Time Will Tell: Information in the Timing of Scheduled Earnings News

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Abstract

This study demonstrates that earnings calendars have strong predictive power for firms' earnings news and future returns. Specifically, firms engage in 'dating-games' by advancing expected dates of earnings announcements with good news and delaying expected dates of earnings announcements with bad news. Advancers outperform delayers by more than 2.5% in the month after revisions are observed, where returns track reported earnings news and are concentrated at the announcements. We also exploit a unique feature of our setting that the revisions simultaneously convey a 'content signal' indicative of firms' earnings, as well as a 'volatility-timing signal' relevant for option prices. Option markets respond immediately to the timing signal, but not the content, which provides novel evidence that markets fail to reflect information about future earnings despite investors trading on the underlying signal in real-time.

JEL Classifications: G10, G11, G12, G14, M40, M41

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1. Introduction

News releases are often scheduled in advance. Discretion over this schedule allows for the possibility that the scheduled timing and content of the news are systematically related. Among public firms, a commonly cited incentive for managers to strategically time news, such as delaying negative news, is to change when information is reflected in market prices. However, it is unclear whether market prices do, or even should, provide an incentive for firms to strategically schedule their news. To the extent the scheduled time of a new release is a reliable indicator of its content, investors in an efficient market should update prices to reflect this information (e.g., Dye and Sridhar (1995), Acharya, DeMarzo, and Kremer (2011)).

This study sheds light on the incentives firms face to strategically schedule their news releases by examining how market prices respond to the information conveyed through earnings calendars. Specifically, this study addresses two central questions. First, do firms reveal signals about their subsequently reported performance when revising the schedule of future earnings announcements? Second, if so, do investors unravel this behavior and update market prices in a timely fashion using signals embedded in the schedule of future announcements?

To address these questions, we use a novel dataset containing a daily list of expected earnings announcement dates for a broad cross-section of firms. A key feature of this dataset is that it identifies firm-initiated revisions in expected announcement dates and thus helps capture managers' efforts to alter the schedule of news releases. The forward-looking nature of the data allows us to develop and implement a new methodology for characterizing the relative timeliness of earnings announcements before the actual earnings news is explicitly announced (or not announced), which permits testing whether the schedule of firms' earnings announcements is informative about their subsequently reported performance. Additionally, the daily snapshots provide a proxy for investors' information set in real-time, which facilitates testing whether market prices adjust to reflect embedded earnings news in a timely fashion.

Throughout the paper, we refer to calendar revisions as being 'firm-initiated' if they are triggered by a firm's disclosure that explicitly states when they intend to announce earnings. A key feature of these disclosures is that they indicate the timing of a firm's earnings announcement but make no explicit reference to its content (see Section 3 for more details and Appendix A for an example).

Our main sample consists of 18,959 firm-initiated calendar revisions between 2006 and 2013 that are observable at least two weeks prior to a firm's expected announcement date. We categorize each observation based on the extent to which the calendar revision advances (i.e., moves forward) or delays (i.e., moves back) the firm's expected announcement date. We then characterize each revision based on its sign and magnitude using a simple summary metric, referred to as '*R-Score*', that is highest for firms advancing (delaying) their announcement by more than one week.

Our first tests show high *R-Score* firms (i.e., 'advancers') subsequently report better earnings news than low *R-Score* firms (i.e., 'delayers') at their earnings announcements. Specifically, advancers report statistically and economically greater return-on-assets (ROA), same-quarter growth in ROA, and analyst-based earnings surprises, compared to delayers. Together, these results highlight the predictive power of earnings calendars and represent strong evidence that firms reveal information about their subsequently reported performance when revising the scheduled timing of future earnings announcements.

Given the predictive power of calendar revisions for earnings news, we next examine whether investors impound signals from earnings calendars into equity prices in a timely fashion. To conduct these tests, we examine differences in returns across high and low *R-Score* firms. These tests show that there is no significant difference in returns across advancers and delayers at the time of their calendar revisions, indicating prices do not respond to revisions as being informative of firm value. By contrast, however, there is a striking difference in returns across advancers and delayers following the calendar revisions. Specifically, advancers predictably outperform delayers by over 260 basis points (i.e., 2.6%) in the month after the calendar revisions are observed.

On average, advancers outperform the market by 1.3% and delayers underperform by 1.3% in the month after the revisions. This symmetry in returns underscores a benefit of the *ex ante* approach implemented in this paper, which predicts both positive and negative earnings news weeks ahead of firms' actual announcements. Event-time tests show that over 60% of the predictable return spread is concentrated at firms' announcements, indicating that prices react to the information content of calendar revisions at the time earning news is announced, rather than at the time of the revisions.

A weekly calendar-time strategy involving firms expected to announce earnings in the subsequent week yields four-factor alphas ranging from 62 to 138 basis points per week, depending on the required portfolio size. The returns to these revision strategies are largely orthogonal to traditional asset pricing factors, consistent with the returns reflecting the correction of predictable expectation errors embedded in market prices.

Subsequent tests show that the predictive power of calendar revisions for future returns is concentrated among subsets of firms, for example, smaller firms with low analyst coverage and those whose prices are more sensitive to earnings news. The results are also stronger in firms where managers face greater career concerns, suggesting that the timing of news is more informative when it has a greater impact on managers' wealth and/or human capital.

A common concern with academic evidence of anomaly returns is that they may mischaracterize the net payoffs available to investors. For example, the net payoffs may be overstated to the extent that the underlying signal is too costly to process, researchers rely on 'cleansed' data not available to investors in real-time, and/or investors face binding cognitive constraints such as limited attention (e.g., DellaVigna and Pollet (2009), Hirshleifer, Lim, and Teoh (2009), and Cohen and Lou (2012)).[1] In most anomaly settings, researchers provide evidence consistent with investor irrationality but are unable to rule out the alternative interpretation of market prices being 'efficiently inefficient' with respect to the costs of obtaining and processing a given signal. To provide evidence on the source of return predictability in our study, we leverage a unique feature of our setting that allows us to empirically verify that investors not only observe calendar revisions in real-time, but also use them to form trading positions in option markets.

A distinguishing feature of our setting, relative to most other anomaly studies, is that calendar revisions convey two simultaneous signals. The first is a 'content signal' that foreshadows the *nature* of firms' earnings news. The second is a 'volatility-timing signal' that conveys the *timing* of firms' earnings news. Because advancing and delaying can shift the timing of announcements relative to option expiration dates, both content and volatility-timing signals are relevant for option prices, but through separable channels. This separability feature allows us to isolate and test the market's response to each signal while holding the other constant. A striking result from these tests is that investors appear to receive and efficiently trade upon the volatility-timing information conveyed through calendar revisions, while at the same time failing to understand the content information they reveal regarding firms' future cash flows.

[1] A related stream of research points to transaction costs as another alternative explanation for anomaly returns. We discuss this alternative explanation in Section 4.

Our option-based tests proceed in two stages. In the first stage, we study how market prices react to the content signal of calendar revisions, while holding constant the volatility-timing signal. We do so by comparing option prices that differ in terms of the magnitude of firms' calendar revisions but where the revisions do not affect whether the earnings announcement occurs before the option expiration date. We show that option prices do not react to the content signal at the time of calendar revisions, which results in predictable drifts in post-revision option returns. These findings mirror the results from our main equity-based tests and provide further evidence investors do not react to the cash flow information embedded in firms' calendar revisions.

In the second stage of our option tests, we use delta-neutral option portfolios to study how market prices react to the volatility-timing signal of calendar revisions, while holding constant the content signal. We do so by comparing the returns of delta-neutral option portfolios that are affected versus unaffected by the change in announcement timing, where the affected subsample refers to cases in which the revision changes whether the announcement occurs before versus after the option expiration date. We show that delta-neutral option prices respond immediately to calendar revisions and display no predictable drift in the post-revision period. These findings document a stark contrast in which the market responds efficiently to the volatility-timing signal but largely ignores the content signal, despite both emanating from the same underlying event.

The ability to separately study the market reactions to the volatility-timing and content signals provides a more powerful setting than prior research to distinguish between between investor irrationality, costly information processing, and sample-biases in standard academic databases as potential explanations for observed return predictability (e.g., Rosenberg and Houglet (1974), Kothari, Shanken, and Sloan (1995), Ljungqvist, Malloy, and Marston (2009)). Specifically, the immediate and efficient reaction in option markets to the volatility-timing signal is consistent with investors observing the revisions in a timely fashion, understanding that they imply an advance or delay in the earnings calendar, but failing to unravel the information they contain regarding firms' future cash flows. As a result, our findings complement the evidence in McLean and Pontiff (2016) that researchers can help improve market efficiency by identifying new value-relevant signals.

The rest of the paper is organized as follows. Section 2 discusses related literature. Sections 3 and 4 detail the data and main results. Section 5 concludes.

2. Related Literature

This paper relates to prior studies that classify firms as 'early' versus 'late' based on when they actually announce earnings relative to their expected announcement date (e.g., Givoly and Palmon (1982), Chambers and Penman (1984), and Bagnoli, Kross, and Watts (2002)). These studies show that firms announcing late (early) tend to report negative (positive) earnings news, and that prices react negatively (positively) to missed (early) announcements, but that prices continue to drift down after firms fail to report on-time.

Whereas prior studies tend to focus on static expected dates and their relation to firms' actual announcements, this study focuses on the dynamics of earnings calendars as *ex ante* signals for predicting firms' earnings news. We explore an informationally rich alternative to the early/late classification that is instead based on whether firms advance or delay their expected announcement date. Although these two dimensions of timeliness are conceptually related and associated with the nature of firms' earnings news, we show they are actually significantly *negatively* correlated, indicating that firms use the two dimensions of announcement timing as substitutes, rather than compliments. Additionally, in Section 3.6, we conduct a series of tests that directly compare the two classifications and show the advance/delay classification provides incremental, economically significant predictive power for earnings news and returns that researchers miss when relying only on traditional approaches from prior research.

A new approach for studying announcement timing is important because it allows us to provide novel and cohesive evidence on the role of prices and price discovery in shaping how firms schedule their future news releases. Prior research on this topic has produced mixed results. For example, DellaVigna and Pollet (2009) argue firms strategically announce negative news on Fridays to capitalize on lower investor attention, however, deHann, Shevlin, and Thornock (2015) show there is no significant difference in investor attention on Fridays relative to other trading days. Similarly, Penman (1984) and Bagnoli, Kross, and Watts (2002) show there is a significant negative market reaction when firms miss their expected date, indicating investors recognize reporting late as a negative signal. However, these same studies also show the negative market reaction to reporting late continues through the announcement, which makes it unclear whether investors incompletely unravel announcement delays as a negative signal, or unravel them but fail to impound these signals into market prices due to sharp increases in transaction costs that arise in the days prior to the announcements (e.g., Lee, Mucklow, and Ready (1993) and So and Wang (2014)).

The evidence in this study also relates to prior research showing that market prices fail to reflect low saliency signals (e.g., Hirshleifer, Lim, and Teoh (2009), Drake, Roulstone, and Thornock (2012), Giglio and Shue (2014), and Chang et al. (2015)) and suggests investors may underweight aspects of timing disclosures due to low saliency but that these disclosures should be treated as significant sources of information ahead of the actual announcements. Moreover, by documenting the predictive power of calendar revisions, the results of this study are also potentially useful for investment practice and have been applied and replicated in contemporaneous, practitioner-oriented work by Livnat and Zhang (2015). Our findings contribute to the literature by highlighting a novel *ex ante* approach for studying announcement timing, by reconciling our forward-looking approach with traditional approaches based on actual announcement dates, and by studying the influence of firms' information environment and managerial incentives on how prices respond to this information. Additionally, a key innovation of our paper is that we use option prices to adjudicate competing explanations for the sources of return predictability.

More broadly, this paper relates to a vast literature studying informed agents who possess discretion over their communication with outsiders. For example, many models of announcement timing assume managers are dissuaded from systematically delaying bad news because outsiders rationally interpret delays as a negative signal (e.g., Guttman, Ilan, and Skrzypacz (2014)). This paper tests that assumption with respect to the schedule of earnings news and highlights a need for further research into investors' ability to discipline insiders by inferring information embedded in their actions.

3. Empirical Tests

This section provides details on the earnings calendar data used throughout the paper, discusses the sample selection process, and details the main tests and empirical results.

3.1. Earnings Calendar Data and Sample Selection

The main analyses of this paper examine information in firms' earnings calendar revisions. To calculate calendar revisions, we use daily snapshots of earnings calendar data provided by Wall

Street Horizon from 2006 through 2013. Wall Street Horizon began disseminating earnings calendar data in 2006, where each snapshot lists expected announcement dates for a broad cross-section of firms. The calendar data reflects information available to investors by 4am ET of each trading day. We use the data to proxy for investors' daily information set regarding expected announcement dates, which is likely conservative because Wall Street Horizon provides this data to clients at much higher frequencies through streaming feeds. Some clients license the calendar data and post it online as a service to their customers.[2]

The earnings calendar provides a rolling view of expected announcement dates by continually updating the calendar in response to new information. A key feature of the data is that it indicates whether an expected announcement date stems from a firm explicitly disclosing when they intend to announce earnings (See Appendix A for an example). All disclosures of expected announcement dates are primarily sourced based on public information including, but not limited to, firms' investor relations webpages, press releases, and direct correspondence.

Prior to firms disclosing their expected announcement date, the earnings calendar contains 'unconfirmed' expected dates, which are forecasts that typically reflect a firm's past reporting behavior. Throughout the text, we use the term 'firm-initiated revisions' to refer to earnings calendar changes that accompany a firm disclosing when the intend to announce earnings.

Firms also sometimes revise a previously disclosed expected announcement date. This practice occurs infrequently, affecting less than 1% of all firm-quarters in our sample. Our main tests only include the first expected date disclosure to avoid look-ahead bias, however, our findings are robust to including the second expected date disclosure as well (results untabulated for brevity but available upon request).

We emphasize that all expected date disclosures in this study are based on public information, meaning that all investors had potential access to this data, even if they did not subscribe to Wall Street Horizon's data, however their data product significantly mitigates the costs of gathering and verifying this information in real-time.

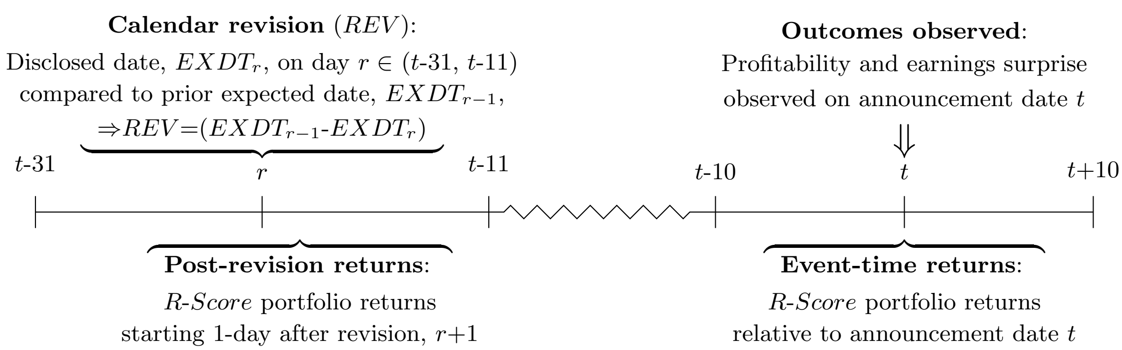
In speaking with Wall Street Horizon, they mention most expected date disclosures are gleaned from press releases (such as the one in Appendix A) and firms' webpages, and rarely derived from

[2]For example, the "e-research" section of www.fidelity.com allows investors to track confirmed expected dates, calendar revisions, and firms' prior year announcement dates.

SEC filings such as 8-K's. Expected announcement dates are also available from related sources such as the Thompson Reuters dataset used in Bagnoli, Kross, and Watts (2002). However, to the best of our knowledge, the Wall Street Horizon data is unique in that it allows researchers to observe the actual files disseminated to investors and thus trace the dynamics of the data as it became observable to investors (deHann, Shevlin, and Thornock (2015), Livnat and Zhang (2015)).[3]

We identify calendar revisions by tracking changes in a firm's expected announcement date from one trading day to the next. To capture economically meaningful calendar revisions, we focus on revisions that alter a firm's expected announcement date by at least two days. Throughout the paper, all dates refer to trading days, rather than calendar days.

Because calendar revisions can occur at any time prior to earnings announcements, we use the timeline below to detail the sample requirements and structure of our main tests. The timeline helps emphasize that the empirical tests are constructed to avoid look ahead bias. We construct a sample of revisions where the revision date, r, occurs in the month (21 days) ending two weeks prior to firms' disclosed expected announcement date, t. Notationally, we require that the r falls between t-31 and t-11.



The requirement that the revision occurs no earlier than t-31 helps identify revisions occurring after a firm's fiscal period and thus those which are potentially informed by managers' knowledge of the firm's performance. Similarly, the requirement that the revision occurs no later than t-11 helps mitigate the risk that investors learn about earnings through other sources such as pre-announcement media coverage and, as depicted in the timeline, facilitates examining event-time returns without exposing the results to look-ahead bias. The results reported below do not appear sensitive to this sample requirement.

[3]The calendar revisions used in this study are summarized via Wall Street Horizon's DateBreaks Monitoring Service. See WallStreetHorizon.com for more details regarding the company's data products.

To characterize the extent of a given calendar revision, we create a variable, REV, which equals the number of trading days the expected date shifts as a result of firms' disclosure. Notationally, REV=($EXDT_{r-1}$-$EXDT_r$), where $EXDT$ is the expected date and the subscripts indicate that REV is measured on the date of firm-initiated revisions (r) relative to the immediately preceding trading day (r-1). Higher values of REV indicate that the firm moved forward their expected announcement date, and vice versa for lower values of REV. We merge the calendar revision sample with return data from CRSP, financial statement information from Compustat, and analyst-based earnings surprise data from IBES. The final sample consists of 18,959 unique firm-quarters spanning 2006 through 2013.

We categorize each observation based on the extent to which the calendar revision advances (i.e., moves forward) or delays (i.e., moves back) the firm's expected announcement date. For each calendar revision, we implement a simple summary metric, referred to as 'R-$Score$', that is highest for firms advancing their expected announcement date by more than one week and lowest for firms delaying by more than one week. Specifically, for each value of REV, we define R-$Score$ as follows:

$$R\text{-}Score = \begin{cases} 0 \text{ (``Delay'')} & \text{for } REV < -5 \\ 0.25 & \text{for } REV \in [-3, -5] \\ 0.5 & \text{for } REV \in [-2, +2] \\ 0.75 & \text{for } REV \in [+3, +5] \\ 1 \text{ (``Advance'')} & \text{for } REV > +5 \end{cases} \tag{1}$$

where the cutoff points are selected to provide a simple classification rule that creates symmetry in the average magnitude of REV across R-$Score$ portfolios (see Table 1 for details). Using static cutoff points also ensures that subsequent tests can be implemented without referencing the full sample of calendar revisions within a given period, however a potential concern is that the classification rule is ad hoc and can lead to unequal sample partitions. To mitigate this concern, additional analyses in Section 3.4 show the paper's inferences are not specific to this classification rule and hold when using the cross-sectional distribution of REV. In the analysis below, our main tests focus on differences between high R-$Score$ firms (hereafter referred to as 'advancers') and low R-$Score$ firms (hereafter referred to as 'delayers').

3.2. Descriptive Statistics

Table 1 contains descriptive statistics of the main sample used throughout the paper. Panel A presents annual descriptive statistics, where the first two columns indicate the number of unique firm-quarters and firms, respectively. The sample consists of approximately 2,300 firms-quarters per year and an average of 1,524 unique firms. $HORIZON$ equals the number of trading days between the revision date r and expected announcement date t. Panel A shows that the average revision date in our sample occurs approximately 16 trading days prior to their expected announcement date, which is closer to the announcement than the midpoint of the sample requirement that r falls between t-31 and t-11.

The REV column of Panel A shows the average revision shifts the expected announcement date back by one to two days, suggesting firms are more likely to delay than advance their expected date. The $|REV|$ column contains absolute values of REV and indicates the average calendar revision shifts the expected announcement date by 4.5 days on an absolute basis. The final two columns of Panel A contain descriptive statistics on firms' deviations from their expected announcement dates. Specifically, DEV equals the number of days between a firm's actual and expected announcement date, where positive (negative) values indicate that a firm reported earlier (later) than the expected date. $|DEV|$ equals the absolute value of DEV. The averages DEV and $|DEV|$ confirm that firm-initiated expected announcement dates are, on average, highly accurate (Livnat and Zhang (2015)). Specifically, the average DEV is insignificantly different than zero and the average $|DEV|$ indicates less than one in four firms announce earnings on a day that differs from their expected date.

Panel B of Table 1 contains descriptive statistics across *R-Score* portfolios. The REV column shows revisions are nearly symmetric across *R-Score* portfolios, where the average delayer (advancer) moves back (forward) their expected dates by 8.8 days. The N column indicates the average number of firm-quarters within each portfolio, and shows there are approximately twice as many low *R-Score* firms than high *R-Score* firms, which is consistent with the result in Panel A that firms are more likely to delay than advance their announcements.

Regarding the sample count, it is important to emphasize that each quarter there are approximately 125 observations where a firm shifts their expected date by more than a week; more than 450 observations where the revision is at least three trading days; and nearly 600 calendar revisions of at least two trading days. These sample counts suggest that calendar revisions are a fairly pervasive phenomena, rather than isolated examples.

Pricing tests below show consistent evidence of return predictability when using extreme *R-Score* portfolios (Table 3), the raw value of *REV* (Table 4), and all revisions of at least three days (Table 8). Additionally, removing some of the sample restrictions discussed above that are in place for the pricing tests is likely to significantly expand the sample available to researchers studying earnings calendars and firms' timing disclosures. Finally, Section 3.6 shows that the accuracy of firms' disclosed expected dates contained in earnings calendars results in significantly larger sample sizes, and thus statistical power, relative to previously-studied approaches to predicting firms' earnings news and returns as a function of announcement timeliness.

The next three columns of Panel B contain average firm characteristics for each *R-Score* portfolio. The *HORIZON* column shows that delayers revise the earnings calendar approximately one day closer to their expected date compared to advancers. *MCAP* equals firms' market capitalization reported in millions and *MOMEN* equals a firm's cumulative market-adjusted return over the twelve months ending on r-11. The market capitalization statistics indicate the average firm in our sample is a mid-cap firm, though firm size does not vary significantly with *R-Score*. By contrast, the *MOMEN* results show delayers significantly underperform advancers over the year prior to the calendar revision and vice versa for advancers, which is consistent with evidence in Ball and Brown (1968) that annual returns lead firms' earnings news.

The *DEV* column of Panel B shows that delayers are more likely to deviate from their expected date by announcing earnings early, and vice versa for advancers, indicating that firms' tendency to advance-vs-delay their expected announcement date is actually *negatively* correlated with their tendency to report earlier-vs-later than the expected date. These results show firms use the two dimensions of announcement timing as substitutes, rather than compliments, and thus that the advance-vs-delay perspective in this paper differs from the early-vs-late perspective in prior research (see Section 3.6 for a direct comparison).

The final column of Panel B examines the market's response to firms' earnings calendar revisions. Specifically, *RET*(r-1,r+1) measures firms' market-adjusted return in the three-day window surrounding their calendar revisions. Panel B shows there is no significant difference in returns across advancers and delayers at the time of the calendar revision. The absence of significant differences in returns at the time of firms' calendar revisions indicates investors do not respond to revisions as being informative of firm-value.[4]

3.3. Predicting Earnings News

This section directly examines the informativeness of the calendar revisions by gauging their predictive power for firms' subsequently reported earnings news. Panel A of Table 2 contains average earnings metrics across *R-Score* portfolios based on (1) return-on-assets, denoted as ROA; (2) changes in ROA, denoted as ΔROA; and (3) reported earnings relative to consensus analyst forecasts and scaled by lagged total assets, denoted as $SURP$. In calculating $SURP$, the consensus is measured immediately prior to the announcement to ensure that analysts had the opportunity to revise their forecasts in response to the calendar revision. Additionally, $ROA<0$, $\Delta ROA<0$, and $SURP<0$ are indicator variables that equal one when the corresponding variable is negative.

Panel A captures the first main result of the paper. Specifically, advancers subsequently announce greater ROA, changes in ROA, and earnings surprises, compared to delayers. These differences are both statistically and economically significant. For example, earnings declines and negative analyst-based surprises are concentrated among delayers, where average ROA is positive for advancers and negative for delayers. Additionally, average earnings innovations and earnings surprises increase monotonically across *R-Score* portfolios.

Panel B of Table 2 presents regression results when controlling for firms' log market capitalization ($SIZE$), log book-to-market ratio (LBM), return momentum ($MOMEN$), and historical return volatility ($VLTY$). *R-Score* has strong predictive power for all three earnings news proxies (t-statistics from 3.62 to 5.58) that is not subsumed by the controls. Together, these results establish that firms reveal information about their subsequently reported performance when revising the scheduled timing of future earnings announcements.

3.4. Predicting Future Returns

Given the evidence that calendar revisions predict subsequently reported earnings news, our next set of tests examine whether investors unravel these signals and impound calendar information into prices in a timely fashion.

[4]These results contrast with the findings in Duarte-Silva et al. (2013) that prices significantly decline at the time of press releases explicitly mention 'delaying', 'postposing', or 'deferring' an earnings announcement, suggesting that the type and wording of the announcement may make delays more salient to investors.

Table 3 contains average equal- and value-weighted returns to each *R-Score* portfolio following the revision date r, using five return metrics measured over the month following the calendar revision from r+1 to r+21. Specifically, the first two columns contain raw and market-adjusted returns denoted as $RR(r{+}1,r{+}21)$ and $RET(r{+}1,r{+}21)$, respectively. $SAR(r{+}1,r{+}21)$ refers to size-adjusted returns which equals the firm's raw return minus the contemporaneous size-matched portfolio return and $CAR(r{+}1,r{+}21)$ is defined analogously for characteristically-adjusted returns, following Daniel et al. (1997). Finally, $FAR(r{+}1,r{+}21)$ refers to four-factor-adjusted returns following Carhart (1997).

Panel A of Table 3 captures the second main result of the paper. Specifically, the results demonstrate a robust positive relation between calendar revisions and firms' future returns. For each return metric, the average return spread across advancers and delayers exceeds 260 basis points (2.6%) in the month following calendar revisions, with corresponding t-statistics ranging from 3.95 to 5.17. Table 3 also shows that the spread in market-adjusted returns is also fairly symmetric across advancers and delayers, mitigating concerns that the returns are limited to the short side of the portfolio. Advancers, on average, outperform the market by approximately 138 basis points and delayers underperform by 130 basis points, which aligns with the nature of firms' subsequently reported earnings news. This evidence of a robust post-revision return spread across advancers and delayers contrasts sharply with the insignificant price reaction at the time of calendar revisions shown in Table 1, suggesting that investors do not unravel the implications of calendar revisions for earnings news in a timely fashion.

To address the possibility that the return predictability we document is limited to small firms where transaction costs are highest, Panel B of Table 3 presents value-weighted future returns across *R-Score* portfolios. Value-weighting lowers the portfolio's performance but the resulting returns remain economically large. The average difference in value-weighted returns across advancers and delayers ranges from 153 to 216 basis points in the month after calendar revisions, with corresponding t-statistics of 2.01 and 2.13. Because we find no evidence the results significantly vary across return metrics in Table 3, we focus on market-adjusted returns in subsequent tests.

To mitigate concerns that the predictability is driven by a firm's exposure to standard risk proxies, Table 4 contains return regressions when controlling for standard risk proxies. The dependent variables are $RET(r{+}1,r{+}21)$, the return in the month following the revision, and $RET(t\text{-}1,t{+}1)$, the return in the three-day window surrounding firms' expected date. In both sets of regressions, the first columns show *R-Score* incrementally predicts returns, where the coefficient magnitudes align with the return spreads shown in earlier tables. Similarly, columns (2) and (4) show the raw magnitude of the calendar revision, *REV*, also predicts returns (t-statistics = 7.76 and 5.00, respectively), indicating the return predictability shown earlier is not dependent upon the cutoff points used in calculating *R-Score*.

Columns (3) and (6) of Table 4 disaggregates *R-Score* into four indicator variables: *Advancer*, *MinorAdvancer*, *MinorDelayer*, and *Delayer*, constructed from the *R-Score* cutoff points, where observations with *REV* from -2 to +2 serve as the control sample. All of the coefficients have the predicted sign. Moreover, the simultaneous significance of *Advancer* and *Delayer* underscores the symmetric predictive power of the revision-based methodology in this paper, which predicts both positive and negative news weeks ahead of the announcement and thus contrasts with prior studies that conduct pricing tests using short positions in response to missed announcement dates.

3.5. Event-Time Returns

Our next analyses examine the spread in event-time returns within the month (21 trading days) surrounding firms' expected earnings announcement dates.[5] Table 5 contains firms' returns in event-time, where *RET*(t+X,t+Y) denotes the cumulative market-adjusted return from day X to Y relative to the expected earnings announcement date t.

The *RET*(t-10,t+10) column of Table 5 shows advancers outperform delayers by 253 basis points in the month centered on firms' expected announcement date (i.e., from t-10 to t+10), consistent with the magnitude of the calendar-time return spread documented in Table 3. The *RET*(t-10,t-2) column of Table 5 shows advancers only weakly outperform delayers by 54 basis points (t-statistic = 1.77) prior to earnings announcements.

In contrast, the *RET*(t-1,t+1) column of Table 5 shows that event-time returns are heavily concentrated in the three-day window surrounding announcement dates. Specifically, over 60% (=158/253 basis points) of monthly event-time returns are earned during the announcement. This evidence suggests that prices adjust to the information content of calendar revisions at the time earnings are announced, rather than at the time of the revisions.

[5] Use of actual announcement dates yields qualitatively identical results, which is not surprising given the evidence in Table 1 and Livnat and Zhang (2015) that firms generally announce earnings on their confirmed expected date.

The $RET(t{+}2{,}t{+}10)$ column of Table 5 also shows that advancers outperform delayers by approximately 50 basis points following earnings announcements, which is consistent with prior evidence of post-earnings announcement drift (PEAD). However, Table 5 also shows that over 80% (=208/253 basis points) of monthly event-time returns are earned up through the announcement window, indicating the results are mostly distinct from PEAD.

Figure 1 provides striking evidence of when strategy returns are earned relative to the announcements. The top graph shows that the cumulative spread in returns reaches 50 basis points two days prior to the announcement (i.e., t-2), but nearly doubles on the announcement date t, and jumps over four-fold by t+1 to over 200 basis points. In related tests, the bottom panel of Figure 1 separately plots the cumulative return of advancers and delayers in event-time relative to firms' announcements. The figure shows that the two lines tend to move in parallel leading up to the announcement but sharply decouple at the time earnings are announced. Together, these results indicate that strategy returns primarily stem from predictable expectation errors that are corrected during the announcement.[6]

Figure 2 shows the average spread in returns across advancers versus delayers for each calendar quarter, where $RET(r{+}1{,}r{+}21)$ is shown in black bars and $RET(t\text{-}1{,}t{+}1)$ is shown in grey bars. The results show that the average return spread is positively skewed and generally positive over time, yielding positive average monthly (announcement-window) returns in 23 (29) of the 32 calendar quarters in our sample window. This evidence helps mitigate concerns that the return-based results are isolated within a specific period.

3.6. Comparing Measures of Announcement Timeliness

Researchers can characterize earnings announcement timeliness in terms of firms being early versus late (i.e., the approach in prior research) or in terms of whether firms shift their expected announcement date (i.e., the approach in this study). Although the early/late and advance/delay classifications are conceptually related and both correlated with earnings news, Table 6 contains results from a series of tests showing that they are actually *negatively* correlated, offer distinct predictive power, and that the advance/delay approach in this paper yields several benefits over the early/late approach used in prior research.

[6] The pre-announcement price increase for both advancers and delayers in Figure 1 is consistent with the evidence in Johnson and So (2015) of abnormally positive pre-announcement returns due to asymmetric trading costs.

Panel A of Table 6 contains average values of REV and observation counts across *R-Score* portfolios, where each portfolio is further partitioned based on whether a firm's realized announcement date is early, on-time, or late relative to their expected announcement date. To the extent that the early/late and advance/delay classifications capture the same phenomenon, readers may expect sample observations to be concentrated among delayers being late (i.e., the upper right cell) and/or among advancers being early (i.e., the bottom left cell). Contrary to this expectation, Panel A shows that the vast majority of observation counts are concentrated among firms being on-time relative to their expected announcement date. Specifically, among both advancers and delayers, approximately 90% of the observations correspond to firms being on-time.

The final row of Panel A shows average Spearman and Pearson correlations between the extent of a firm's calendar revision, REV, and the extent to which a firm reports early versus late, DEV. The correlations are significantly negative, ranging from -4% to -6%. Although the two dimensions are negatively related, the small magnitude of these correlations suggests that they also likely capture separate aspects of earnings announcement timing.

Panels B and C of Table 6 address the following thought experiment: if researchers assumed *perfect foresight* of whether firms report early versus late, would calendar revisions still offer incremental predictive power for earnings news and returns? Columns (1) and (4) of Panel B show that DEV has significant positive relation with ΔROA and $SURP$, which replicates the result in Bagnoli, Kross, and Watts (2002) that reporting late is correlated with negative earnings news. Panel B also shows that *R-Score* predicts earnings news incremental to DEV when both measures are included in the regression simultaneously. Moreover, the *R-Score* coefficients appear relatively constant in terms of size and significance across regressions that include versus exclude DEV, which is consistent with the small statistical correlations between REV and DEV reported in Panel A.

Panel C provides similar evidence for predicting returns. Columns (1) and (4) show that although DEV is significantly related to longer-window returns around the announcement, they are insignificantly related to returns around the expected announcement date, which is consistent with evidence in Penman (1984) that prices drift down after a firm fails to report on-time. Moreover, the remaining columns show the predictive power of *R-Score* is largely orthogonal to controlling for DEV, despite these tests assuming that realized announcement dates are observable at the same time as firms' calendar revisions.

Finally, Panel D contains average sample counts and returns in the month surrounding firms' expected announcement dates, corresponding to two distinct samples. The first two columns correspond to the main sample used throughout the paper. The N column shows there are only roughly 15 firms *per quarter* (2.6% of the total) that actually announce late and 21 firms (3.5% of the total) that report early relative to their disclosed expected date.

The spread in average returns across these portfolios is 195 basis points (t-statistic = 1.85), indicating that the spread in returns across early versus late firms is smaller than the spread corresponding to advancers versus delayers and that the early/late strategy is also applicable to significantly fewer firms within the paper's main sample. The latter two columns in Panel D contain analogous results corresponding to a sample of 49,575 observations where firms verified at least two weeks prior to their expected announcement date, which expands upon the main sample by including cases where the calendar revision is less than two trading days. These tests show that the early versus late classification continues to yield fewer observations and roughly similar predictive power for returns compared to advances versus delays even when implementing a version of the early/late strategy that assumes perfect foresight of whether firms announce earnings on-time.

Together, Table 6 shows that earnings calendars possess informationally rich signals that researchers can use to supplement approaches from prior studies and, at the same time, offers several advantages over existing approaches in predicting firms' earnings news and returns.

3.7. Contextual Analysis

The preceding analysis establishes a robust link between firm-initiated calendar revisions and future returns. A natural extension of these tests is to examine whether the return results are predictably concentrated among subsets of firms in which calendar revisions are more likely to be relevant for prices. To address this possibility, Table 7 contains results from regressing $RET(r{+}1,r{+}21)$ on *R-Score* interacted with four conditioning variables.

The first two conditioning variables in Table 7 capture the extent of a firm's information environment and trade frictions. Specifically, $\mathbf{1}$(Small Firm) is an indicator variable that equals one if the firm is in the lowest tercile of market capitalization and $\mathbf{1}$(Low Coverage) is defined analogously for analyst coverage, where terciles are measured each calendar quarter. We expect that the predictive power of *R-Score* for returns is concentrated among smaller firms where investors are less likely to learn about the earnings information embedded in calendar revisions through other sources such as media coverage.

Abarbanell and Lehavy (2003) and So (2013) provide evidence that analysts' investment recommendations signal a firm's incentives to meet or beat analysts' forecasts, such that higher recommendations signal a greater sensitivity of a firm's share price to earnings news. Thus, we define **1**(Buy Recommendation) as an indicator variable that equals one if the firm has a consensus 'BUY' recommendation in IBES and predict that it has a positive interaction effect with *R-Score* in predicting future returns because prices should react more strongly to subsequently announced earnings news for this subset of firms.

Finally, Gilson (1989) shows that managers' career concerns increase when a firm approaches distress and Kothari, Shu, and Wysocki (2009) argues that managers of distressed firms have a heightened incentive to suppress bad news. We define **1**(High Distress) as an indicator variable that equals one if a firm is in the lowest tercile of the Zmijewski (1984) Z-Score financial distress measure and predict that it has a positive interaction effect with *R-Score* in predicting returns. This prediction is based on the idea that managers are more likely to use discretion over the timing of earnings news when it has a greater impact on their human capital and/or personal wealth.

Consistent with these predictions, the interaction terms in Table 7 show that return prediction increases among firms with greater sensitivities to earnings news, small firms with low analyst coverage, and among firms whose management faces greater career concerns. These results show the predictive power of calendar revisions for future returns is correlated with firm characteristics through contextual analysis.

3.8. Calendar-time Strategies

The evidence that calendar revisions predict returns concentrated during firms' announcements suggests that there are trading strategies exploiting this pattern. Whereas the preceding tests study returns in event-time, Table 8 studies returns to calendar-time strategies. Specifically, Panel A reports alphas and factor loadings from strategies based on simultaneous long and short positions in the week of firms' expected earnings announcement dates.

The strategies we test in Table 8 are long firms with $REV>3$ and short firms with $REV<-3$. The four sets of tests vary in terms of the required minimum long and short positions within a given week for the strategy to be implemented. For example, the first two columns correspond to the returns from a strategy that requires at least one long and one short position; otherwise the strategy is not implemented. N indicates the number of weeks in which the strategy was implemented out of 409 possible weeks.

In Table 8, we estimate the alpha of each strategy's weekly time-series of returns relative to a standard four factor model. Table 8 shows that the four-factor alpha from a weekly long-short strategy varies from 138 basis points (t-statistic = 5.44), which corresponds to a minimum of five long and short positions, to 62 basis points (t-statistic = 2.95), which corresponds to a minimum of 15 long and short positions. These results indicate that the returns to revision strategies are largely orthogonal to traditional asset pricing factors, including the momentum factor, despite the results in Table 1 showing that revisions are correlated with momentum. This evidence is consistent firms' earnings news – rather than their exposure to risk factors – being the primary determinant of returns around earnings announcements.

Related evidence in Figure 3 presents the cumulative value of a $1 invested across the four long-short revision strategies shown in Panel A of Table 8 starting from the beginning of 2006 through 2013. In weeks where there the number of sample observations does not meet the stated minimum requirement, the strategy is not implemented and assumed to earn zero returns. As a result, the mean and variance of the returns predictably vary with the required portfolio size. For the requirement of at least five long and short positions, the cumulative value of $1 invested in 2006 reaches $9.57 by the end of the sample period. By contrast, the equivalent value when using at least ten long and short positions is $3.61, which is consistent with the evidence in Table 8 that the number of weeks that a given strategy is implemented declines when increasing in the minimum position requirements.

Panel B of Table 8 presents analogous strategy returns when expanding the underlying sample to include observations where REV is less than 2 in absolute value, which are omitted from the Panel A tests. In the Panel B tests, all firms expected to announce earnings in a given week are cross-sectionally ranked into tercile portfolios based on REV. When expanding the sample, the strategy continues to yield statistically significant but slightly smaller four-factor alphas ranging from 63 to 81 basis points per week (t-statistics = 2.03 and 5.05, respectively). However, Panel B also shows that using terciles of REV and incorporating firms with small or no calendar revisions significantly increases the number of weeks when the strategy can be applied and therefore improves potential long-run performance. Together, the findings in Table 8 and Figure 3 highlight significant returns to calendar-time strategies that exploit the information content of calendar revisions.

4. Additional Analyses: Understanding the Source of Predictability

4.1. Option Market Tests

There are at least two potential explanations for the evidence in Section 3 that equity prices fail to react to earnings calendar revisions and instead subsequently drift in the direction of firms' earnings news. The first is that investors observe calendar revisions but are not aware that they contain information about the nature of firms' earnings news. The second is that investors are unable to observe calendar revisions due data procurement and processing costs and/or due to cognitive constraints such as limited attention (as suggested by Cohen and Lou (2012), DellaVigna and Pollet (2009), and Hirshleifer, Lim, and Teoh (2009)).

To distinguish between these explanations, we utilize a unique feature of our research setting that calendar revisions convey two simultaneous signals. The first is a 'content signal' that foreshadows the nature of firms' earnings news. The second is a 'volatility-timing signal' that conveys the timing of firms' earnings news. Because advancing and delaying can shift the timing of announcements relative to option expiration dates, both content and volatility-timing signals are relevant for option prices, but through separable channels. This separability feature allows us to test the market's response to each signal while nullifying the other (i.e., holding the other signal constant).

Our earnings calendar setting provides a more powerful platform for studying investor irrationality than most other event settings, such as earnings announcements and analysts' forecast revisions, for at least three reasons. First, earnings announcements convey several different aspects of firms' performance including, but not limited to, its past earnings, expectations of future earnings, and operational and strategic risks, making it more difficult to interpret market reactions. Second, the information researchers use to study market reactions can differ from the information available to investors at the time of the event, which can create misleading depictions of market inefficiency (Rosenberg and Houglet (1974), Kothari, Shanken, and Sloan (1995), Ljungqvist, Malloy, and Marston (2009)). Third, the content, clarity, and novelty of information conveyed at earnings announcements and forecast revisions can vary across firms, whereas the revisions we study are more likely to represent a uni-dimensional news event with clear and measurable content.

To the extent our evidence of return predictability is driven by investors observing calendar revisions but failing to internalize the directional earnings news they contain, we would expect to see substantial abnormal price movements in option markets around these revisions. However, if the return predictability is driven by investors not observing the revision, or by them not knowing the announcement date expected prior to the revision/confirmation, we would expect no contemporaneous option market reaction. To explore these potential explanations, we separately study the content and volatility-timing signals embedded in calendar revisions along with option market prices from OptionMetrics.

Our option market tests are based on a sample of 10,313 firm-initiated earnings calendar revisions for which we have options pricing data. For each observation, we compute the returns of an at-the-money call option and an at-the-money put option at the time of the calendar revision (i.e., r-1,r+1) as well as in the days between the revision and the option expiration date, which we denote as $r+T$. We focus on the expiration date T closest to the revised announcement date $EXDT_r$ to facilitate identifying instances in which the calendar revision postpones the announcement past, or advances it prior to, the expiration date.

One challenge in studying option returns, unlike stock returns, is that there is no "market" to use as an abnormal performance benchmark. Additionally, the expected return of an option varies as a function of its moneyness, time to maturity, implied volatility, and proximity to earnings announcements. For these reasons, we use a characteristic-based approach for measuring abnormal performance. Specifically, for each outcome variable y and revision i, we subtract average values from revisions j in a matched sample of options returns surrounding earnings calendar revisions:

$$y_i^{\text{abnormal}} = y_i - \frac{1}{N} \sum_{j \in \text{match}_i} y_j, \tag{2}$$

where N is the number of matched observations used. By using other at-the-money options from our sample as the benchmark, we eliminate any variation driven by moneyness and any pattern in options returns affecting all firms surrounding their calendar revisions and earnings announcements. Appendix B details our approach to constructing a matched sample of N firms for each revision i.

Our option market tests are divided across two tables. Our first tests, presented in Table 9, isolate the option market reaction to the content signal embedded in earnings calendar revisions by sorting observations according to *R-Score*. A key feature of these tests is that we examine the returns of directional option strategies relative to a matched sample with the same announcement timing relative to the option expiration date. This matching procedure effectively nullifies the volatility-timing signal by ensuring that all options are similarly affected by whether the earnings announcement occurs before or after the options expire.

Our second set of tests, presented in Table 10, measure the option market reaction to volatility-timing signals by focusing on observations in which the earnings calendar revision changes the earnings announcement timing relative to option expiration. We effectively nullify the content signal of calendar revisions in these tests by measuring abnormal option market outcomes relative to a matched sample with the same value of REV.

Table 9 presents average abnormal returns to directional option strategies surrounding calendar revisions as a function of *R-Score*. Panel A shows that, like equity markets, option markets do not react in a timely manner to the content signal embedded in earnings calendar revisions. Specifically, we find both call and put option returns are slightly negatively related to *R-Score*, with neither pattern being statistically significant.

Also echoing our equity market results, Table 9 shows a predictable drift in option prices after the revisions are observed. Specifically, we find positive subsequent call option returns and negative subsequent put option returns for high *R-Score* firm-quarters. The opposite pattern holds for low *R-Score* firm-quarters. The significance is more marginal than in our main tests because requiring options data reduces the sample size by around half and options returns are much more volatile. However, the difference in option returns across extreme values of *R-Score* remains economically large, at approximately 20% per month, reflecting the additional leverage embedded in options.

Table 10 shows option market reactions and subsequent returns for observations in which firms' calendar revisions change the timing of their announcements relative to expiration dates, while controlling for the content signal using our matching methodology. We consider two subsamples, the "Advanced into" subsample for which:

$$EXDT_r < r + T < EXDT_{r-1}, \tag{3}$$

meaning we expect additional volatility prior to option expiration now that the announcement is moved forward, and the "Postponed out of" subsample for which:

$$EXDT_{r-1} < r + T < EXDT_r, \tag{4}$$

meaning we expect less volatility prior to the option expiration. Because each outcome variable is measured relative to a control sample with similar REV, the results in Panel B are attributable to the timing of the option expiration date relative to the expected announcement dates.

To assess the options market reaction to volatility-timing information, we examine the behavior of option-based volatility measures and volatility strategy returns. Our primary outcome variables are the returns of straddles, denoted $Strad$; delta-hedged straddles, denoted $DHStrad$; delta-hedged call options, denoted $DHCall$; and delta-hedged put options, denoted $DHPut$.[7] Following Bakshi and Kapadia (2003), we compute delta-hedged returns using the option delta provided by OptionMetrics (Δ) according to:

$$DHr_{\text{option},t} = r_{\text{option},t} - \frac{p_{\text{stock},t-1}}{p_{\text{option},t-1}} \cdot \Delta_{\text{option},t-1} \cdot r_{\text{stock},t}, \tag{5}$$

where $r_{\text{asset},t}$ represents the asset's return on day t and $p_{\text{asset},t}$ represents the asset's price on day t.

We also examine option market reactions to revisions using changes in at-the-money implied volatility (ΔIV), and subsequent returns using unexpected return variance ($UVAR$), defined as the difference between option-implied return variance as of day r and realized daily return variance from $r + 1$ through $r + T$, both annualized.

Panel A of Table 10 shows there is an immediate reaction in option markets to revisions that affect the announcement's timing relative to the option expiration date, which notably differs from the results in Table 9. Implied volatility increases and all four volatility strategies earn positive

[7] While exactly at-the-money straddles have zero delta, the range of strike prices often does not include the precise current stock price, meaning straddles often have non-zero delta (see Coval and Shumway (2001)).

abnormal returns at the time of the revision when the revision advances the announcement into the option's duration, and follow the opposite pattern when the revision postpones the announcement out of the option's duration. Moreover, in addition to being immediate, the option market reaction appears to be efficient, as we find no subsequent predictability in unexpected variance or volatility strategy returns in the post-revision period.

4.2. Discussion

The evidence in Section 4.1 highlights a stark contrast between the options market reaction to the volatility-timing and content signals of earnings calendar revisions. One potential alternative explanation for these findings is that investors are fully aware of the content signal but unable to trade on it because transaction costs are too high in option markets. However, the volatility strategies require forming portfolios with multiple assets including at least one option position, making them more expensive to implement than the directional strategies. This means that transactions costs alone would likely make option markets *more*, not less, efficient with respect to the content signal compared to the volatility-timing signal.

Another potential alternative is that trading on the content signal requires additional data or poses greater computational complexity relative to the volatility-timing signal. However, both signals require the same underlying data (i.e., expected dates both before and after the revision), meaning that investors could not observe the volatility-timing signal of earnings calendar revisions without also observing the information necessary to infer the content signal.

Combined, the evidence in Tables 9 and 10 indicate that option markets react strongly and efficiently to the volatility-timing signal in earnings calendar revisions while not significantly reacting to the content signal embedded within the same calendar revision. Based on this evidence, we conclude our results are not due to investor inattention or information processing costs. Instead, they appear to be driven by investors observing calendar revisions but failing to internalize their predictive value for firms' earnings news.

More broadly, a likely explanation for the evidence of predictable returns is that investors fail to unravel calendar revisions because the link to firms' cash flows is subtle. As the example in Appendix A shows, it is not immediately obvious that these seemingly 'boilerplate' disclosures signal the nature of firms' earnings news; only *when* the news is to be announced. Thus, identifying the content information embedded in these disclosures requires viewing them through a skeptical lens which considers that managers may strategically time news.

Taken together, our findings validate a simple approach for extracting information embedded in the dynamics of earnings calendars and, thus, are consistent with the idea that researchers can contribute to more efficient market prices by identifying new, cost-effective approaches for summarizing value-relevant signals (McLean and Pontiff (2016)). Specifically, our results suggest that investors primarily relied upon early/late dimension of announcement timing to infer firms' earnings news, perhaps because that was the predominant approach in prior academic research rather than calendar revisions being too costly to observe or trade upon.

5. Conclusion

We study a novel approach for harnessing the predictive power of earnings calendar data. A key feature of this approach is that it utilizes firm-initiated revisions in expected earnings announcement dates and thus helps capture managers' efforts to alter the schedule of future news releases. The results of this study confirm that the old adage "time will tell" also applies to firms' expected earnings announcement dates by showing that firms reveal information about their subsequently reported performance and future returns when revising the schedule of future announcements.

Our findings contribute to the literature by highlighting a novel *ex ante* approach for studying earnings announcement timing, by reconciling our forward-looking approach with traditional approaches based on actual announcement dates, and by studying the influence of firms' information environment and managerial incentives on how prices respond to this information. Additionally, a key innovation of our paper is that we use option prices to adjudicate competing explanations for the sources of return predictability.

Taken together, the results in this study establish the predictive power of firms' timing disclosures and earnings calendars with the hope and expectation that these findings will stimulate further thought and research on earnings calendars as a topic of central importance to researchers, investors, and corporate managers.

Appendix A. Example of Firm-Initiated Calendar Revisions

This appendix uses the change in the expected earnings announcement date of Oracle Corporation (ORCL) in March of 2010 as an example of a firm-initiated calendar revision. On March 3, 2010, Oracle issued a press release with the following information:

SOURCE: Oracle Corporation

ORACLE®

March 03, 2010 08:30 ET

Oracle Sets the Date for Its Third Quarter Fiscal Year 2010 Earnings Announcement

Earnings Results to Be Released on March 25, 2010, After the Close of the Market

REDWOOD SHORES, CA--(Marketwire - March 3, 2010) - Oracle Corporation (NASDAQ: ORCL) today announced that its third quarter fiscal year 2010 results will be released on Thursday, March 25th, after the close of the market. Oracle will host a conference call and live web broadcast at 2:00 p.m. Pacific time to discuss the financial results. The live web broadcast will be available on the Oracle Investor Relations website at http://www.oracle.com/investor.

In the prior year, Oracle announced its 2009 third quarter earnings on March 18th, 2009 (the third Wednesday of the month) and, prior to the above press release, the earnings calendar forecasted Oracle's 2010 third quarter expected earnings announcement date as March 17, 2010 (also the third Wednesday of the month).

In response to Oracle's press release, Wall Street Horizon revised the expected announcement date to March 25, 2010. Because the calendar revision resulted from the firm explicitly indicating when they intend to announce earnings, we categorize the revision as being 'firm-initiated'. The calendar data appears as follows:

Date	Ticker	Fyear	FQtr	EXDT	etype
3/1/2010	ORCL	2010	3	3/17/2010	T
3/2/2010	ORCL	2010	3	3/17/2010	T
3/3/2010	ORCL	2010	3	3/17/2010	T
3/4/2010	ORCL	2010	3	3/25/2010	V
3/5/2010	ORCL	2010	3	3/25/2010	V
3/8/2010	ORCL	2010	3	3/25/2010	V

Note that the press release is issued on March 3, 2010 but is recorded one day later in the March 4, 2010 earnings calendar data, which Wall Street Horizon dissiminated by 4am ET on March 4. Accompanying this date change, the 'etype' column of the calendar data changes from 'T', indicating it was unconfirmed, to 'V', indicating it was based on information directly conveyed by the firm regarding when they intend to announce earnings.

In this example, our measure of the calendar revision, REV, equals negative six because Oracle's press release caused the expected announcement date in the earnings calendar to shift back by six trading days. Because the value of REV is greater than one week, Oracle's revision is assigned an *R-Score* of zero and Oracle would be treated as a 'delayer'.

Appendix B. Matching Procedure for Options Analysis

In Table 9 our goal is to study how option returns vary as a function of *R-Score* holding fixed other relevant factors. We therefore compute a control sample of other revisions with the same announcement timing relative to the option expiration date, the same time to expiration, and similar implied volatility. Specifically, for each observation i we compute a matched sample of $N = 10$ other observations j with the following properties:

(C1) The same announcement timing relative to the option's expiration date both before and after the calendar revision, meaning:

$$\begin{cases} EXDT_{r,j} \leq r_j + T_j & \text{if } EXDT_{r,i} \leq r_i + T_i \\ EXDT_{r,j} > r_j + T_j & \text{if } EXDT_{r,i} > r_i + T_i \\ EXDT_{r-1,j} \leq r_j + T_j & \text{if } EXDT_{r-1,i} \leq r_i + T_i \\ EXDT_{r-1,j} > r_j + T_j & \text{if } EXDT_{r-1,i} > r_i + T_i \end{cases} \tag{6}$$

(C2) Among those satisfying (C1), choose the N with the closest T_j to T_i.

(C3) If more than N satisfying (C1) have $T_j = T_i$, choose the N with the closest IV_j to IV_i among those with $T_j = T_i$.

In Table 10, our goal is to study option returns in cases where the revision postpones the earnings announcement out of an option's life (the "Postponed out of" sample), or the calendar revision advances the announcement into an options life (the "Advanced into" sample), while holding fixed other relevant factors. We therefore compute a control sample for these observations with the same revision $REV = EXDT_r - EXDT_{r-1}$, the same time to expiration, and similar implied volatility, but without the same change in timing relative to the option expiration date. Specifically, for each observation i in the Advanced into sample, we compute matched sample of $N = 10$ other observations with the following properties:

(V1) The announcement timing was prior to the option's expiration date both before and after the revision, meaning $EXDT_{r,j} \leq T_j$ and $EXDT_{r-1,j} \leq T_j$

(V2) Among those satisfying (V1), choose the N with the closest REV_j to REV_i.

(V3) If more than N satisfying (V1) have $REV_j = REV_i$, choose the N with the closest T_j to T_i among those with $REV_j = REV_i$.

(V4) If more than N satisfying (V2) have $T_j = T_i$, choose the N with the closest IV_j to IV_i among those with $T_j = T_i$ and $REV_j = REV_i$.

We compute the matched sample for each observation in the Postponed out of sample using a similar procedure on the sample of revisions for which the announcement was always after the option expiration, meaning $EXDT_{r,j} > T_j$ and $EXDT_{r-1,j} > T_j$.

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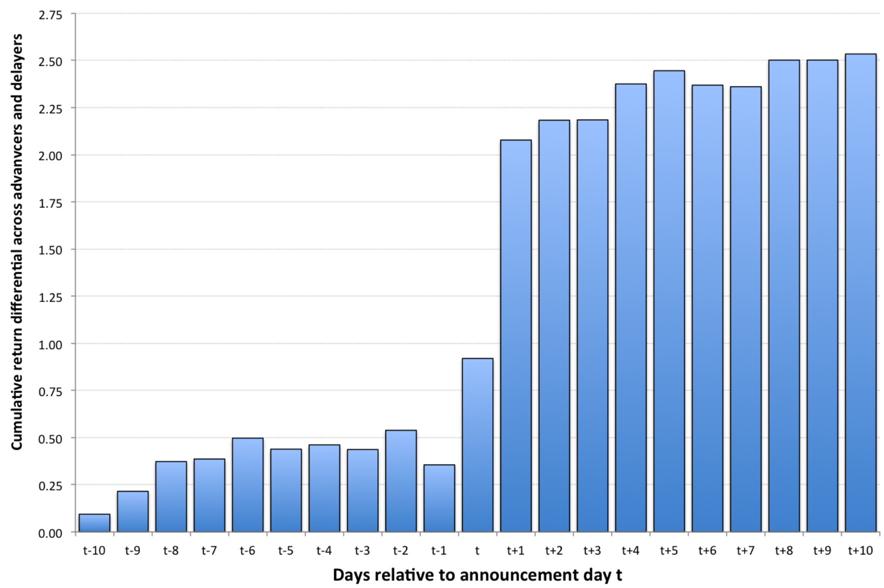
Figure 1. Cumulative Returns Around Earnings Announcements

Panel A contains the average spread in cumulative returns across high and low *R-Score* portfolios in event-time in the month surrounding expected earnings announcement dates. Firms are assigned to *R-Score* portfolios on date r using firm-initiated revisions in their expected expected announcement dates, REV, defined as the number of trading days between the expected announcement date provided by the firm and the immediately preceding expected announcement date. *R-Score* equals 0 for firms with REV<-5 and 1 for firms with REV>5. Firms in the highest *R-Score* portfolio are deemed 'advancers' and firms in the lowest *R-Score* portfolio are deemed 'delayers'. In Panel A, the value on day d equals the average cumulative return spread from day t-10 to day d. Panel B contains the average cumulative, market-adjusted returns to high and low *R-Score* firms. The sample consists of 18,959 firm-quarters spanning 2006 through 2013 in which firms revise their expected earnings announcement date at least two weeks prior to their expected announcement date.



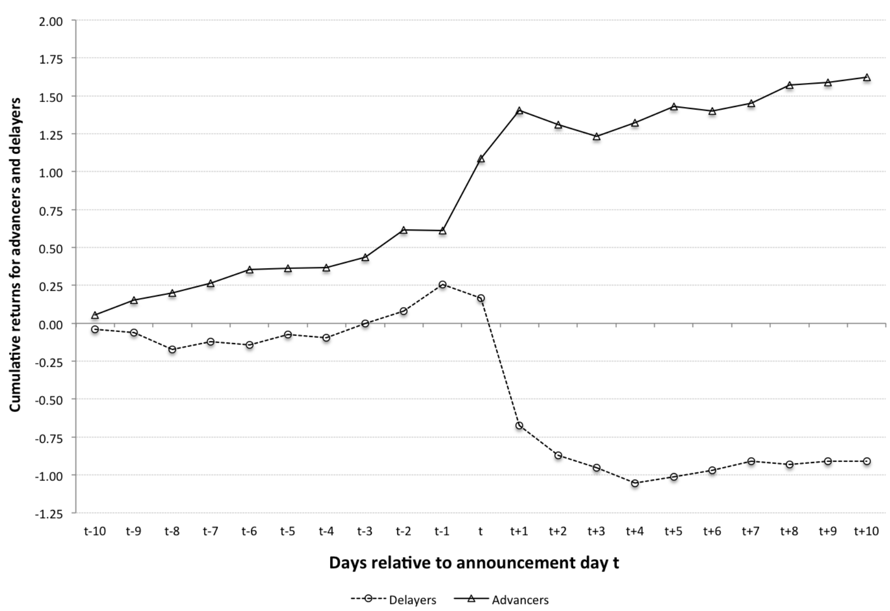


Figure 2. Quarterly Strategy Returns

The figure contains the average spread in returns across high and low *R-Score* firms (i.e., advancers vs. delayers) each calendar quarter. Firms are assigned to *R-Score* portfolios on date r using firm-initiated revisions in their expected expected announcement dates, REV, defined as the number of trading days between the expected announcement date provided by the firm and the immediately preceding expected announcement date. *R-Score* equals 0 for firms with REV<-5; 0.25 for firms with -5$\leq REV \leq$-3; 0.5 for firms with -2$\leq REV \leq$2; 0.75 for firms with 3$\leq REV \leq$5; and 1 for firms with REV>5. Firms in the highest *R-Score* portfolio are deemed 'advancers' and firms in the lowest *R-Score* portfolio are deemed 'delayers'. $RET(r{+}1,r{+}21)$, shown in black bars, equals the market-adjusted return over the month following the calendar revision. $RET(t{-}1,t{+}1)$, shown in grey bars, equals the three-day return surrounding the expected earnings announcement date t. The sample consists of 18,959 firm-quarters spanning 2006 through 2013 in which firms revise their expected earnings announcement date at least two weeks prior to their expected announcement date.

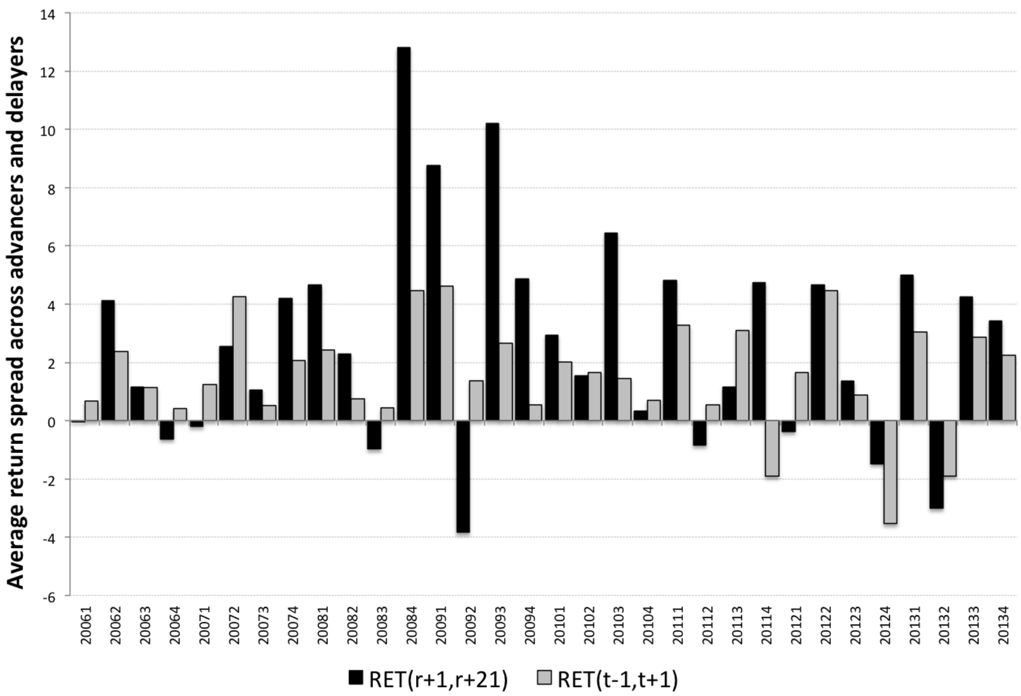


Figure 3. Cumulative Returns to Weekly Revision Strategy

This figure contains the cumulative value of a $1 invested across four long-short revision strategies. The strategies involves simultaneous, weekly long and short positions in the week of firms' expected earnings announcements. The strategy is long firms with $REV>3$ and short firms with $REV<-3$, where REV is defined as the number of trading days between the expected announcement date provided by the firm and the immediately preceding expected announcement date. The strategies vary in terms of the required minimum long and short positions for the strategy to be implemented within a given calendar week. For example, the red dotted line corresponds to the returns from a strategy that requires at least five long and five short positions; otherwise the strategy is not implemented and is assumed to earn zero returns. The sample consists of 18,959 firm-quarters spanning 2006 through 2013 in which firms revise their expected earnings announcement date at least two weeks prior to their expected announcement date.

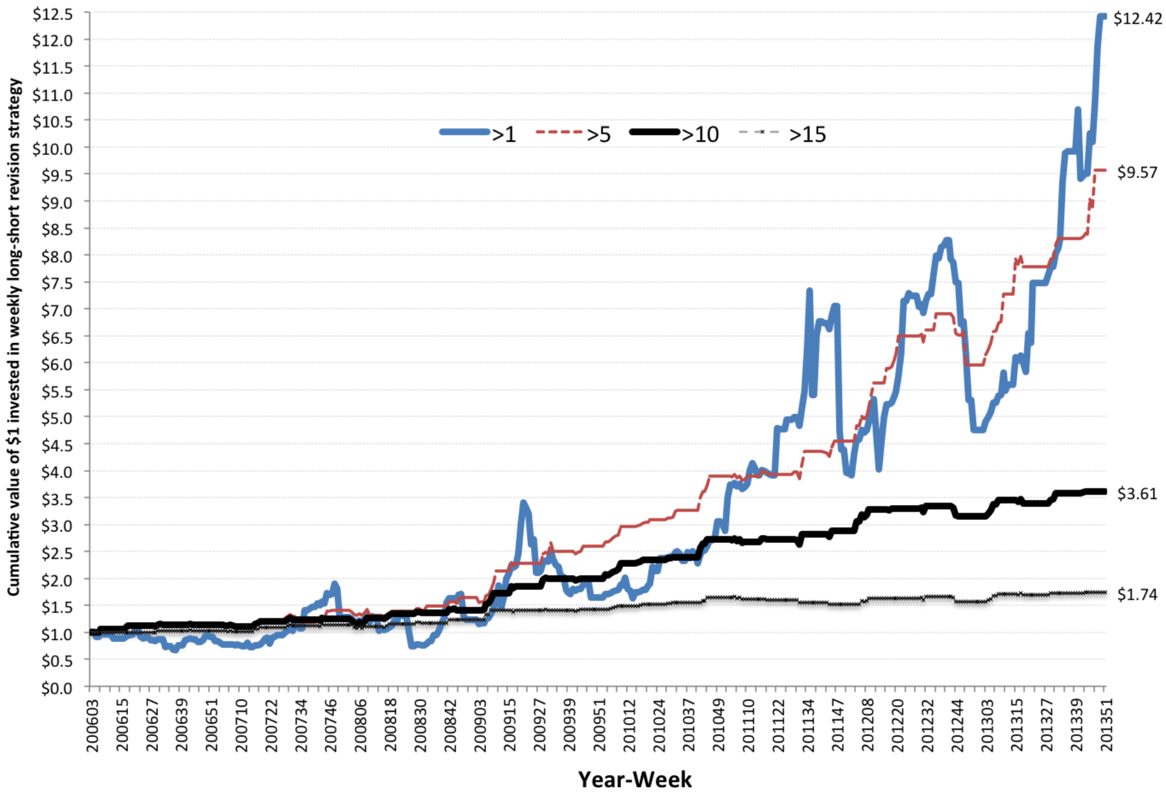


Table 1. Descriptive statistics

Panel A presents annual descriptive statistics of the main variables used throughout the paper. N equals the number of firm-quarters and $Firms$ indicates the number of unique firms. $HORIZON$ equals the number of days between the date on which a firm issues a confirmed date and the expected announcement date. REV equals the number of days between a confirmed expected announcement date and the immediately preceding expected announcement date. $|REV|$ equals the absolute value of REV. DEV equals the number of days between the confirmed expected announcement date and the actual announcement date and positive (negative) values indicate that the firm reported earlier (later) than expected. $|DEV|$ equals the absolute value of DEV. The 'All' column indicates the average of the annual means. Panel B contains sample averages across *R-Score* portfolios. Firms are assigned to *R-Score* portfolios on date r using firm-initiated revisions in their expected expected announcement dates, REV, defined as the number of trading days between the expected announcement date provided by the firm and the immediately preceding expected announcement date. *R-Score* equals 0 for firms with REV<-5; 0.25 for firms with -5≤REV≤-3; 0.5 for firms with -2≤REV≤2; 0.75 for firms with 3≤REV≤5; and 1 for firms with REV>5. MCAP equals firms' market capitalization reported in millions. MOMEN is the cumulative market-adjusted return over the prior 12-months ending on r-11. RET(r-1,r+1) is the three-day market-adjusted return surrounding the calendar revision. Reported t-statistics are based on the difference in high and low *R-Score* portfolios over the time-series of calendar quarters. The sample consists of 18,959 firm-quarters spanning 2006 through 2013 in which firms revise their expected earnings announcement date at least two weeks prior to their expected announcement date.

Panel A: Summary Statistics by Year

	N	*Firms*	*HORIZON*	*REV*	*|REV|*	*DEV*	*|DEV|*
2006	1,926	1,357	15.069	-2.965	5.372	-0.075	0.268
2007	2,536	1,652	16.123	-1.647	4.744	-0.057	0.244
2008	3,031	1,843	16.747	-1.638	4.551	-0.019	0.250
2009	2,402	1,524	16.622	-1.993	4.635	0.001	0.229
2010	2,146	1,418	16.224	-1.137	4.754	0.016	0.140
2011	2,076	1,378	16.205	-1.665	4.564	-0.012	0.196
2012	2,395	1,495	16.250	-1.857	4.466	-0.028	0.179
2013	2,447	1,528	16.145	-1.884	4.620	0.046	0.089
All	2,370	1,524	16.173	-1.848	4.713	-0.016	0.200

Panel B: Descriptive Statistics by R-Score Portfolios

R-Score	*REV*	*N*	*HORIZON*	*MCAP*	*MOMEN*	*DEV*	*RET(r-1,r+1)*
0 (Delay)	-8.849	84.6	16.495	3,579	-8.525	0.036	-0.230
0.25	-4.158	248.8	16.434	5,272	-2.871	0.017	-0.180
0.5	-0.019	134.1	15.894	5,275	0.579	0.019	-0.052
0.75	4.118	83.8	15.442	4,106	1.404	-0.088	-0.081
1 (Advance)	8.836	41.2	15.487	3,025	6.311	-0.213	-0.047
Advance-Delay	17.685	-43.5	-1.009	-554	14.835	-0.250	0.183
t-statistic		-(9.16)	-(4.17)	-(1.40)	(8.62)	-(4.33)	(1.52)

Table 2. Profitability and Earnings Surprises

Panel A contains average earnings metrics (shown as percentages) across *R-Score* portfolios. Firms are assigned to *R-Score* portfolios on date r using firm-initiated revisions in their expected expected announcement dates, REV, defined as the number of trading days between the expected announcement date provided by the firm and the immediately preceding expected announcement date. *R-Score* equals 0 for firms with REV<-5; 0.25 for firms with -5≤REV≤-3; 0.5 for firms with -2≤REV≤2; 0.75 for firms with 3≤ REV ≤5; and 1 for firms with REV>5. ROA is the firm's return on assets defined as net income scaled by beginning-of-quarter total assets and ROA<0 equals one for firms with negative ROA. ΔROA equals same-quarter annual change in ROA and ΔROA<0 equals one for firms with annual decreases in ROA. $SURP$ equals the actual EPS reported in IBES minus the last consensus forecast available immediately prior to the announcement, and scaled by beginning-of-quarter assets, and $SURP$<0 equals one for firms with negative $SURP$. Reported t-statistics are based on the difference in high and low *R-Score* portfolios over the time-series of calendar quarters. Panel B contains regression results of earnings metrics on *R-Score* and additional firm controls. LBM and $SIZE$ are the log of one plus the book-to-market ratio and log of market capitalization, respectively. $MOMEN$ is the cumulative market-adjusted return and $VLTY$ is the standard deviation of returns over the prior 12-months ending on r-11. The reported t-statistics are based on two-way cluster robust standard errors, clustered by firm and quarter. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. Industry fixed effects are based on two-digit SIC codes. The sample consists of 18,959 firm-quarters spanning 2006 through 2013 in which firms revise their expected earnings announcement date at least two weeks prior to their expected announcement date.

Panel A: Earnings Metrics by R-Score Portfolios

R-Score	ROA	ROA<0	ΔROA	ΔROA<0	$SURP$	$SURP$<0
0 (Delay)	-0.316	0.418	-0.824	0.600	-0.028	0.374
0.25	0.507	0.338	-0.254	0.549	0.055	0.319
0.5	0.636	0.312	-0.059	0.501	0.058	0.310
0.75	0.394	0.353	0.285	0.479	0.116	0.287
1 (Advance)	0.525	0.377	0.854	0.423	0.124	0.283
Advance-Delay	0.841	-0.041	1.678	-0.177	0.152	-0.091
t-statistic	(4.80)	-(2.79)	(6.08)	-(9.70)	(4.95)	-(6.58)

Panel B: Regression Results of Earnings Metrics

	ROA		ΔROA		$SURP$	
	(1)	(2)	(3)	(4)	(5)	(6)
R-Score	0.481***	0.439***	1.326***	1.162***	0.128***	0.118***
	(3.79)	(3.62)	(5.58)	(5.07)	(5.59)	(5.10)
$SIZE$	0.628***	0.420***	0.065	0.112***	0.016	0.024***
	(12.46)	(10.00)	(1.04)	(2.97)	(1.61)	(2.82)
LBM	-0.588**	-0.226	-0.997***	-0.649***	-0.304***	-0.205***
	(-2.72)	(-1.04)	(-6.31)	(-3.20)	(-8.35)	(-5.73)
$MOMEN$	–	0.013***	–	0.016***	–	0.001***
	–	(6.51)	–	(10.58)	–	(4.34)
$VLTY$	–	-0.581***	–	0.197*	–	-0.001
	–	(-8.85)	–	(1.78)	–	(-0.05)
R^2	0.074	0.110	0.015	0.040	0.015	0.016
Year FE?	Y	Y	Y	Y	Y	Y
Industry FE?	N	Y	N	Y	N	Y

Table 3. Equal- and Value-Weighted Future Returns

This table contains average equal- and value-weighted returns to each *R-Score* portfolio. All returns are shown as percentages. Firms are assigned to *R-Score* portfolios on date r using firm-initiated revisions in their expected expected announcement dates, REV, defined as the number of trading days between the expected announcement date provided by the firm and the immediately preceding expected announcement date. *R-Score* equals 0 for firms with REV<-5; 0.25 for firms with -5≤REV≤-3; 0.5 for firms with -2≤REV≤2; 0.75 for firms with 3≤REV≤5; and 1 for firms with REV>5. The reported returns are calculated over the month following the calendar revision from r+1 to r+21. The first two columns contain raw and market-adjusted returns denoted as RR(r+1,r+21) and RET(r+1,r+21), respectively. SAR(r+1,r+21) refers to size-adjusted returns defined as the firm's raw return minus the average return of firms in the same size decile. CAR(r+1,r+21) refers to firm-size, book-to-market, and momentum characteristic-adjusted returns following Daniel et al. (1997). FAR(r+1,r+21) refers to factor-adjusted returns defined as the firm's raw return minus the return calculated by estimating a firm's daily sensitivity to the market ($MKTRF$), small-minus-big (SMB), high-minus-low (HML), and up-minus-down momentum (UMD) factors over the year prior to the earnings announcement and applying those sensitivities to the contemporaneous factors, following Fama and French (1993). Reported t-statistics are based on the difference in high and low *R-Score* portfolios over the time-series of calendar quarters. The sample consists of 18,959 firm-quarters spanning 2006 through 2013 in which firms revise their expected earnings announcement date at least two weeks prior to their expected announcement date.

Panel A: Equal-Weighted Returns in Month Following Revision

R-Score	RR(r+1,r+21)	RET(r+1,r+21)	SAR(r+1,r+21)	CAR(r+1,r+21)	FAR(r+1,r+21)
0 (Delay)	-0.773	-1.304	-0.743	-1.256	-1.165
0.25	0.173	-0.677	-0.267	-0.648	-0.300
0.5	0.750	-0.094	0.335	0.090	0.319
0.75	1.365	0.189	0.656	0.402	0.607
1 (Advance)	2.263	1.384	1.896	1.913	1.627
Advance-Delay	3.036	2.688	2.639	3.168	2.792
t-statistic	(4.59)	(4.15)	(3.95)	(4.23)	(5.17)

Panel B: Value-Weighted Returns in Month Following Revision

R-Score	RR(r+1,r+21)	RET(r+1,r+21)	SAR(r+1,r+21)	CAR(r+1,r+21)	FAR(r+1,r+21)
0 (Delay)	0.584	-0.496	-0.247	-0.428	0.098
0.25	0.618	-0.639	-0.185	-0.430	0.086
0.5	0.695	-0.657	-0.260	-0.176	0.246
0.75	1.148	-0.490	0.065	0.207	0.219
1 (Advance)	2.745	1.261	1.716	1.360	1.624
Advance-Delay	2.162	1.757	1.962	1.788	1.526
t-statistic	(2.13)	(1.95)	(2.07)	(1.73)	(2.01)

Table 4. Cross-Sectional Return Regressions

This table contains results from regressing future returns on *R-Score* and additional controls. $RET(r{+}1,t{+}21)$ is the cumulative market-adjusted return over the month following the calendar revision date, r. $RET(t\text{-}1,t{+}1)$ denotes the cumulative market-adjusted return from day -1 to +1 relative to the expected earnings announcement date, t. *R-Score* is measured on date r using confirmed revisions in firms' expected expected announcement dates, REV, defined as the number of trading days between the expected announcement date provided by the firm and the immediately preceding expected announcement date. *R-Score* equals 0 for firms with REV<-5; 0.25 for firms with -5≤REV≤-3; 0.5 for firms with -2≤REV≤2; 0.75 for firms with 3≤REV≤5; and 1 for firms with REV>5. *Advancer* is a binary variable for REV>5, $MinorAdvancer$ is a binary variable for 3≤REV≤5, $MinorDelayer$ is a binary variable for -5≤REV≤-3, and *Delayer* is a binary variable for REV<-5. LBM and $SIZE$ are the log of one plus the book-to-market ratio and log of market capitalization, respectively. $MOMEN$ is the cumulative market-adjusted return and $VLTY$ is the standard deviation of returns over the prior 12-months ending on r-11. Year and industry-fixed effects are included throughout. The reported t-statistics are based on two-way cluster robust standard errors, clustered by firm and quarter. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. Industry fixed effects are based on two-digit SIC codes. The sample consists of 18,959 firm-quarters spanning 2006 through 2013 in which firms revise their expected earnings announcement date at least two weeks prior to their expected announcement date.

	RET(r+1,r+21)			RET(t-1,t+1)		
	(1)	(2)	(3)	(4)	(5)	(6)
R-Score	1.514***	–	–	2.333***	–	–
	(6.72)	–	–	(4.86)	–	–
REV	–	0.086***	–	–	0.128***	–
	–	(7.76)	–	–	(5.00)	–
Advancer	–	–	1.002***	–	–	1.666***
	–	–	(3.16)	–	–	(2.79)
$MinorAdvancer$	–	–	0.578**	–	–	0.417
	–	–	(2.61)	–	–	(1.47)
$MinorDelayer$	–	–	-0.138	–	–	-0.494
	–	–	(-0.80)	–	–	(-1.70)
Delayer	–	–	-0.651***	–	–	-1.034**
	–	–	(-3.36)	–	–	(-2.39)
$SIZE$	-0.042	-0.047	-0.044	0.015	0.009	0.017
	(-0.62)	(-0.68)	(-0.64)	(0.10)	(0.06)	(0.11)
LBM	-0.197	-0.194	-0.194	-0.121	-0.117	-0.122
	(-1.00)	(-0.99)	(-0.99)	(-0.16)	(-0.15)	(-0.16)
$MOMEN$	0.004*	0.004*	0.004*	0.001	0.001	0.001
	(1.91)	(1.90)	(1.92)	(0.10)	(0.09)	(0.09)
$VLTY$	-0.276**	-0.278**	-0.278**	-0.066	-0.069	-0.072
	(-2.24)	(-2.26)	(-2.27)	(-0.13)	(-0.14)	(-0.15)
R^2	0.367	0.393	0.378	0.227	0.240	0.239

Table 5. Returns in Event-Time Relative to Earnings Announcements

This table contains market-adjusted returns around earnings announcements across *R-Score* portfolios. All returns are shown as percentages. Firms are assigned to *R-Score* portfolios on date r using firm-initiated revisions in their expected expected announcement dates, REV, defined as the number of trading days between the expected announcement date provided by the firm and the immediately preceding expected announcement date. *R-Score* equals 0 for firms with REV<-5; 0.25 for firms with -5≤REV≤-3; 0.5 for firms with -2≤REV≤2; 0.75 for firms with 3≤REV≤5; and 1 for firms with REV>5. $RET(t$+X,t+Y) equals the cumulative market-adjusted return from day X to Y relative to the expected earnings announcement date t. Reported t-statistics are based on the difference in high and low *R-Score* portfolios over the time-series of calendar quarters. The sample consists of 18,959 firm-quarters spanning 2006 through 2013 in which firms revise their expected earnings announcement date at least two weeks prior to their expected announcement date.

R-Score	RET(t-10,t+10)	RET(t-10,t-2)	RET(t-1,t+1)	RET(t+2,t+10)	RET(t-10,t+1)
0 (Delay)	-0.911	0.078	-0.707	-0.294	-0.675
0.25	-0.323	-0.175	-0.083	-0.081	-0.288
0.5	-0.016	-0.105	0.149	-0.046	0.021
0.75	0.412	0.044	0.627	-0.253	0.656
1 (Advance)	1.623	0.616	0.870	0.198	1.403
Advance-Delay	2.534	0.538	1.578	0.493	2.077
t-statistic	(4.36)	(1.77)	(4.85)	(2.13)	(4.17)

Table 6. Comparing Measures of Announcement Timing

Panel A contains average values of *REV* and average observation counts across *R-Score* portfolios and classifications based on whether firms' actual earnings announcement date is early, on-time, or late relative to their expected announcement date. *REV* is defined as the number of trading days between the expected announcement date provided by the firm and the immediately preceding expected announcement date. *R-Score* equals 0 for firms with $REV<-5$; 0.25 for firms with $-5\leq REV\leq -3$; 0.5 for firms with $-2\leq REV\leq 2$; 0.75 for firms with $3\leq REV\leq 5$; and 1 for firms with $REV>5$. Additionally, ρ indicates the time-series average correlations between *REV* and *DEV* with corresponding *p*-values shown in parentheses. Panels B and C contain results from regressing measures of earnings news and returns on *R-Score* and *DEV*, where *DEV* is defined as the number of days between a firm's actual earnings announcement and its expected date and higher values indicate that the firm reported earlier than expected. ΔROA equals same-quarter annual change in *ROA* and *SURP* equals the actual EPS number reported in IBES minus the last consensus forecast available immediately prior to the announcement, and scaled by beginning-of-quarter assets. $RET(r+X,r+Y)$ equals the cumulative market-adjusted return from day X to Y relative to the calendar revision date r. Similarly, $RET(t+X,t+Y)$ equals the cumulative market-adjusted return from day X to Y relative to the expected earnings announcement date *t*. The reported *t*-statistics are based on two-way cluster robust standard errors, clustered by firm and quarter. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. *LBM* is the log of one plus the book-to-market ratio. *MOMEN* is the cumulative market-adjusted return and *VLTY* is the standard deviation of returns over the prior 12-months ending on *r*-11. Year and industry fixed effects are included throughout. Industry fixed effects are based on two-digit SIC codes. The sample consists of 18,959 firm-quarters spanning 2006 through 2013 in which firms revise their expected earnings announcement date at least two weeks prior to their expected announcement date. Panel D contains two set of results that examine differences in returns across 'Early' versus 'Late' firms, where firms are classified as 'Early' ('Late') when their actual announcement date is at least one day before (after) their confirmed announcement date. The first two columns of Panel D correspond to the 18,959 firm-quarters used throughout the main tests and the latter two columns correspond to a sample of 49,575 observations where firms verified at least two weeks prior to their expected announcement date.

Panel A: Comparing Advance/Delay versus Early/Late

	EARLY	ON-TIME	LATE
0 (Delay)	-9.313	-8.787	-9.463
	3.5	77.2	5.2
0.25	-4.154	-4.161	-4.128
	5.4	235.6	8.4
0.5	0.613	-0.017	-0.582
	3.2	127.3	4.4
0.75	4.138	4.117	4.203
	3.0	79.2	2.6
1 (Advance)	10.138	8.805	9.630
	1.9	39.0	1.4
	Spearman	Pearson	
$\rho(REV,DEV)$	-0.042	-0.060	
p-value	(0.00)	(0.00)	

Panel B: Earnings Metrics Regressed on R-Score and DEV

	ΔROA			*SURP*		
	(1)	(2)	(3)	(4)	(5)	(6)
R-Score	–	1.166***	1.200***	–	0.118***	0.124***
	–	(5.72)	(5.81)	–	(5.19)	(5.40)
DEV	0.130***	–	0.141***	0.033***	–	0.034***
	(2.80)	–	(3.10)	(4.07)	–	(4.23)
SIZE	0.120***	0.123***	0.120***	0.024***	0.025***	0.024***
	(2.84)	(2.86)	(2.84)	(2.86)	(2.95)	(2.88)
LBM	-0.677***	-0.648***	-0.640***	-0.200***	-0.197***	-0.193***
	(-3.27)	(-3.14)	(-3.15)	(-5.46)	(-5.41)	(-5.23)
MOMEN	0.017***	0.017***	0.017***	0.001***	0.001***	0.001***
	(12.05)	(11.77)	(11.86)	(4.75)	(4.59)	(4.66)
VLTY	0.225**	0.213**	0.215**	0.004	0.002	0.003
	(2.26)	(2.17)	(2.19)	(0.28)	(0.18)	(0.20)
R^2 (%)	3.644	3.941	4.101	1.705	1.643	1.832

Table 6 [Continued]: Comparing Measures of Announcement Timing

Panel C: Returns Regressed on R-Score and DEV

	$RET(t\text{-}1,t{+}1)$			$RET(r{+}1,r{+}21)$		
	(1)	(2)	(3)	(4)	(5)	(6)
R-Score	–	1.514***	1.521***	–	2.333***	2.424***
	–	(6.72)	(6.73)	–	(4.86)	(5.12)
DEV	0.023	–	0.037	0.434***	–	0.456***
	(0.55)	–	(0.84)	(3.41)	–	(3.73)
SIZE	-0.044	-0.042	-0.043	0.007	0.015	0.008
	(-0.63)	(-0.62)	(-0.62)	(0.04)	(0.10)	(0.05)
LBM	-0.242	-0.197	-0.195	-0.172	-0.121	-0.097
	(-1.23)	(-1.00)	(-0.99)	(-0.22)	(-0.16)	(-0.12)
MOMEN	0.005**	0.004*	0.004*	0.001	0.001	0.000
	(2.12)	(1.91)	(1.91)	(0.20)	(0.10)	(0.05)
VLTY	-0.266**	-0.276**	-0.275**	-0.043	-0.066	-0.058
	(-2.15)	(-2.24)	(-2.23)	(-0.09)	(-0.13)	(-0.12)
R^2 (%)	0.166	0.367	0.370	0.174	0.227	0.407

Panel D: Early/Late Portfolios Assuming Perfect Foresight

	Main Sample		All Verified Sample	
	N	RET(t-10,t+10)	N	RET(t-10,t+10)
Late	15.4	-1.825	29.8	-1.850
On-Time	558.2	-0.086	1479.1	0.115
Early	20.5	0.182	43.6	0.391
Early-Late	5.6	1.950	15.1	2.373
t-statistic	(3.19)	(1.85)	(5.30)	(4.02)

Table 7. Interaction Effects

This table contains results from regressing *RET*(*r*+1,*r*+21) on *R-Score* and additional controls. Firms are assigned to *R-Score* portfolios on date *r* using firm-initiated revisions in their expected expected announcement dates, *REV*, defined as the number of trading days between the expected announcement date provided by the firm and the immediately preceding expected announcement date. *R-Score* equals 0 for firms with $REV < -5$; 0.25 for firms with $-5 \leq REV \leq -3$; 0.5 for firms with $-2 \leq REV \leq 2$; 0.75 for firms with $3 \leq REV \leq 5$; and 1 for firms with $REV > 5$. *RET*(*r*+1,*r*+21) equals the cumulative market-adjusted return in the month (21 trading days) following the calendar revision. **1**(Small Firm) is an indicator variable that equals one if the firm is in the lowest tercile of market capitalization within a given calendar quarter, **1**(Low Coverage) is an indicator variable that equals one if the firm is in the lowest tercile of analyst coverage within a given calendar quarter, and **1**(High Distress) is an indicator variable that equals one if the firm is in the lowest tercile of the Zmijewski (1984) Z-Score financial distress measure within a given calendar quarter. **1**(Buy Recommendation) is an indicator variable that equals one if the firm has an outstanding 'BUY' recommendation in the IBES consensus database. The reported *t*-statistics are based on two-way cluster robust standard errors, clustered by firm and quarter. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively. *LBM* is the log of one plus the book-to-market ratio. *MOMEN* is the cumulative market-adjusted return and *VLTY* is the standard deviation of returns over the prior 12-months ending on *r*-11. Year and industry fixed effects are included throughout. Industry fixed effects are based on two-digit SIC codes. The sample consists of 18,959 firm-quarters spanning 2006 through 2013 in which firms revise their expected earnings announcement date at least two weeks prior to their expected announcement date.

	(1)	(2)	(3)	(4)	(5)	(6)
R-Score	2.398***	1.308**	1.750***	2.283***	1.918***	0.580
	(4.93)	(2.75)	(2.96)	(4.92)	(4.44)	(1.17)
*R-Score**__1__(Small Firm)	–	2.961***	–	–	–	2.292***
	–	(3.61)	–	–	–	(3.00)
1(Small Firm)	–	-1.282***	–	–	–	-1.054*
	–	(-2.93)	–	–	–	(-2.00)
*R-Score**__1__(Low Coverage)	–	–	1.983**	–	–	1.468*
	–	–	(2.35)	–	–	(1.88)
1(Low Coverage)	–	–	-0.698	–	–	-0.489**
	–	–	(-1.47)	–	–	(-2.17)
*R-Score**__1__(Buy Recommendation)	–	–	–	3.712*	–	2.426**
	–	–	–	(1.76)	–	(2.11)
1(Buy Recommendation)	–	–	–	-0.659	–	-0.109
	–	–	–	(-0.57)	–	(-0.16)
*R-Score**__1__(High Distress)	–	–	–	–	3.239***	2.818**
	–	–	–	–	(2.90)	(2.32)
1(High Distress)	–	–	–	–	-1.824***	-1.646***
	–	–	–	–	(-3.96)	(-3.92)
LBM	-0.089	-0.037	-0.112	-0.107	-0.074	-0.064
	(-0.13)	(-0.05)	(-0.15)	(-0.15)	(-0.11)	(-0.13)
MOMEN	0.000	0.000	0.000	0.000	-0.000	-0.001
	(0.04)	(0.02)	(0.02)	(0.01)	(-0.01)	(-0.09)
VLTY	-0.090	-0.072	-0.094	-0.095	-0.057	-0.042
	(-0.21)	(-0.16)	(-0.22)	(-0.22)	(-0.13)	(-0.08)
R^2	0.235	0.318	0.271	0.261	0.302	0.407

Table 8. Alphas and Factor Loadings for Weekly Revision Strategy

This table contains alphas and factor loadings of various weekly revision strategies. The strategies involves simultaneous, weekly long and short positions in the week of firms' expected earnings announcements. In Panel A, the strategy is long firms with REV>3 and short firms with REV<-3, where REV is defined as the number of trading days between the expected announcement date provided by the firm and the immediately preceding expected announcement date. The strategies vary in terms of the required minimum long and short positions, "Min. Positions", for the strategy to be implemented within a given calendar week. For example the first two columns correspond to the returns from a strategy that requires at least one long and one short position; otherwise the strategy is not implemented. N indicates the number of weeks in which the strategy was implemented out of 409 possible weeks in the sample window. The time-series of weekly returns is regressed on the following four contemporaneous factors from Ken French's website: the market minus the risk-free rate ($MKTRF$), small-minus-big (SMB), high-minus-low (HML), and up-minus-down momentum (UMD). The sample consists of 18,959 firm-quarters spanning 2006 through 2013 in which firms revise their expected earnings announcement date at least two weeks prior to their expected announcement date. Panel B presents analogous results that ranks all firms expected to announce earnings in a given week into terciles based on REV and that incorporates observations where REV is less than 2 in absolute value, which are omitted from the Panel A results. The strategy takes a long (short) position in firms within the highest (lowest) REV tercile. ***, **, and * indicate significance at the 1, 5, and 10% level, respectively.

Panel A: Weekly Alphas for REV<-3 versus REV>3 Strategy

Min. Positions	> 1		> 5		> 10		> 15	
	(N=339 Weeks)		(N=171 Weeks)		(N=119 Weeks)		(N=94 Weeks)	
Intercept	1.079***	1.072***	1.375***	1.376***	1.115***	1.135***	0.589***	0.624***
	(2.56)	(2.55)	(5.45)	(5.44)	(4.83)	(4.91)	(2.76)	(2.95)
MKT-RF	0.036	-0.045	0.035	0.041	-0.017	0.013	-0.065	-0.021
	(0.20)	-(0.24)	(0.30)	(0.33)	-(0.15)	(0.11)	-(0.65)	-(0.21)
SMB	-0.866	-0.800	-0.239	-0.246	0.013	-0.019	-0.166	-0.238
	-(2.30)	-(2.11)	-(1.01)	-(1.02)	(0.06)	-(0.08)	-(0.80)	-(1.14)
HML	-0.231	-0.539	-0.151	-0.128	-0.311	-0.207	-0.101	0.056
	-(0.67)	-(1.35)	-(0.78)	-(0.55)	-(1.68)	-(1.01)	-(0.59)	(0.30)
UMD	–	-0.313	–	0.021	–	0.121	–	0.188*
	–	-(1.53)	–	(0.18)	–	(1.14)	–	(1.84)

Panel B: Weekly Alphas for Cross-Sectional REV Strategy

Min. Positions	> 1		> 5		> 10		> 15	
	(N=397 Weeks)		(N=295 Weeks)		(N=198 Weeks)		(N=165 Weeks)	
Intercept	0.625**	0.626**	0.744***	0.739***	0.814***	0.814***	0.809***	0.816***
	(2.03)	(2.03)	(3.32)	(3.28)	(5.07)	(5.05)	(5.20)	(5.24)
MKT-RF	0.099	0.088	0.145	0.139	-0.109	-0.104	-0.034	-0.013
	(0.75)	(0.64)	(1.49)	(1.39)	-(1.49)	-(1.38)	-(0.45)	-(0.17)
SMB	-0.406	-0.398	-0.098	-0.092	0.257	0.253	0.146	0.120
	-(1.46)	-(1.42)	-(0.50)	-(0.47)	(1.72)	(1.67)	(0.98)	(0.79)
HML	-0.147	-0.195	-0.264	-0.290	0.085	0.104	-0.064	0.025
	-(0.58)	-(0.67)	-(1.45)	-(1.39)	(0.69)	(0.69)	-(0.54)	(0.18)
UMD	–	-0.051	–	-0.026	–	0.018	–	0.084
	–	-(0.34)	–	-(0.26)	–	(0.23)	–	(1.14)

Table 9. Content Information and Option-Based Directional Strategies

This table presents and directional strategy returns surrounding firm-initiated revisions in their expected announcement dates, r, across values of *R-Score*, as defined in Table 1. *Call* and *Put* are the returns an at-the-money call option and an at-the-money put option, in percent. Each outcome variable presented is the abnormal value relative to the average in a matched sample detailed in Appendix B. Panel A presents outcome variables in the three-day window around the revision date (r-1,r+1), and Panel B presents outcome variables between the revision date and the option expiration date (r+1,r+T). The sample includes 10,313 revisions for firms with options data from 2005–2013.

Panel A: Market Reaction (r-1,r+1)

R-Score	*Call*	*Put*	*Call-Put*
0 (Delay)	0.379	1.278	-0.898
0.25	-3.300	1.985	-5.285
0.5	-0.286	-0.185	-0.101
0.75	1.238	-1.601	2.839
1 (Advance)	-3.733	-1.777	-1.957
Advance-Delay	-4.113	-3.055	-1.058
t-statistic	(-0.864)	(-0.529)	(-0.112)

Panel B: Subsequent Returns (r+1,r+T)

R-Score	*Call*	*Put*	*Call-Put*
0 (Delay)	-6.837	15.891	-22.729
0.25	-2.521	4.956	-7.477
0.5	-7.240	4.667	-11.907
0.75	11.751	-13.166	24.917
1 (Advance)	10.233	-7.102	17.336
Advance-Delay	17.071	-22.994	40.064
t-statistic	(1.458)	(-2.030)	(2.067)

Table 10. Volatility-Timing Information and Option-Based Volatility Strategies

This table presents volatility strategy returns surrounding firm-initiated revisions in their expected announcement dates, r, as a function of whether the revision affects the timing of earnings news relative to option expiration dates. We estimate mean outcome variables for revisions which advance the announcement into the life of the option $EXDT_r < r + T < EXDT_{r-1}$ ("Advanced into"), revisions which postpone the announcement out of the life of the option $EXDT_{r-1} < r + T < EXDT_r$ ("Postponed out of"), and the difference between the two ("Difference"). ΔIV is the change in the implied volatility of at-the-money options. $Strad$, $DHStrad$, $DHCall$, and $DHPut$ are the returns of a straddle, a delta-hedged straddle, a delta-hedged call, and a delta-hedged put, all at-the-money and in percent. $UVAR$ is the unexpected variance, defined as the differences between realized return variance in (r+1,r+T) and the expected variance implied by at-the-money option prices, both in annualized percent. Each outcome variable presented is the abnormal value relative to the average in a matched sample detailed in Appendix B. Panel A presents outcome variables in the three-day window around the revision date (r-1,r+1), and Panel B presents outcome variables between the revision date and the option expiration date (r+1,r+T). The sample includes 10,313 revisions for firms with options data from 2005–2013.

Panel A: Market Reaction (r-1,r+1)

	IV	$Strad$	$DHStrad$	$DHCall$	$DHPut$
Advanced into	0.786	1.586	2.126	5.538	5.538
t-statistic	(1.919)	(1.415)	(2.096)	(1.960)	(2.828)
Postponed out of	-0.483	-2.764	-4.303	-5.261	-9.088
t-statistic	(-1.694)	(-4.135)	(-5.460)	(-3.252)	(-4.498)
Difference	1.269	4.350	6.429	10.800	14.626
t-statistic	(3.357)	(3.216)	(4.781)	(3.009)	(5.575)

Panel B: Subsequent Returns (r+t,r+T)

	$UVAR$	$Strad$	$DHStrad$	$DHCall$	$DHPut$
Advanced into	-0.524	1.855	-2.980	-2.736	2.326
t-statistic	(-0.166)	(0.502)	(-0.768)	(-0.334)	(0.500)
Postponed out of	3.067	-3.289	-1.256	-4.289	-1.477
t-statistic	(0.744)	(-1.082)	(-0.443)	(-0.702)	(-0.302)
Difference	-3.591	5.144	-1.723	1.553	3.803
t-statistic	(-0.809)	(1.173)	(-0.389)	(0.165)	(0.631)