, comprise the third portfolio. The t-statistic is associated with the test of whether mean \( ABRET(3\_20) \) is positive. Panel B presents Fama and MacBeth (1973) summary statistics from annual regressions. \( ABRET(3\_20) \) is excess return compounded over the period starting three days after the earnings announcement and ending 20 days after the earnings announcement. We compute excess returns by subtracting the expected return based on the Fama and French (1993) three-factor model supplemented with the momentum factor from the raw (3, 20) return. \( Beta \) is the CAPM beta. All other variables are defined in Table 2. ** and * indicate significance at the 1% and 5% levels; significance levels reflect a one-sided alternative when we have a signed prediction and a two-sided alternative otherwise. The sample comprises annual earnings announcements relating to fiscal years ending 1994 to 2011.
Table 6
Insider Trading and Asymmetric Timeliness

Panel A: By ATC portfolios

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Insider Purch</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>q1</td>
<td>5,638</td>
<td>-1.28</td>
<td></td>
</tr>
<tr>
<td>q2 to q4</td>
<td>16,129</td>
<td>-1.01</td>
<td></td>
</tr>
<tr>
<td>q5</td>
<td>5,425</td>
<td>-0.78</td>
<td></td>
</tr>
<tr>
<td>Difference (q5 – q1)</td>
<td>0.50</td>
<td>6.67**</td>
<td></td>
</tr>
</tbody>
</table>

Panel B: Regression summary statistics from estimating:

\[ \text{Insider Purch}_{i,t} = \alpha_0 + \alpha_1 \text{ATC}_{i,t} + \alpha_2 \text{Size}_{i,t} + \alpha_3 \text{MOM}_{i,t} + \alpha_4 \text{EA RET}_{i,t} + e_{i,t} \]

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Prediction</th>
<th>Mean</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATC</td>
<td>+</td>
<td>0.70</td>
<td>2.29*</td>
</tr>
<tr>
<td>Size</td>
<td></td>
<td>0.03</td>
<td>1.10</td>
</tr>
<tr>
<td>BM</td>
<td></td>
<td>0.18</td>
<td>2.52*</td>
</tr>
<tr>
<td>MOM</td>
<td></td>
<td>-1.47</td>
<td>-13.07**</td>
</tr>
<tr>
<td>EA RET</td>
<td></td>
<td>-4.34</td>
<td>-10.01**</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>27,192</td>
<td></td>
</tr>
</tbody>
</table>

Table 6, Panel A, presents mean net insider purchases, \( \text{Insider Purch} \), for portfolios based on the quintile rank of ATC. Observations in the first quintile, q1, comprise the first portfolio, observations in the second through fourth quintiles, q2 to q4, comprise the second portfolio, and the observations in the fifth quintile, q5, comprise the third portfolio. The t-statistic is associated with the test of whether the difference in mean \( \text{Insider Purch} \) is different from zero. Panel B presents regression statistics from the regression of \( \text{Insider Purch} \) on \( \text{ATC} \) and control variables. The regression includes untabulated industry and earnings announcement month-year fixed effects, and the t-statistics are based on standard errors clustered by firm and earnings announcement month-year. \( \text{Insider Purch} \) is the number of shares purchased minus the number of shares sold by all of the firm’s insiders during the (3, 20) announcement period, divided by shares outstanding as of the end of the year. All other variables are defined in Table 2. ** and * indicate significance at the 1% and 5% levels; significance levels reflect a one-sided alternative when we have a signed prediction and a two-sided alternative otherwise. The sample comprises annual earnings announcements relating to fiscal years ending 1994 to 2011.
The first two columns present summary statistics from the first version of the estimation, which includes Size, BM, Lev, and NUMEST and their interactions with DR, R, and R × DR as controls.

Table 7 presents regression summary statistics for the estimation of the asymmetric timeliness of earnings, allowing the asymmetric timeliness coefficient to vary with EA_VOLM and EA_VOLA.
The second two columns present summary statistics from the second version of the estimation, which includes controls from the first version and MOM, DISP, FE, ASQRET, TURN_Pre, and EA_RET and their interactions with DR, R, and R × DR. Main effects of EA_VOLA, EA_VOLM, and all controls and interactions are untabulated. All regressions include untabulated industry and earnings announcement month-year fixed effects. All variables are defined in Tables 1 and 2. The t-statistics based on standard errors clustered by firm and earnings announcement month-year are in parentheses. ** and * indicate significance at the 1% and 5% levels; significance levels reflect a one-sided alternative when we have a signed prediction and a two-sided alternative otherwise. The sample comprises annual earnings announcements relating to fiscal years ending 1994 to 2011.
Figure 1
Median Percentage $ACAR$ for Observations in the Top and Bottom Terciles of $ATC$ During the Earnings Announcement Period

Figure 1 presents the median percentage $ACAR$ for observations in the top and bottom terciles of $ATC$ for each day of the full announcement period. $ACAR$ is the firm’s absolute buy-and-hold excess return from day $−1$ to each day of the earnings announcement period, which ranges from day $−1$ to day $20$ relative to the earnings announcement. Percentage $ACAR$ is $ACAR$ for each day scaled by $ACAR$ for the full announcement period.