9-2010

Corporate Financial Policies and Informed Trading

Abu S. Amin
Sacred Heart University, amina49@sacredheart.edu

CORPORATE FINANCIAL POLICIES AND INFORMED TRADING

Abu S Amin

Sacred Heart University

Amina49@sacredheart.edu

September, 2010

ABSTRACT

This paper uses informed trading to examine information content of earnings and dividends announcements. The major innovation of this research design is a combination of assessing information contents of dividends and earnings announcements based on their surprises and estimating informed trading to understand market reaction. The premise of this study is that if announcements contain information it should reflect on traders' trading patterns. Based on this premise, I find evidence of significant change in informed trading for dividend announcements but not for earnings announcements when the announcements are made concurrently, an issue which the existing literature does not address. I also find significant differences in informed trading when dividend announcements contain surprises but not when dividends announcements contain no surprises, which the extent literature provides no empirical evidence. These results collectively imply that *dividends are better signal than earnings* to market participants. More importantly, contrary to recent findings that suggest a decline in information content of dividends, the results confirm *significant information content* of dividends. This study highlights the importance of *identification and control of information environment* and *disaggregating* dividends announcements based on its surprises while studying information content of announcement.

Keywords: Dividends and Earnings Surprises, Informed Trading.

1. Introduction

This paper introduces a new dimension to extent literature by assessing the information content of corporate announcements using informed trading. This study considers a market set-up where the information environment is not exogenous; rather, it depends on the content of corporate announcements. Instead of studying the price impact of announcements, this paper studies the impact of corporate announcements on informed trading. Another key novelty of this paper is that the research design adequately identifies and controls information environment while assessing the impact of announcements on informed trading.

The effects of earnings announcements on market microstructure parameters have drawn interest of many researchers. Early research by Morse and Ushman (1983) find no change in daily bid-ask spreads surrounding earnings announcements, while Vankatesh and Chiang (1986) and Patel (1991) report that bid-ask spread changes after the earnings announcements. Using intraday bid-ask spread and volume, Lee, Mucklow and Ready (1993) report an increase in spreads and a decrease in depth a day before the announcement. Krinsky and Lee (1996) decompose the intraday bid-ask spread surrounding the earnings announcements and report that information asymmetry increases significantly before and after the earnings announcements. A more recent study by Chae (2005) reports that abnormal trading volume decrease before the scheduled announcements.

Similarly earlier work by Venkatash and Chiang (1986) investigates the bid-ask spread prior to dividend announcements and reports that for certain types of dividend announcements bid-ask spread increases and for other types of announcements there is no significant change in bid-ask spread. Bajaj and Vijh (1995) find evidence of excess returns, increased trading volume and price volatility during the dividend announcements days which suggests increase in information asymmetry. More recently, Fuller (2003) provides direct evidence of an inverse relation between the pre-announcements informed trading and announcements day excess returns.

The extent literature on the effect of earnings and dividends announcements has several issues. Most of these papers either use *abnormal returns or bid-ask spreads* as the metric to examine the effects of these announcements. It is documented in the asset pricing literature that there is no unique way to estimate abnormal returns. Hence, it is plausible that the reported results are highly sensitive to the models used for estimation of abnormal returns. Alternatively some studies have used bid-ask spreads to examine the announcements effect. Although bid-ask spreads are easy to compute, but it provide only a snap-shot of market liquidity. There are not many papers using other measures to evaluate the information content of announcements. So there is a need for more comprehensive analysis of market reaction to corporate announcements. This paper contributes to ongoing literature by evaluating the information content of earnings and dividends announcements using *informed trading* as a more comprehensive market microstructure metric.

Moreover, most of these studies have examined the impact of earnings announcements *only* when in reality, earnings and dividends announcements are made *concurrently*. Failure to control the information environment may completely distort empirical findings. For example, if we study effect of dividend announcements without controlling the information content of concurrent earnings announcements then the reported abnormal returns/bid-ask spread may potentially understate true effect of dividend announcements. So there is a clear need to re-evaluate the information content of earnings and dividends announcements using a research design that explicitly identifies and controls information environment. This paper contributes to ongoing literature by re-evaluating the information content of earnings and dividends announcement using a research design that rely on *conditional sorting* which adequately and sufficiently identifies and controls information environment.

Another observation is that most of the papers in extent literature examine the information content of dividend announcements without classifying announcements based on their surprises. According to dividend signaling hypothesis, only the unexpected changes in dividend has information content. Hence, failure to address the importance of surprises in dividends may potentially bias our understanding of true effect of dividend announcements. So

this paper contributes to literature by examining the *information content of dividend announcements* with proper *classification of announcements* based on their surprises.

Hence, the research agenda for this paper has two fold. In this paper I address the question how do concurrent dividends and earnings announcements affect pre-and post-announcements informed trading? This question is mainly motivated by recent empirical findings and guideline provided by the analytical models.[1] The second question addressed in this paper is how do surprises in dividends affect pre-and post-announcements informed trading?

The basic premise of studying the changes in informed trading is that if traders can anticipate the timing of announcements then traders' will have incentive to acquire information if they anticipate that the announcement will have significant information content. Once informed traders acquire information in an anticipation of an announcement, it is likely that informed traders will avail the information advantage and are more likely to trade prior to announcements. Subsequently, actual dividends or earnings announcements partially resolve the uncertainty and prices tend to reflect available information. Eventually informed traders' information advantage may not prevail after the announcements hence informed trading is likely to decline. Using same line of argument, if the traders' anticipate that corporate announcements will not contain any significant information content, then acquisition of information is not profitable for them and it leads to no change in informed trading before and after the announcements.

I conjecture that if dividends are considered as signal then for concurrent dividend announcements with surprises, informed trading during the pre-announcement period will be higher than post-announcement period. I also conjecture that if earnings are considered as signal then for concurrent earnings announcements with surprises, informed trading during the pre-announcement period should be higher than that of post-announcement period. To address the second question, I conjecture that for dividend announcements with surprises, informed trading during the pre-announcements period will be higher than post-announcements period and for

[1] Bhattacharya (1979), Miller and Rock (1985), and John and Williams (1985) for dividend signaling models.

dividend announcements with no surprise, there will be no significant change in informed trading.

I use the probability of informed trading (PIN)[2] as a proxy for informed trading. I estimate PIN for 28 trading days before and after earnings and dividends announcements. For the first part of the study, I construct two portfolios. Portfolio one includes firms with the *highest absolute surprises in earnings and lowest absolute surprises in dividends*. Portfolio two constitutes firms with the *highest absolute surprises in dividends and lowest absolute surprises in earnings*. These portfolios include only the concurrent earnings and dividends announcements. For the second part of the study, I construct two more portfolios. Portfolio three constitutes firms with *highest surprises in dividends and lowest surprises in earnings*. Portfolio four includes firms that have *lowest surprises in dividends and earnings*. Portfolio three and four include dividends and earnings announcements whether made concurrently or separately. The unique feature of this research design is that identifies and control information environment pertaining to different corporate announcements.

I find significant difference in PIN for a group of firms that have the highest absolute surprises in dividends and the lowest absolute surprises in earnings. However, for the group of firms that contain the highest absolute surprises in earnings and lowest absolute surprises in dividends I find no significant change in PIN. Collectively, these results suggest that dividend announcements contain information beyond that is conveyed by the earnings announcements.

One of the explanations of why earnings announcements do not convey information is that the management provides "earnings guidelines" periodically and mostly prior to actual announcements, which help market and analyst update their predictions. Hence, by the time firm makes earnings announcement, even the surprises in earnings *no longer* convey significant information. On the other hand, dividends are viewed as "sticky" and usually management do not change (increase or decrease) dividends often and do not provide dividends guidelines; as a result change in dividends conveys significant information about firm's future earnings

[2] The methodology section outlines the estimation issues regarding informed trading and surprises in dividends and earnings.

potentials which is also consistent with dividend signaling theories. Hence dividends work as a better *signal* than earnings in conveying future earnings potential of the firm.

These findings are consistent with Pettit (1972), Ahrony and Sawary (1980), Asquith and Mullins (1983). Instead of using abnormal returns, this paper offers new insight by looking at the changes in informed trading to understand the information content of concurrent dividends and earnings announcements. One of the major implications of these findings is that they reemphasize the need for "… adequate identification and control of information conveyed by earnings announcements…" (Ahrony and Sawary, 1980). Without proper identification and control of information environment, it could be difficult to infer the information content of announcements.

Moreover, I find significant differences in informed trading, when dividend announcements contain surprises. In contrast, when dividend announcements contain no surprises, there is no significant change in informed trading, implying that for dividend announcements with no surprises, the information environment does not change significantly. Collectively, these findings suggest that not *all* dividend announcements have information content. A recently study by Amihud and Li (2006) suggest that information content of dividends is declining, contrary to this, findings presented here suggests that dividend announcements with surprises have significant information content. It also highlights the *need to disaggregate* different dividend announcements based on the surprises in announcements. In most of the cases firms do not change dividends; failure to *classify* announcements based on surprises may lead to distorted results. The results presented here are consistent with dividend signaling theories. Thus one of the contributions of this study is show the importance of disaggregating dividend announcements based on their surprises while studying their information content.

This dissertation proceeds as follows. Section 2 presents literature review. Section 3 presents analytical research design and methodology. Section 4 provides empirical research design. Section 5 discusses empirical results. Finally, section 6 presents the concluding remarks.

2. Literature Review

2.1 The effect of earnings announcements on market microstructure parameters:

Ball and Brown (1968) is among the most influential papers that provides compelling evidence of information content of accounting earnings announcements. They find significant positive correlation between sign of the abnormal stock return in the month of an earnings announcement with the sign on the earnings change over that firm's previous year's earnings. They use a) a random walk model and b) a market model in earnings to estimate the earnings surprises. The association between the announcement period abnormal return and earnings surprises depend information content of announcements and the earnings expectation models.

Beaver (1968) specify a different earnings expectation model which incorporates the variability of stock returns and trading volume around earnings announcements. The paper hypothesize increased the information flow during the earnings announcement period compared to non-announcement period. He uses return volatility to measure information flow. The empirical evidence supports his hypothesis. Lee (1992) uses intra-day return and trading volume and finds a statistically significant price reaction of the same sign as earnings surprises. The reaction occurs within 30 min of the earnings announcements; he finds no statistically discernible price effect thereafter. Lee also reports a short lived trading volume reported in less than two hours for large trades and a few hours for small trades. Landsman and Maydew (1999) analyze markets reactions to earnings announcements over three decades. They too find that the stock return volatility and trading volume are significantly greater on earnings announcements days, but the activity reverts to normal conditions immediately thereafter.

Early research[3] by Morse and Ushman (1983) study the change in daily bid-ask spreads surrounding quarterly earnings announcements and large price changes. They estimate actual and proportional bid-ask spread (remove the contemporaneous price effects). They report find no change in daily bid-ask spreads surrounding earnings announcements but also report increase in bid-ask spread on large absolute price changes.

[3]See Kothari (2001) for a discussion of price effects of earnings announcements.

Vankatesh and Chiang (1986) find significant changes in the spreads after earnings announcements only in cases when no other material information with regard to firm was released in the 30-day period prior to the earnings announcements. Patel (1991) report an increase in bid-ask spreads after earnings announcements, while Skinner (1991) reports similar results only for announcements that convey large earnings surprises.

Lee, Mucklow and Ready (1993) study change in liquidity four-day period surrounding earnings announcements. They estimate intraday bid-ask spreads, depth and volume; report an increase in spreads and a decrease in depth a day before the announcement and also show significant increase in spread during and one day after the precise announcement time while depth return to non-announcements level immediately after the announcement.

Krinsky and Lee (1996) decompose the intraday bid-ask spread surrounding the earnings announcements and report that the adverse selection component of the bid-ask spreads increases significantly during the announcement window and during the pre-disclosure period.

Chae (2005) studies the change in daily trading volume for scheduled (earnings announcements) and unscheduled announcements (acquisition, target and bond rating announcements) reports that cumulative trading volume decrease before the scheduled announcements. He also reports that abnormal trading volume is also positively correlated with popular measures of information asymmetry. Finally, the paper reports a positive correlation between pre-announcements asymmetry of information between post-announcements abnormal trading volume.

A more recent paper by Cho (2007) uses Foster and Viswanathan (1996) model (henceforth FV model) and provide both daily and intra-daily estimates of FV model. He reports that for the intra-daily data, the number of informed traders increases while level of liquidity trading decreases as the time of earnings announcements approaches. These findings imply that

as time to announcements approaches increasing number of informed traders trader on their private information, on the other hand the liquidity trading decreases.

2.2 The effect of dividends announcements on market microstructure parameters:

One of the predictions of dividend signaling models (henceforth DSM) developed in Bhattacharya (1979), Miller and Rock (1985), and John and Williams (1985) is that unexpected dividend changes convey information about cash flow; i.e., increase (decrease) in dividend conveys favorable (unfavorable) information about current and/or future cash flow. Numerous studies have confirmed that stock prices (within the announcements period) significantly increase as dividends increase and vice versa. There are two main stream of papers that examine the empirical validity of dividend signaling hypothesis; the classical papers investigates the price impact of dividend announcements and the recent set of papers look at announcement effect on market microstructure parameters mainly on bid-ask spreads.

In a classical research by Pettit (1972) it is reported that a significant price increase follows dividend increase announcements, and a significant price drop follows dividend decrease announcements, while earnings announcements have no impact on stock returns. This paper uses dividend and earnings expectation model to estimate the change in dividend and earnings. This paper studies the information effect of different level of changes in dividend, dividend omission, reductions, no change and initial payments.

Aharony and Swary (1980) find a small prices change in response to dividend announcements after controlling for contemporaneous earnings announcements. To adequately identify the information content of dividend announcements they examine the dividend and earnings announcements that are made on different dates (separated by 11 days) within the quarter. They also employed dividend expectation model to measure the information content of dividend announcements.

Asquith and Mullins (1983) study the announcement effect of dividend initiations and report significant positive excess return. They also report that dividend initiation has larger impact on price than subsequent dividend changes. For robustness analysis, the study also estimates announcement period abnormal returns for dividend initiating firms when there are no other information event, when there are simultaneous earnings announcements and when there are other events and finds consistent results when no other events occurs with dividend announcements. However, the results also show lower initial impact of dividend announcements in the presence other announcements especially earnings announcements.

Other studies examine the empirical validity of dividend signaling hypothesis e.g. Nissim and Ziv (2001) study the relation between changes in dividend and future profitability of the firm. In contrary, Grullon, Michaely and Swaminathan (2002) find that changes in dividend do not convey information about future earnings potentials rather it convey information about systematic risk of a firm. Overall, a recent review article by Allen and Michealy (2003) reports mixed empirical evidence in favor of the dividend signaling theory.

The other stream of research studies the effect of dividend announcements on market microstructure parameters. A pioneer research by Venkatash and Chiang (1986) find a strong presence of asymmetry of information (measured by the bid-ask spread adjusted for holding costs) for some types of announcements but not for some other types. They report that the raw spread increases before second announcements and hardly before first and joint announcements.[4] This result implies that for first and joint announcements there exists only normal asymmetry; on the other hand since second announcements are non-routine announcements, and hence asymmetry increases. The study does not focus on the announcements that contain dividend surprises. It considers all the dividend announcements and observes the impact on spread, which may give an incomplete result.

[4]Venkatash and Chiang (1986) define: i) first announcement as the announcements that are not preceded by other announcements by at least 30 days, ii) second announcements as the announcements that are separated from the first announcements by at least 10 days but no more than 30 days, and iii) joint announcements are the announcements that are made on the same day.

Bajaj and Vijh (1995) find evidence of excess returns, increased trading volume and price volatility during the announcement days. Based on this finding, they comment that the observed excess returns during the announcement period are due to an increase in information asymmetry. This study focuses only on the announcement window and does not compare pre- and post-announcement trading volume or price volatility to see how the information environment changes due to dividend announcements.

Fuller (2003) provides direct evidence of an inverse relation between pre-announcement informed trading and announcement period excess returns. The study also provides evidence of a positive relation between pre-announcement informed trading and unexpected dividends changes, but it focuses only on the announcement period.

More recently Graham, Koski and Loewenstein (2006) study the impact on information processing in financial markets for two different types of corporate announcements; announcements with timing that are surprise and announcements with timing known in advance. They estimate intra-day volume, bid-ask spread during the announcement day for initial dividend announcements (unanticipated announcements) and regular dividend announcements (anticipated announcements). The find increased intra-day spread before the very anticipated announcements which subsequently reaches to normal level after the announcements, whereas for the unanticipated announcements the spreads are normal prior to the announcements but it increases after the announcements. This study also reports the impact of these announcements on volume, abnormal returns and volatility.

The review clearly reveals that there is need to investigate information content of dividends and earnings announcements using a metric other than abnormal returns or bid-ask spreads which will provide deeper understanding of announcements effect. There is also need for studying the information content of these announcements concurrently and separately. So this paper addresses the following two research questions: 1) how do concurrent dividend and earnings announcements affect pre- and post- announcements informed trading? 2) How do surprises in dividend announcements affect pre- and post- announcements informed trading?

3. Analytical Research design and Methodology

3.1 Analytical Framework:

3.1. a. Information content of dividend and earnings announcements:

The asymmetry of information drives demand for information. There are mainly two sources of informed agents i) insiders, ii) informed traders (e.g. stock analysts, hedge fund managers, and bankers). A manager may either use dividend or earnings announcements to convey future profitability of the firm. According to "dividend signaling theories", a change in dividend conveys information about firm's current/future earnings potentials. Since dividend decision is almost at management's discretion, a change in dividend should convey less ambiguous signal than earnings. Moreover, due to the "sticky" nature of dividend, signals conveyed by changes in dividends contain information beyond that conveyed by earnings number.

3.1. b. Informed trading around dividend and earnings announcements:

The insiders' information is revealed in the market through the financial policy choices, e.g. periodic payout announcements by the firm. On the other spectrum, the informed traders reveal their information through trading. Since the insiders' information is revealed periodically, the informed traders play a significant role in generating and disseminating information through their informed trading. Thus, between any two payout announcements, the extent to which information is going to be incorporated into prices depends on the trading behavior of the informed traders.

The fundamental hypothesis of this research is that the extent of informed trading is endogenous and, at least in the short run, the extent of informed trading is affected by the in formativeness of payout announcements. If the informed traders know the timing of upcoming corporate announcements then they will acquire information if they believe the announcements

will have significant surprise. Hence, informed traders will have incentive to trade on their information prior to announcements which will lead to higher informed trading. At the announcements, the uncertainty associated with announcements is partially resolved, so the information advantage by the informed traders may not prevail which may lead to lower informed trading. Based on the premise, informed trading depends on the information content of the announcements which leads to following hypothesis:

Hypothesis One:

If earnings announcements are signal, then for concurrent earnings announcements with surprise, informed trading during the pre-announcement period should be higher than post-announcement period

Hypothesis Two:

If dividend announcements are signal, then for concurrent dividend announcements with surprise, informed trading during the pre-announcement period should be higher than post-announcement period.

3.1. c. Surprises in dividend announcements and informed trading:

If dividend announcements have surprises (i.e. the actual dividends are different than forecasted dividends), then informed traders will have incentive to acquire information prior to the announcements and informed trading will be higher during the pre-announcement period and subsequently it will decline since the traders no longer have the informational advantages.

On the other hand, if dividend announcements do not have any surprise (i.e. the actual dividends are same as expected dividends), then for the informed traders there are no changes in the information environment during the pre- and post-announcement periods. Therefore, it can be anticipated that there will be no change in informed trading. This leads to following hypothesis:

Hypothesis Three:

If dividend announcements have surprise, then informed trading during the pre-announcement period should be higher than post-announcement period.

Hypothesis Four:

If dividend announcements contain no surprise, then there will be no significant change in informed trading during the pre- and post- announcement periods.

3.2 Methodology:

The paper is based on an event study frame work. This section overviews some of the key definitions and also outlines their estimation techniques.

3.2. a. Measure of surprises in dividends and earnings:

In order to estimate the surprise in dividends and earnings, it is important to determine the expected dividends and earnings then compare them with the actual. But the expected dividends and earnings are unobservable. The majority of empirical studies[5] follow the "naïve" method in determining dividend and earnings changes. The "naïve" method defines the surprises as follows[6]:

$$E\left(D_{j,q}\right) = D_{j,q-1}$$
$$\Delta D_{j,q} = D_{j,q} - D_{j,q-1} \qquad (1)$$

[5] These include Aharony and Swary (1980), Asquith and Mullins (1983), Yoon and Starks (1995), Benartzi Michaely Thaler (1997), Grullon Michaely Swaminathan (2002) just to name a few. See Bar-Yosef and Sarig (1992) for a detailed comparison of different method of dividends change.

[6] Same definitions can be applied in measuring earnings surprises.

where, $D_{j,q}$ is the dividends of firm 'j' at quarter 'q'. The critical assumption of the "naïve method" is that the expected change in dividends is zero. If current dividends are different from the previous, then it is regarded as informativeness of dividends.

Despite the popularity, there are criticisms of the "naïve" method.[7] Bar-Yosef and Sarig (1992) present a detailed comparison of different methods to estimate dividend changes and report that the "naïve" model produces a biased proxy of dividend changes since it fails to account for an upward trend in dividends. Asquith and Mullins (1983) mention that *"... the naïve model used in previous studies may underestimate the wealth effect of an increase in dividends."* Dhillon, Raman and Ramirez (2003) provide very strong evidence against the naïve model. In their study, about 33.97% of the sample is misclassified using the "naïve" approach when compared against alternative methods of dividend changes.

This study uses a different measure to estimate surprises in dividends and earnings. I use analyst forecasts[8] (I/B/E/S forecast) to compare them with the actual announcements. Hence, the surprises in dividend and earnings are defined as:

$$\text{Standardized Dividend Surprises} \quad \Delta D_{j,q} = \frac{\left(D_{j,q} - Forecast(D_{j,q})\right)}{\hat{\sigma}_j} \qquad (2)$$

where, $D_{j,q}$ are actual dividends per share of firm 'j' during quarter 'q', $Forecast(D_{j,q})$ are analyst forecasts of dividends per share for firm 'j' during quarter 'q', and $\hat{\sigma}_j$ are the standard deviations of all forecast errors $\left(D_{j,q} - Forecast(D_{j,q})\right)$ in the sample. This definition of informativeness of dividends allows us to compare the estimated surprises across the firms.

[7] Using the past sequences of dividends and timing of dividend changes, investors can construct a better forecasting model; in that case the expected change in dividends may not be zero as assumed in "naïve" method.

[8] Abarbanell, Lanen and Verrecchia (1995) provided theoretical analysis of using analyst forecast as a proxy for information.

A related issue in using the IBES dataset is the choice of forecast files[9]. Previous studies by Diether et al. (2002) and Vega (2005) show that the empirical results do not significantly change by using either the detail or summary forecast files. This paper uses the summary history files to obtain analyst forecasts.

3.2. b. Measure of Informed Trading (Probability of Informed Trading):

An important part of the analysis is to determine the extent of informed trading during pre- and post-dividend announcement periods. Informed trading cannot be measured directly, but there are several ways[10] to estimate it. In a series of papers, Easley et al.[11] have demonstrated a way to measure informed trading by looking at abnormal order flow. This measure is known as probability of informed trading (PIN). The underlying assumption of the PIN model is that public information is directly incorporated into prices without the need for trading activity, whereas private information is reflected in excess buying or excess selling pressure (abnormal order flow). Thus PIN is designed to capture the extent of informed trading by looking at the frequency of buy and sell orders for a stock in a given day. Any imbalance between the buying and selling frequency would be interpreted as trades motivated by private information, and hence PIN would count that into its estimation.

---

[9] In fact, I/B/E/S data include U.S. detailed history file that contains individual analysts' current forecasts, the date they submitted the forecast and the dividends announcement date. The summary history file contains summary statistics on analysts' forecasts such as mean, median and standard deviations of all outstanding forecasts as of the third Thursday of the month. The I/B/E/S summary history file uses analysts' forecasts that are not current. This error on the part of I/B/E/S can be corrected using the U.S. detailed history file.

[10] According to Huang and Stoll (1996), the adverse selection component of the spread corresponds to the extent of asymmetry of information, which is often used as a proxy for informed trading. Bessembinder (1999) proposes a price impact measure as a proxy for informed trading.

[11] Detailed discussion on PIN measures is available in Easley, Kiefer, O'Hara (1997), Easley, Kiefer, O'Hara and Paperman (1996), and Easley, O'Hara (1987, 1992). Discussion on PPIN measure is available on Aslan et al. (2007).

Using this model requires data on the number of buys and sells per day, which is not directly available from the empirical data. The standard procedure in the literature is to follow the Lee and Ready (1991) algorithm to determine the number of buys and sells each day from the intraday data. Very briefly, according to this algorithm methods, trades for which the transaction price is above the current mid-quote are considered buys and below the mid-quote are sells. Trades at the midpoint are classified depending upon the price movement of the previous trades and will be a buy if the midpoint is moved up. If there were no price movement, then one should move back to the prior price movement and use that as the benchmark and so on.

According to Easley et al. (2002), this model can be estimated using the following log likelihood function:

$$L(\theta|B,S) = (1-\alpha)e^{-\varepsilon b}\frac{\varepsilon_b^B}{B!}e^{-\varepsilon_S}\frac{\varepsilon_s^S}{S!} + \alpha\delta e^{-\varepsilon b}\frac{\varepsilon_b^B}{B!}e^{-(\mu+s_S)}\frac{(\mu+\varepsilon_s)^S}{S!} + \alpha(1-\delta)e^{-(\mu+\varepsilon b)}\frac{(\mu+\varepsilon_b)^B}{B!}e^{-\varepsilon_S}\frac{\varepsilon_s^S}{S!} \quad (3)$$

where B and S represent total buy trades and sell trades for the day, respectively, and $\theta = (\alpha, \delta, \mu, \varepsilon_b, \varepsilon_s)$ is the parameter vector. Here, $\alpha(1-\delta)$ denotes the probability of a "good news day," $\alpha\delta$ denotes the probability of a "bad news day," and the probability of "no-news day" is captured by $(1-\alpha)$. To maximize the likelihood function, I need to assume independences across the trading days. Thus, the likelihood function across T days can be obtained by the product of likelihoods for each day as described by the following equation:

$$V = L(\theta|M) = \prod_{i=1}^{T} L(\theta|B_i, S_i) \quad (4)$$

where (B_i, S_i) is trade data for day i = 1,…,T and $M = ((B_1 S_1), \ldots\ldots (B_T S_T))$ is the data set. Equation (4) is maximized over θ given the data M, to determine the underlying structural parameters of the model (i.e. $\alpha, \delta, \mu, \varepsilon_b, \varepsilon_s$).

The estimated values of the parameters obtained from equation (4), are then used to construct the probability that an order is from an informed trader (PIN), which is defined by the following equation (as in Easley et al. (2002)):

$$PIN = \frac{\alpha\mu}{\alpha\mu + \varepsilon_S + \varepsilon_B} \qquad (5)$$

where $\alpha\mu + \varepsilon_S + \varepsilon_B$ is the arrival rate for all orders, i.e., from informed and uninformed traders, and $\alpha\mu$ denotes the arrival rate for information-based orders. So PIN is the ratio of orders originating from informed traders relative to the overall order flow. It is important to note that PIN is a combination of three parameters. It is not solely determined by the arrival rate of informed traders. Analytically, the probability of informed trading will be higher when there are more frequent information events (captured by α), and/or higher arrival of informed traders (captured by μ), and it is lessened by the willingness of uninformed traders to hold the stock captured by the ε's.

For ease of computation, it is assumed that ε_B and ε_s are the same for a given day, and the following definition has been used for estimating PIN in this paper:

$$PIN = \frac{\alpha\mu}{\alpha\mu + 2\varepsilon} \qquad (6)$$

4. Empirical Research Design

The empirical analysis focuses on two estimation windows: pre-announcement (-42 days, -2 days) periods and post-announcement (+2 days, +42 days) periods relative to dividend, earnings and share repurchase announcements dates. It is important to note that 40 calendar days

is approximately 28 trading days. All the study-related results refer to 28 trading days for each of these two windows.

The empirical analysis on dividend and earnings announcements uses the analyst summary forecast of dividend per share (DPS) and earnings per share (EPS) between 2002 and 2008 obtained from I/B/E/S database. The key variables of interest are the median forecasts of DPS and EPS and announcement dates of dividends and earnings. The sample constitutes quarterly dividends and earnings forecast for the U.S. firms only. In addition, sample does not include firms that initiate or resume dividends. Following these sample selection criteria, observations are first merged with CRSP then with COMPUSTAT and finally with TAQ database. The merged dataset contains 5,508 observations (firms/quarters). The merged dataset is then used to construct several portfolios using two-stage sorting to identify and control information environment. To test the information content of concurrent dividend or earnings announcements, I construct two different portfolios. Portfolio one includes the firms (107 observations) that have highest absolute surprise in dividends and lowest absolute surprises in earnings. Both portfolios only consider concurrent dividends and earnings announcements. For both portfolios, the absolute surprises are first sort into decile then the top decile is further sorted into quartiles. The two stage sorting is an innovative research design over the extent literature. This allows for adequate control of information pertaining to dividend announcements while studying the information content of earnings announcements and vice-versa. Once the portfolios are created then trades and quotes data are used to determine the number of buys and sells to estimate PIN.

I further construct two different portfolios to examine how surprises in dividends affect pre- and post-announcements informed trading. The surprises in dividends and earnings are estimated using the actual and analyst forecast of dividends and earnings for the period of 2002 to 2005. While constructing these portfolios, I relax the assumption of concurrent dividend and earnings announcements. Hence, Portfolio three includes only the firms (107 observations) that have highest absolute surprises in dividends and lowest absolute surprises in earnings; on the other hand Portfolio four contains the firms (107 observations) that have lowest absolute

surprises in dividends and earnings. Comparing the pre- and post-announcements informed trading for these portfolios will help understanding whether all dividend announcements have information content. The Portfolio four contains the firms that rarely change their dividends; in my sample there are 754 observations. Since the sample size for the bottom quartile is reasonably large, the study only looks at a representative sample. To draw the representative sample of 107 observations (to make even comparison with the Portfolio three) out of 754, Portfolio four is further sorted by size of firms and years and within each size-year quartiles firms are selected randomly [the number of firms to select from each size quartile is proportional to the weight of each size quartile in the entire sample].

5. Empirical results and analysis

Table 1 presents the summary statistics for Portfolio one. The average absolute surprises in earnings for the firms in this Portfolio are 11.81 whereas the average absolute surprises in dividends are zero. Thus, the double sorting method ensures studying the appropriate earnings announcements. Since the average absolute surprises in dividends is zero, hence any information reveled by managements pertain to earnings only.

Table 2 reports the differences in probability of informed trading for Portfolio one; it is evident that for absolute surprises in earnings, the cross-sectional difference in PIN is not statistically significant. Further, for positive and negative announcements surprises, I also do not find any change in cross-sectional PIN. In all the three cases, the differences in PIN are positive which implies that informed trading before the announcements is higher than after the announcements.

The results also show that on an average the differences in cross-sectional arrival rate of informed traders and uninformed traders are negative. It is plausible that the uninformed traders anticipate presence of informed traders prior to announcements that might induce them to trade after the announcements. On the other hand, the informed traders may find opportunities to trade after the announcements; it is also plausible that due to superior interpretation skill they take

advantage of the asymmetry of information that prevails immediately after the announcements. The management occasionally issue earnings guideline (management forecasts) for the analyst prior to the actual announcements. The management guidelines often remove uncertainty associated with actual earnings announcements; as a result, the informed traders may no longer have the informational advantage, which may lead to lower informed trading prior to the announcements.

Table 3 provides summary statistics for Portfolio two, that contains the firms with highest absolute surprises in dividends and lowest absolute surprises in earnings. The average absolute surprises in dividends are 7.68 which is lower than that of earnings, but the average surprise in dividends are 2.28 whereas average surprises in earnings is 0.76. The average market capitalization for these firms is 19.0 million, which is similar to that of firms in Portfolio one. The quoted spreads, effective spreads and relative spreads are also similar for both the Portfolios. Table 4 shows the cross sectional differences in PIN parameters for Portfolio two. There is significant difference in PIN for the firms that have highest absolute surprises in dividends and lowest absolute surprises in earnings.

This result implies that for concurrent dividend announcements with surprises, the informed traders prefer to trade prior to announcements. The difference in informed trading reflects the information content of dividend announcements. Combining the results presented in table 2 and 4 it is evident that dividend announcements with surprises convey information above and beyond what is contained in earnings announcements.

Table 5 presents summary statistics for Portfolio three in Panel A and Portfolio four in Panel B. Portfolio three contains firms with highest absolute surprises in dividends and lowest absolute surprises in earnings, when dividends and earnings are announced anytime during the estimation window. One of the key features of firms in Portfolio three is that the surprises are not concentrated on any one size-quartile and there is no monotonic relation between the size of the firm and the surprises in dividends. By construction, the bottom decile firms have zero surprises.

Further, the average surprises in earnings are very small, and there is no monotonic relation between the size of the firm and surprises in earnings.

The estimates in Table 6 explain that there is a statistically significant difference in cross-sectional informed trading for the firms in Portfolio three. This result implies that dividend announcements with surprises have information content after controlling for the information content in earnings announcements regardless whether the announcements are made concurrently or separately.

It is apparent that during the post-announcement period, 'alpha (α)' decreases while 'delta (δ)' increases marginally and 'epsilon (ε)' increases but 'mu (μ)' decreases. This means that the post-announcement periods can be characterized by the higher cross-sectional arrival of uninformed traders (captured by 'epsilon (ε)') and lower cross-sectional arrival of informed traders (captured by 'mu (μ)') on average.

The differences in arrival rates are one of the key factors that contribute to lower informed trading during post-announcement periods. This result is consistent with the classical market microstructure theory that suggests a reduction in the degree of information asymmetry after public announcements (Glosten and Milgrom (1985), Kyle (1985)). The essence of this result is that when the timing of information events is fairly predicted, it is more likely that uninformed traders will lose to informed traders (i.e., adverse selection problems get worse) if they trade before the announcements.[12] For that reason, uninformed traders' hold back and trade after the announcements. On the other hand, informed traders' have less informational advantage during the post-announcement period, since they already traded based on their superior information prior to the announcements.

[12] In a similar study, Cho (2007) reports that as the timing of the earnings announcements approaches, the number of informed traders increases and liquidity trading decreases.

In short, the result from Table 6 indicates that surprises in dividends have an impact on the extent of informed trading during the pre- and post-dividend announcement periods. By construction, for this sample, the timing of announcements is fairly accurately predicted but the contents are not, and that contributes towards the increased asymmetry of information and hence increased informed trading prior to announcements. Once the announcements are made, there is no incremental benefit from the superior information of informed traders; hence informed trading decreases.

Table 7 reveals that, on average, PIN for small firms is larger than that for large firms. This happens because the asymmetry of information for smaller firms is higher than the larger firms, which suggests higher private information-based trading for smaller firms. This negative relation between PIN and size is also reported in Easley et al. (2002).

Several cross-sectional features can be observed by comparing quartile one (smaller firms) and quartile four (larger firms). First, there exists a significant difference in the cross-sectional arrival of information (captured by 'alpha (α)') during the pre- and post-announcement periods for these portfolios. This is expected, since on a given day it is more likely to obtain information for large firms than for small firms. Second, cross-sectionally there exists a significant difference in the arrival of informed traders (captured by 'mu (μ)') during the pre- and post-announcement periods for these portfolios. Moreover, the cross sectional arrival rate of informed traders for these portfolios is higher during the pre-announcement period than post-announcement period, which is consistent with our hypothesis. Thirdly, there is a significant difference in the cross-sectional arrival rate of uninformed traders (captured by 'epsilon (ε)') during the pre- and post-announcement periods. Unlike the smaller firms, the arrival of uninformed traders during the post- announcement period is higher than the pre-announcement period for the larger firms, which is also consistent with our hypothesis. Finally, the effect of surprises in dividends on informed trading (PIN) is also visible across the size distributions.

From Table 8, it is apparent that there exists no significant difference in PIN for firms with zero surprises in dividends. This result implies that there is no significant change in the

information environment during the pre- and post-dividend announcement periods. It is also consistent with the dividend signaling theories. If there are no surprises in dividends, then there is no new information conveyed, and hence there are no significant changes in informed trading during pre- and post-announcement periods. It appears that the cross-sectional arrival rate of informed (captured by 'mu (μ)') and uninformed traders (captured by 'epsilon (ε)') are higher during the pre-announcement period, unlike the case when dividends contain surprises. When dividends carry no new information (i.e. no surprises), liquidity traders on average prefer to trade during the pre-announcement period rather than the post-announcement period. The essence of this result is that the liquidity traders face less risk of losing to informed traders when dividends contain no surprises.

The findings presented in Tables 6 and 8 suggest that the decline in information asymmetry depends on the information contents of announcements. If announcements have surprises, then the asymmetry of information during the post-announcement period declines. If announcements do not have surprises, then there is no significant change in information asymmetry during pre- and post-announcement periods.

Table 9 presents the distribution of parameters estimates from the log likelihood function sorted into quartiles based on firm size. A detailed comparison of pre- and post-announcement periods PINs across quartiles sorted by firm size reveals that PIN, on an average, declines moving from smaller to larger firms.

This is again consistent with the existing findings in the literature. Similar to the top decile firms, several key features emerge from Table 9. As the firm size increases, the cross-sectional arrival rate of informed (captured by 'mu (μ)') and uninformed traders (captured by 'epsilon (ε)') increases. Cross-sectionally, the uninformed traders prefer to trade more during the pre- announcements in larger firms compared to smaller firms. This is consistent, since for larger firms, in case of no surprises in dividends, there is less risk of potential loss from trading against the informed traders. Finally, even in the case of no dividend surprises, cross-sectionally informed traders prefer to trade pre-announcements regardless of the size of the firm.

6. Conclusion

This paper introduces a new dimension to extent literature by assessing the information content of corporate announcements using informed trading. This research considers a market set- up where the information environment is not exogenous; rather, it depends on the content of corporate announcements. Instead of studying the price impact of announcements, this paper studies the impact of corporate announcements on informed trading.

The study tests the hypothesis that informed trading depends on the information content of corporate announcements. If an announcement has surprise then pre-announcements informed trading will be higher than post –announcements, whereas for announcements with no surprises there will be no change in informed trading. I test these hypotheses by constructing several portfolios of dividends and earnings announcements. The unique feature of this research design is that it adequately identifies and controls the information environment pertaining to dividends, and earnings announcements. It also studies the information content of dividend and earnings announcements when they are made concurrently and separately. Empirical results confirm that for earnings announcements with surprises, there are no significant differences in cross-sectional informed trading after controlling for concurrent dividends announcements, on the other hand for dividend announcements with surprises, I find a significant change in cross-sectional informed trading before and after the announcements after controlling for concurrent earnings announcements. I relax the assumption concurrent announcements and find that dividend announcements with surprises have significant change in informed trading after controlling for earnings surprises, whereas for dividend announcements with no surprises, I find no significant change in informed trading after controlling for earnings surprises.

Collectively, these results suggest that dividend announcements contain information beyond that is conveyed by the earnings announcements. This is consistent with the finding by Pettit (1972), Ahrony and Sawary (1980), Asquith and Mullins (1983) It is widely viewed that earnings are “variable”; moreover, management provides “earnings guidelines” periodically which help market and analyst update their predictions. Hence, by the time firm makes earnings announcement, surprises in earnings *no longer* convey significant information. On the other

hand, dividends are viewed as "sticky" and usually management do not change (increase or decrease) dividends often; as a result change in dividends conveys significant information about firm's future earnings potentials which is also consistent with dividend signaling theories. Hence it is dividends *not* earnings that convey a signal to the market. Another implication of this result is that not *all* dividends announcements have information content. A recently study by Amihud and Li (2006) suggest that information content of dividends is declining, contrary to this, findings presented here suggests that dividend announcements with surprises have significant information content. It also highlights the need to disaggregate the dividend announcements based on the surprises in announcements, since in most of the cases firms do not change dividends, failure to study information content of announcements based on surprises may lead to distorted results.

Future research in this area requires a theoretical model with richer prediction on effect of corporate announcements on informed trading. The extent literature mostly focuses on the market microstructure parameters other than informed trading.

Appendix A

Probability of Informed Trading

According to Easley et al. (2002), there are three major players in this structural model: i) informed traders, ii) market makers, iii) uninformed traders. The game is repeated over trading days i=1,…,T. First, nature chooses whether there is new information at the beginning of the trading day, and these events occur with probability α. The new information is a signal regarding the underlying asset value, where good news is that the asset is worth $\overline{V}_i$, and bad news is that it is worth $\underline{V}_i$. If an event occurs, then the probability of good news is $(1-\delta)$ and that of bad news is δ. In this game traders arrive according to Poisson processes throughout the day. Orders from informed traders arrive at rate μ (on information event days), orders from uninformed buyers arrive at rate ε_b. And orders from uninformed sellers arrive at rate ε_s. Traders informed with bad news sell and those informed with good news buy. That is, on a good news day, the arrival rates are $\mu+\varepsilon_b$ for buy orders and ε_s for sell orders. On bad news days, the arrival rates are ε_b for buy orders and $\mu+\varepsilon_s$ for sell orders. On no-news days, only uninformed traders arrive, and the arrival rate of both buys and sells are ε_b and ε_s respectively. If an order arrives at time t, the market maker observes the trade (either a buy or a sell), and he uses this information to update his beliefs. New prices are set, trades evolve, and the price process moves in response to the market maker's changing beliefs. This process is captured in Figure 1 [as in Easley et al. (2002).

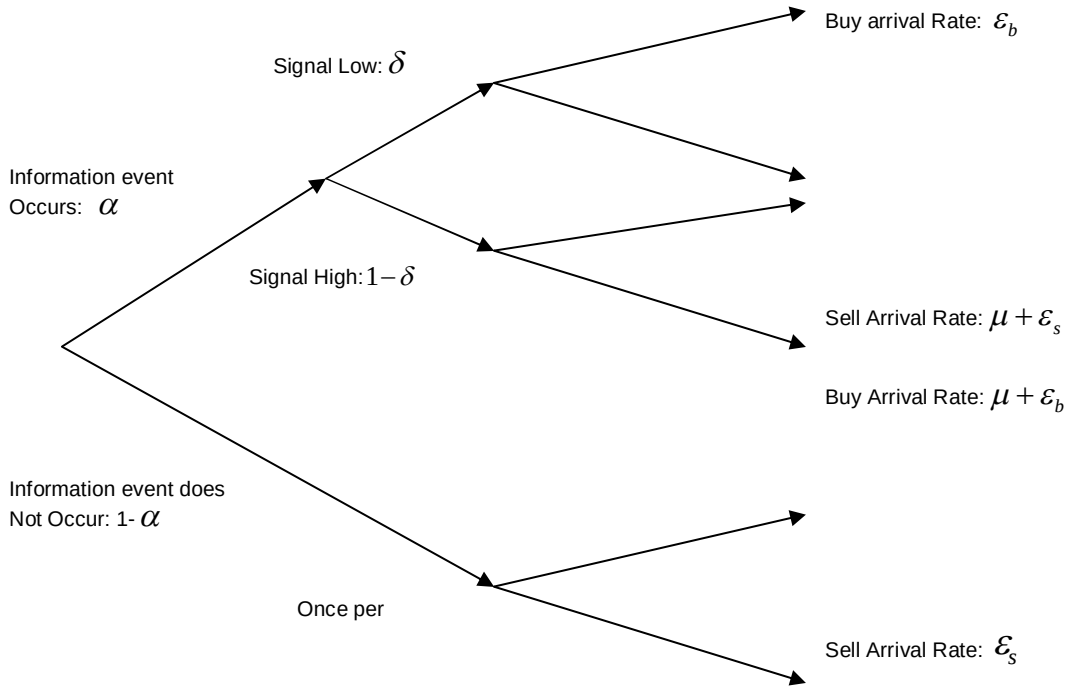

Figure-1

Tree diagram of the trading process

This figure helps to parameterize the model as described in the original paper. Once the model is parameterized it can be estimated using maximum likelihood method.

Appendix-B

TABLE 1: Summary Statistics for Portfolio One

(Highest Absolute Surprises in Earnings and Lowest Absolute Surprises in Dividends)

Variable	N	Mean	Median	Std Dev	Minimum	Maximum	Q1	Q2
ASK	118	51.41	48.42	26.55	6.63	131.15	30.84	66.00
BID	118	46.95	43.83	24.63	6.05	112.07	28.22	60.40
Price	118	49.76	45.88	26.45	6.63	129.93	29.38	64.58
Share Outstanding	118	283,421	93,099	620,178	11,181	5,832,488	43,565	264,024
Market Capitalization	118	16,297,935	4,642,275	44,429,682	304,648	447,000,000	1,570,156	14,344,064
Volume	118	528,835	185,252	1,122,830	6,603	8,430,917	63,789	454,498
Forecasted DPS	118	0.33	0.25	0.54	-	5.00	0.10	0.40
Forecasted EPS	118	1.00	0.76	2.16	(7.00)	18.10	0.34	1.33
Surprise in EPS	118	0.76	5.10	19.00	(99.98)	47.44	(5.70)	7.51
Surprise in DPS	118	0	0	0	0	0	0	0
Absolute Surprise in EPS	118	11.81	6.91	14.87	4.05	99.98	5.40	10.81
Absolute Surprise in DPS	118	0	0	0	0	0	0	0
Quoted spread	118	4.45	3.28	3.79	0.58	23.16	2.02	5.61
Effective spread	118	3.20	1.78	3.79	0.05	21.33	0.77	4.30
Relative spread	118	0.10	0.08	0.07	0.02	0.45	0.05	0.11

This table shows the summary statistics for portfolio one which includes firms with highest absolute surprises in earnings and lowest absolute surprises in dividends. The sample period used in this table is 2002 to 2008. For this table only the concurrent dividends and earnings announcements are considered. The final sample is constructed by merging I/B/E/S, CRSP, COMPUSTAT and TAQ databases. *Ask* is the ask price, *Bid* is the bid price, *Market Capitalization* is the product of market price and total number of share outstanding, *Volume* is the number of shares traded, *Forecasted DPS* is the analyst forecast of dividend per share, *Forecasted EPS* is the analyst forecast of earnings per share, *Surprise in EPS* is the difference between actual and forecasted earnings per share standardized by the cross-sectional forecast error, *Surprise in DPS* is the difference between actual and forecasted dividend per share standardized by the cross-sectional forecast error. Absolute surprises in EPS and DPS

are the absolute difference in earnings and dividend per share. *Quoted spread* is defined as (Ask – Bid), *Effective spread* is defined as 2|Transaction price-Midpoint of bid and ask| and *Relative spread* is defined as (Ask - Bid)/((Ask + Bid)/2). *Mean*, *Median* and *standard deviation* is the average, median and the standard deviation for respective parameters. Q1 and Q2 are first quartile and second quartile respectively. .

TABLE 2: Cross-Sectional Differences in PIN Parameters for Portfolio One

(Highest Absolute Surprises in Earnings and Lowest Absolute Surprises in Dividends)

	N	Differences in Alpha	Differences in Delta	Differences in Epsilon	Differences in Mu	Differences in PIN
Absolute Surprises	118	0.0196	-0.0114	-282.9	-137.0	0.00534 (1.87)
Positive Surprises in Earnings	75	0.00430	-0.0154	-331.6	-137.5	0.00443 (1.32)
Negative Surprises in Earnings	43	0.0463	-0.00443	-331.6	-136.1	0.00692 (1.31)

This table shows the estimated PIN for portfolio one (118 observations) which constructed by sorting firms with highest absolute surprises in earnings and lowest absolute surprises in dividends. The sample period used in this table is 2002 to 2008. For this table only the concurrent dividends and earnings announcements are considered. The final sample is constructed by merging I/B/E/S, CRSP, COMPUSTAT and TAQ databases. The pre- and post-announcements periods constitute 28 trading days relative to the announcements days [-2 days to -40 days and +2 days to +40 days]. The PIN is estimated by maximizing the log likelihood function. The methodology section outlines the detail estimation of PIN. The surprises in dividends and earnings are estimated by comparing the actual and expected dividends and earnings respectively using the summary forecast files from I/B/E/S dataset. The PIN parameters alpha explains arrival of information, delta estimates probability of bad news, mu represents arrival of informed traders and epsilon shows arrival of uninformed traders. Parenthesis includes *t-statistics.*

TABLE 3: Summary Statistics for Portfolio Two

(Highest Absolute Surprises in Dividends and Lowest Absolute Surprises in Earnings)

Variable	N	Mean	Median	Std Dev	Minimum	Maximum	Q1	Q2
ASK	107	45.94	44.65	22.21	6.04	127.91	29.66	59.64
BID	107	41.38	40.46	18.58	4.84	102.35	27.67	54.45
Price	107	43.10	41.36	19.24	5.91	110.92	28.08	56.61
Share Outstanding	107	480,595	160,200	898,141	13,266	6,468,000	63,743	404,644
Market Capitalization	107	19,085,673	7,729,650	30,875,646	307,241	176,000,000	2,410,896	18,261,173
Volume	107	571,161	227,359	1,700,151	4,346	17,171,814	91,023	461,784
Forecasted EPS	107	0.54	0.42	0.36	(0.90)	1.64	0.32	0.77
Forecasted DPS	107	0.24	0.19	0.20	0	1.04	0.07	0.35
Surprise in EPS	107	0.06	0	0.23	(0.30)	0.30	0	0.30
Surprise in DPS	107	2.28	1.61	15.12	(74.64)	79.55	(2.41)	3.21
Absolute Surprise in EPS	107	0.19	0.30	0.14	0	0.30	0	0.30
Absolute Surprise in DPS	107	7.68	2.41	13.20	1.61	79.55	1.61	7.23
Quoted spread	107	4.56	2.67	9.91	0.61	88.74	1.92	3.97
Effective spread	107	3.42	1.74	9.93	0.00	88.74	0.94	2.69
Relative spread	107	0.10	0.07	0.12	0.02	1.06	0.05	0.10

This table shows the summary statistics for portfolio two which includes firms with highest absolute surprises in dividends and lowest absolute surprises in earnings. The sample period used in this table is 2002 to 2008. For this table only the concurrent dividends and earnings announcements are considered. The final sample is constructed by merging I/B/E/S, CRSP, COMPUSTAT and TAQ databases. *Ask* is the ask price, *Bid* is the bid price, *Market Capitalization* is the product of market price and total number of share outstanding, *Volume* is the number of shares traded, *Forecasted DPS* is the analyst forecast of dividend per share, *Forecasted EPS* is the analyst forecast of earnings per share, *Surprise in EPS* is the difference between actual and forecasted earnings per share standardized by the cross-sectional forecast error, *Surprise in DPS* is the difference between actual and forecasted dividend per share standardized by the cross-sectional forecast error. Absolute surprises in EPS and DPS are the absolute difference in earnings and dividend per share. *Quoted spread* is defined as (Ask – Bid), *Effective spread* is defined as 2|Transaction price-Midpoint of bid and ask| and *Relative spread* is defined as (Ask - Bid)/((Ask + Bid)/2). *Mean*, *Median* and *standard deviation* is the average, median and the standard deviation for respective parameters. Q1 and Q2 are first quartile and second quartile respectively.
.

TABLE 4: Cross-Sectional Differences in PIN Parameters for Portfolio Two

(Highest Absolute Surprises in Dividends and Lowest Absolute Surprises in Earnings)

	N	Differences in Alpha	Differences in Delta	Differences in Epsilon	Differences in Mu	Differences in PIN
Absolute Surprises	107	0.0134	-0.0105	-52.90	-26.99	0.00656* (2.58)
Positive Surprises in Dividends	69	0.00120	-0.00948	-94.75	-47.32	0.00493 (1.85)
Negative Surprises in Dividends	38	0.0356	-0.0123	23.08	9.92	0.00952 (1.79)

This table shows the estimated PIN for portfolio two (107 observations) which constructed by sorting firms with highest absolute surprises in dividends and lowest absolute surprises in earnings. The sample period used in this table is 2002 to 2008. For this table only the concurrent dividends and earnings announcements are considered. The final sample is constructed by merging I/B/E/S, CRSP, COMPUSTAT and TAQ databases. The pre- and post-announcements periods constitute 28 trading days relative to the announcements days [-2 days to -40 days and +2 days to +40 days]. The PIN is estimated by maximizing the log likelihood function. The methodology section outlines the detail estimation of PIN. The surprises in dividends and earnings are estimated by comparing the actual and expected dividends and earnings respectively using the summary forecast files from I/B/E/S dataset. The PIN parameters alpha explains arrival of information, delta estimates probability of bad news, mu represents arrival of informed traders and epsilon shows arrival of uninformed traders. Parenthesis includes *t-statistics*.

* denotes significance at 5% level.

TABLE 5: Size wise Distribution of Firms in Portfolio Three (Panel A)

(Highest Absolute Surprises in Dividends and Lowest Absolute Surprises in Earnings)

Variables	Quartile 1 (N=26)	Quartile 2 (N=27)	Quartile 3 (N=26)	Quartile 4 (N=27)
Absolute Surprises in DPS	10.63	17.19	15.78	17.77
Absolute Surprises in EPS	0.1331	0.0872	0.0612	0.0693
Firm Size(mm $)	448.58	1377.31	7003.96	57257.84

TABLE 5: Size wise Distribution of Firms in Portfolio Four (Panel B)

(Lowest Absolute Surprises in Dividends and Lowest Absolute Surprises in Earnings)

Variables	Quartile 1 (N=23)	Quartile 2 (N=27)	Quartile 3 (N=30)	Quartile 4 (N=24)
Absolute Surprises in DPS	0.00	0.00	0.00	0.00
Absolute Surprises in EPS	0.0839	0.0736	0.0505	0.0759
Firm Size(mm $)	364.87	1464.93	4186.26	30120.77

This table reports the absolute surprises in dividends and earnings announcements for a sample of U.S. firms. The sample for this study focuses on quarterly dividends announcements between 2002 and 2005. The sample does not include firms that initiate or resume dividends. The surprises in dividends and earnings are estimated by comparing the actual and expected dividends and earnings respectively. The actual and expected dividends and earnings are obtained from summary history files of I/B/E/S. The firms in the sample are sorted into deciles based on absolute surprises in dividends and then again sorted into quartiles based on absolute surprises in earnings. Portfolio three includes the firms with highest absolute surprises in dividend and lowest absolute surprises in earnings [107 observations]. Portfolio four constitute firms with lowest absolute surprises in dividends and earnings [107 observations] In panel A, the firms in Portfolio three are further sorted into quartiles by firm size, where firm size is estimated by market capitalization on the first day of the quarter obtained from CRSP. In panel B, the firms in Portfolio four are sorted based on firm size. Parenthesis includes *t-statistics.*

TABLE 6: Cross-Sectional Differences in PIN Parameters for Portfolio Three

(Highest Absolute Surprises in Dividends and Lowest Absolute Surprises in Earnings)

Event Windows	Alpha(α)	Delta(δ)	Mu(μ)	Epsilon(ε)	PIN
Pre- Announcements	0.4456	0.3631	335.41	719.08	0.1192
Post- Announcements	0.4428	0.3706	299.85	723.42	0.1086
Difference (Pre-Post)					0.0106* (2.47)

This table shows the estimated PIN for portfolio three (107 observations) which constructed by sorting firms with highest absolute surprises in dividends and lowest absolute surprises in earnings. The sample period used in this table is 2002 to 2005. The final sample is constructed by merging I/B/E/S, CRSP, COMPUSTAT and TAQ databases. The pre- and post-announcements periods constitute 28 trading days relative to the announcements days [-2 days to -40 days and +2 days to +40 days]. The PIN is estimated by maximizing the log likelihood function. The methodology section outlines the detail estimation of PIN. The surprises in dividends and earnings are estimated by comparing the actual and expected dividends and earnings respectively using the summary forecast files from I/B/E/S dataset. The PIN parameters alpha explains arrival of information, delta estimates probability of bad news, mu represents arrival of informed traders and epsilon shows arrival of uninformed traders. Parenthesis includes *t-statistics*.

* denotes significance at 5% level.

TABLE 7: Size-wise Distribution of PIN Parameters for Portfolio Three

(Highest Absolute Surprises in Dividends and Lowest Absolute Surprises in Earnings)

Event Windows	Alpha(α)	Delta(δ)	Mu(μ)	Epsilon(ε)	PIN
	Quartile One (Small Firms)				
Pre- Announcements	0.3579	0.4277	127.15	124.57	0.1514
Post- Announcements	0.4060	0.3796	89.54	110.38	0.1520
	Quartile Two				
Pre- Announcements	0.4434	0.3371	223.06	298.04	0.1337
Post- Announcements	0.3930	0.4211	198.29	307.26	0.1110
	Quartile Three				
Pre- Announcements	0.5041	0.3582	370.13	793.94	0.1115
Post- Announcements	0.4643	0.3348	370.40	808.17	0.0967
	Quartile Four (Large Firm)				
Pre- Announcements	0.4745	0.3293	621.31	1,659.77	0.0801
Post- Announcements	0.5079	0.3467	541.17	1,667.87	0.0746
	Quartile One - Quartile Four				
Pre- Announcements	-0.1176** (-2.98)	0.0979 (1.45)	-496.52** (-7.21)	-1540.88** (-13.24)	0.0712** (6.44)
Post- Announcements	-0.1100** (-2.99)	0.0291 (0.47)	-449.44** (-9.67)	-1563.93** (-14.17)	0.0767** (10.22)

This table shows the size-wise distribution of estimated PIN for portfolio three (107 observations) which constructed by sorting firms with highest absolute surprises in dividends and lowest absolute surprises in earnings. The sample period used in this table is 2002 to 2005. The final sample is constructed by merging I/B/E/S, CRSP, COMPUSTAT and TAQ databases. The pre- and post-announcements periods constitute 28 trading days relative to the announcements days [-2 days to -40 days and +2 days to +40 days]. The PIN is estimated by maximizing the log likelihood function. The methodology section outlines the detail estimation of PIN. The surprises in dividends and earnings are estimated by comparing the actual and expected dividends and earnings respectively using the summary forecast files from I/B/E/S dataset. The PIN parameters alpha explains arrival of information, delta estimates probability of bad news, mu represents arrival of informed traders and epsilon shows arrival of uninformed traders. The firm size is estimated by computing the market capitalization for each firm in the beginning of the sample year. Parenthesis includes *t-statistics*.

** denotes significance at 1% level.

TABLE 8: Cross-Sectional Differences in PIN Parameters for Portfolio Four

(Lowest Absolute Surprises in Dividends and Lowest Absolute Surprises in Earnings)

Event Windows	Alpha(α)	Delta(δ)	Mu(μ)	Epsilon(ε)	PIN
Pre- Announcements	0.4294	0.3501	292.722	619.519	0.1182
Post- Announcements	0.4490	0.3469	272.282	561.528	0.1193
Difference (Pre-Post)					-0.0012 (-0.27)

This table shows the estimated PIN for portfolio four (107 observations) which constructed by sorting firms with lowest absolute surprises in dividends and earnings. The sample period used in this table is 2002 to 2005. The final sample is constructed by merging I/B/E/S, CRSP, COMPUSTAT and TAQ databases. The pre- and post-announcements periods constitute 28 trading days relative to the announcements days [-2 days to -40 days and +2 days to +40 days]. The PIN is estimated by maximizing the log likelihood function. The methodology section outlines the detail estimation of PIN. The surprises in dividends and earnings are estimated by comparing the actual and expected dividends and earnings respectively using the summary forecast files from I/B/E/S dataset. The PIN parameters alpha explains arrival of information, delta estimates probability of bad news, mu represents arrival of informed traders and epsilon shows arrival of uninformed traders. Parenthesis includes *t-statistics.*

TABLE 9: Size-wise Distribution of PIN Parameters for Portfolio Four

(Lowest Absolute Surprises in Dividends and Lowest Absolute Surprises in Earnings)

Event Windows	Alpha(α)	Delta(δ)	Mu(μ)	Epsilon(ε)	PIN
	Quartile One (Small Firms)				
Pre- Announcements	0.4275	0.4435	102.94	94.67	0.1829
Post- Announcements	0.4122	0.3949	104.15	103.76	0.1776
	Quartile Two				
Pre- Announcements	0.3836	0.3937	181.91	256.83	0.1157
Post- Announcements	0.4353	0.3965	174.79	259.74	0.1213
	Quartile Three				
Pre- Announcements	0.4598	0.3179	338.70	782.24	0.0987
Post- Announcements	0.4922	0.3252	308.05	625.12	0.1073
	Quartile Four (Large Firm)				
Pre- Announcements	0.4452	0.2517	541.78	1327.13	0.0832
Post- Announcements	0.4456	0.2721	498.38	1260.25	0.0763
	Quartile One - Quartile Four				
Pre- Announcements	-0.0247	0.2135**	-440.10**	-1211.71**	0.0978**
	(-0.48)	(2.84)	(-5.21)	(-6.79)	(5.37)
Post- Announcements	-0.0408	0.1490	-379.10**	-1140.77**	0.1009**
	(-1.02)	(1.80)	(-4.90)	(-7.67)	(8.68)

This table shows the size-wise distribution of estimated PIN for portfolio four (107 observations) which constructed by sorting firms with lowest absolute surprises in dividends and in earnings. The sample period used in this table is 2002 to 2005. The final sample is constructed by merging I/B/E/S, CRSP, COMPUSTAT and TAQ databases. The pre- and post-announcements periods constitute 28 trading days relative to the announcements days [-2 days to -40 days and +2 days to +40 days]. The PIN is estimated by maximizing the log likelihood function. The methodology section outlines the detail estimation of PIN. The surprises in dividends and earnings are estimated by comparing the actual and expected dividends and earnings respectively using the summary forecast files from I/B/E/S dataset. The PIN parameters alpha explains arrival of information, delta estimates probability of bad news, mu represents arrival of informed traders and epsilon shows arrival of uninformed traders. The firm size is estimated by computing the market capitalization for each firm in the beginning of the sample year. Parenthesis includes *t-statistics*.

** denotes significance at 1% level.

References

Abarbanell, Jeffrey, Lanen, William N., and Verrecchia, Robert E., 1995, Analysts' forecasts as proxies for investor beliefs in empirical research, *Journal of Accounting and Economics* 20, 31-60.

Aharony, Joseph and Swary, Itzhak, 1980, Quarterly dividend and earnings announcements and stockholders returns: An empirical analysis, *Journal of Finance* 35, 1-12.

Allen, F., and Michaely, R., 2003, Payout policy. In: Constantinides, G., Harris, M., Stulz, R. (Eds.), *Handbook of the Economics of Finance*, North-Holland, Amsterdam, ISBN: 0-444-50298-X.

Amihud, Y., and Li, K., 2006, The declining information content of dividend announcements and the effects of institutional holdings, *Journal of Financial and Quantitative Analysis* 41, 3.

Aslan, H., Easley, D., Hvidkjaer, S., and O'Hara, M., 2007, Firm characteristics and informed trading: implications for asset pricing, *Working Paper*, University of Houston.

Asquith, P., and Mullins, D., 1983, The impact of initiating dividend payments on shareholders wealth, *Journal of Business* 56, 77-96,

Bajaj, Mukesh and Vijh, Anand M., 1995, Trading Behavior and the Unbiasedness of the Market Reaction to Dividend Announcements, *Journal of Finance* 50, No. 1, pp. 255-279.

Ball, R., and Brown, P., 1968, An Empirical Evaluation of Accounting Numbers, *Journal of Accounting Research*, 6, 159-177.

Bar-Yosef, S., and Sarig, Oded H., 1992, Dividend surprises inferred from option and stock prices, *Journal of Finance* XLVII, No. 4, pp. 1623-1640.

Beaver, W., 1968, The Information Content of Annual Earnings Announcements, *Journal of Accounting Research*, Supplement 6, 67-92.

Benartzi, S., Michealy, R., and Thaler, R., 1997, Do changes in dividends signal the future or the past?, *Journal of Finance* 52, 1007-1034.

Bessembinder's, H., 1999, Trade execution costs on NASDAQ and the NYSE: a post-reform comparison, *Journal of Financial and Quantitative Analysis* 34, 387-407.

Bhattacharya, Sudipto, 1979, Imperfect information, dividend policy, and 'the bird in the hand' fallacy, *Bell Journal of Economics* 10, 259-270.

Brown, S., and Warner, J., 1985, Using Daily Stock Returns: The Case of Event Studies, *Journal of Financial Economics*, 14, 3-31.

Chae, J., 2005, Trading Volume, Information Asymmetry and Timing Information, *Journal of Finance*, 85, No 1.

Cho, Jin-Wan, 2007, Earnings announcements private information, and strategic informed trading, *Journal of Finance Intermediation* 16, 117-149.

Dhillon, Upinder S., Raman, Kartik, and Ramirez, Gabriel G., 2003, Analysts' dividend forecasts and dividend signaling, *Working Paper*.

Diether et al., 2002, Differences of opinion and the cross section of stock returns, *Journal of Finance* 53, 2113-2141.

Dimson, E., 1979, Risk Mismeasurement When Share Are Subject to Infrequent Trading, *Journal of Financial Economics*, 7, 197-226.

Easley, D., and O'Hara, M., 1987, Prices, Trade size and information in security markets, *Journal of Financial Econometrics* 19, 69-90.

Easley, D., and O'Hara, M., 1992, Time and the process of security price adjustment, *Journal of Finance* XLVII, No. 2, pp. 577-605.

Easley, D., Hividkjaer, S., and O'Hara, M., 2002, Is information risk a determinant of asset returns? *Journal of Finance* 57, 2185-2221.

Easley, D., Kiefer, N., O'Hara, M., 1997, One day in the life of a very common stock, *Review of Financial Studies* 10, 805-835.

Easley, D., Kiefer, N., O'Hara, M., and Paperman, J., 1996, Liquidity, information, and infrequently traded stocks, *Journal of Finance* 51, 1405-1436.

Foster, F.-D. and Viswanathan, S., 1996, Strategic Trading When Agents Forecasts the Forecast of Others, *Journal of Finance*, 51, 1437-1478.

Fuller, Kathleen P., 2003, The impact of informed trading on dividend signaling: a theoretical and empirical examination, *Journal of Corporate Finance* 9, 385-407.

Glosten, Larry, and Milgrom, Paul, 1985, Bid, ask, and transaction price in specialist market with heterogeneously informed traders, *Journal of Finance* 14, 17-100.

Graham, J., Koski, J., and Loewenstein, U., 2006, Information Flow and Liquidity around Anticipated and Unanticipated Dividend Announcements, *Journal of Business,* 79, No 5.

Grullon, Gustavo, Michealy, Roni, and Swaminathan, B., 2002, Are dividend changes a sign of firm maturity? *Journal of Business* 75, 387-424.

Healy, P., and Palepu, K., 1988, Earnings information conveyed by dividend initiations, *Journal of Financial Economics* 21,149-175.

Huang, R., and Stoll, H., 1996, Dealer versus auction markets a paired comparison of execution costs on NASDAQ and the NYSE, *Journal of Financial Economics* 41, 313-358.

John, Kose and Williams, John, 1985, Dividends, dilution, and taxes: A signaling equilibrium, *Journal of Finance* 40, 1053- 1070.

Kothari, S.P., 2001, Capital Markets Research in Accounting, *Journal of Accounting and Economics*, 31, 105-231.

Krinksky, I., and Lee, J., 1996, Earnings Announcements and the Components of Bid-Ask Spread, *Journal of Finance*, 76, No 4.

Kyle, Albert, 1985, Continuous auctions and insider trading, *Econometrica*, 53, 1315-35.

Landsman, W., Maydew, E., 1999. Beaver (1968) revisited: Has the Information Content of Annual Earnings Announcements Declined in the Past Three Decades? *Working Paper*, University of North Carolina

Lee, C., 1992. Earnings news and small trades: an intraday analysis. *Journal of Accounting and Economics*, 15, 265–302.

Lee, C.,M.,C., Muclow, B. and Ready, M., J., 1993, Spreads, Depths and the Impact of Earnings Information: An Intraday Analysis, *The Review of Financial Studies*, 6, 345-374.

Lee, Charles M. C., and Ready, Mark J., 1991, Inferring trade direction from intraday data, *Journal of Finance* 46, 733-746.

Miller, Merton and Rock, Kevin, 1985, Dividend policy under asymmetric information, *Journal of Finance* 40, 1031-1051.

Morse, D., and Ushman, N.,1983, True effect of information announcement on the market microstructure, *Accounting Review* 58, 247-258.

Nissim, D., and Ziv, A., 2001, Dividend changes and future profitability, *Journal of Finance* 56, 2111-2133.

Patel, S.A., 1991, Intra-day bid-ask spreads surrounding earnings announcements and information asymmetry, Ph.D. dissertation (University of Pennsylvania, Philadelphia).

Pettit, R.R., 1972, dividend Announcements, Security Performance, and Capital Market Efficiency, *Journal of Finance* 27, 993-1007.

Scholes, M., and Williams, J., 1977, Estimating Beta from Nonsynchronous Data, *Journal of Financial Economics*, 5, 309-327.

Vega, Clara, 2005, Stock price reaction to public and private information, *Journal of Financial Economics*, forthcoming.

Venkatesh, P. C. and Chiang, R., 1986, Information asymmetry and the dealer's bid-ask spread: A case study of earnings and dividend announcements, *Journal of Finance* 41, 1089-1102.

Yoon, Pyung S., and Starks, L., 1995, Signaling, Investment opportunities, and dividend announcements, *Review of Financial Studies* 8, No. 4, pp. 995-1018.