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**OPTION TRADING AND
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Abstract

Option market activity increases by more than 10% in the four days before quarterly earnings announcements. We show that the direction of this pre-announcement trading foreshadows the subsequent earnings news. Specifically, we find option traders initiate a greater proportion of long (short) positions immediately before good (bad) earnings news. Returns to “active-side” option trades executed immediately prior to earnings announcements are significantly higher than normal. Collectively, these findings suggest option trading facilitates the dissemination of earnings news by providing informed investors with a low cost trading alternative.

1. Introduction

Equity option contracts are redundant assets, in the sense that their returns can be dynamically replicated by a portfolio of riskless bonds and shares of the underlying stock. However, as Grossman (1988, p.275) observed, “the notion that a real security is redundant when it can be synthesized by a dynamic trading strategy ignores the informational role of real securities.” If option markets provide a lower cost trading alternative for informed traders, it is likely that the availability of option markets enhances the informational efficiency of equity markets in general.

This study investigates the informational role of option markets in the dissemination of earnings news. Prior studies have examined the effect of option markets by analyzing stock market reactions to earnings news conditional on the availability of option trading.¹ A key finding from these studies is that option trading increases the informational efficiency of the stock market. When option trading is available, the stock price adjustment is faster [Jennings and Starks (1986)], market price reactions to earnings news are smaller [Skinner (1989), Ho (1993)], and post-announcement price drifts are less pronounced [Botosan and Skinner (1993)].

While this literature shows option trading contributes to overall price efficiency, it does not address how such contributions are made. By focusing solely on the stock market reaction, prior research offers few insights on the informational role of option trading. Our approach in this study differs in that we do not use the existence of the option market as a conditioning variable. Instead, we examine option trading activities directly. Specifically, we investigate the speed, direction and profitability of option trades immediately around the release of different earnings news surprises -- i.e., “good” and “bad” news earnings. Using transactional data from the Berkeley Options database, we document several new findings that suggest an informational role for option markets in news dissemination.

First, we find that option market trading volume increases several days before earnings announcements. In contrast to equity markets, where abnormal trading does not begin until the announcement date, option volume is 10 to 15% higher up to four days before the announcement. As in equity markets, options activity remains higher than normal for

¹ For example, Skinner (1990), Ho (1993), Jennings and Starks (1986), Botosan and Skinner (1993)]. Also related are general studies of the effect of derivative products on stock price behavior [e.g., Figlewski and Webb (1993), Damodaran and Subrahmanyam (1992), and Skinner (1989)].

several days after the announcement. However, controlling for contemporaneous increases in equity trading, we show option market activity is disproportionately high in the three to four days *before* the earnings news release. The timing of earnings news announcements is quite predictable,² and our findings show that option traders adjust their positions in anticipation of these announcements.

Our second result is that the increased preannouncement trading in the option market is not simply a volatility play. We find that option traders anticipate not only the magnitude of the price reaction [Patell and Wolfson (1981)], but also its direction. Specifically, we show that the direction of preannouncement option trades foreshadows the nature of the earnings news, such that a greater proportion of long (short) positions are initiated by active-side traders immediately before good (bad) earnings news. This finding suggests that some traders have superior information prior to earnings announcements, possibly obtained through information leaks [Seppi (1992), Seyhun (1992)], or increased information collection activities [Kim and Verrecchia (1991)].

The directional volume of preannouncement option trades contrasts with Lee (1992), who finds no evidence of "informed" trading in the buy/sell imbalance of equity trades prior to earnings announcements. Therefore, with Lee (1992), our findings show that "informed" traders may prefer to trade in the option (versus equity) market, prior to earnings announcements. Since options and equity are redundant assets in perfect markets, we posit that the differential cost structures across the two markets lead a greater proportion of informed traders to trade in options. Consistent with the conjectures of Black (1975) and Cox and Rubinstein (1985), our evidence shows that investors with certain private information (in this case, news about the forthcoming earnings release) gravitate toward the option market.

Finally, we investigate the profitability of active-side trading in options. If option markets play a role in price discovery, then option (and stock) prices should respond to active-side option trades -- i.e., buyer-initiated (seller-initiated) option trades should precede price increases (decreases). This general phenomenon will result in short-run profits (ignoring bid-ask spreads) for active-side option traders. To assess the impact of earnings news, we compare profits (losses) to active-side option trading during earnings announcements and

² Using prior release dates, Kross and Schroeder (1984) show that over 80 percent of earnings announcements are within three days of the date predicted. Anecdotal evidence from discussions with market participants suggests some traders may have even more precise information about the timing of releases.

during a matched sample of “pseudo-announcements.” Specifically, for each actual news announcement, we generate a pseudo-announcement using the same firm and time-of-day, but a random date. We then compare active-side profits on the 50 trades immediately before and after the actual announcements to the profits on the corresponding trades around pseudo-announcements. Using a simple trading strategy, we open positions based on the buy or sell direction of option trades and unwind them at the end of the second day of trading after the announcement (or pseudo-announcement).

We find that active-side trades executed at mid-spread prices generate short-term returns of approximately 3% during non-announcement (i.e., pseudo-announcement) periods. This suggests that investors who initiate trades on the option market bring information to market during non-announcement periods. Moreover, we show that the profits to active-side trades are significantly higher during earnings announcements. Investors who initiated option trades immediately before earnings announcements earn a return of approximately 6% by the end of day +2 -- that is, 3% more than matched pseudo-announcement trades. If these option trades had been executed on the equity market, a lower (but still statistically significant) average return of 0.2% results. These findings show that the information brought to market by active-side option trades was not previously impounded in the stock price. In other words, option traders do participate in the price discovery process associated with the dissemination of earnings news.

We find, however, that option trading around earnings news is on average unprofitable, because of wide bid-ask spreads. The quoted bid-ask spread on a typical option contract is 6-12% of the contract price, as compared to spreads of less than 1% for equities [e.g., see Phillips and Smith (1980) or Vijh (1990)]. John, Koticha, and Subrahmanyam (1991) posits that liquidity suppliers in the option market seek compensation for bearing greater information risk by charging more for dealer services. Consistent with this hypothesis, we find that after accounting for bid-ask spreads, option traders using the above strategy realize an average trading loss of almost 10%. This shows that, after transaction costs, investors who initiate option trades do not earn abnormal profits.

In summary, extensive research has focused on the equity market reaction to earnings news. However, with the exception of Schachter (1988) and Anthony (1988a), this

research does not examine how earnings information affects option trading.³ Our study shows that when option trading is available, the option market is an important vehicle of response to earnings news. Not only does option trading increase around earnings announcements, but we find this trading *anticipates* the nature and timing of the news release.

Our findings are also relevant to the literature on the intermarket linkage between stocks and options. Recent evidence on the speed of information transfer between option and equity markets has been mixed [e.g., Stephan and Whaley (1990), Chan, Chung and Johnson (1993)]. These studies employ Granger-Sims causality tests, without conditioning on an exogenous information signal. In contrast, we isolate abnormal trading activities that relate to a known information signal and show faster and more informed trading in the option market. Our evidence suggests that option markets play an informational role by facilitating price discovery in the underlying security during periods of news dissemination.

The remainder of the paper is organized as follows. The next section formulates the hypotheses; Section 3 describes the sample and data; Section 4 reports results of the empirical tests; and Section 5 concludes.

2. Development of Hypotheses

Stock options are derivative financial contracts that offer potentially reduced transaction costs and increased financial leverage, relative to trading the underlying stock. A call (put) option gives its owner the right to buy (sell) a fixed number of shares of a specified stock at a fixed price at any time on or before a given date. The return patterns of option contracts can be replicated by a dynamically adjusted portfolio of riskless bonds and shares of the underlying stock. Therefore, option contracts and shares of the underlying stock differ mainly in terms of their transaction costs. With concurrent trading in what are essentially redundant assets, we expect investors to select the market with lower overall costs.⁴

Many authors [e.g., Black (1975), Cox and Rubinstein (1985), Manaster and Rendleman (1982), and Skinner (1990)] have argued that informed traders may prefer the cost

³ Schachter (1988) shows that open interest declines prior to earnings announcements, Anthony (1988a) reports daily abnormal volume for a sample of ten firms. Neither study examines the direction or speed of the option market trading activity.

⁴ We define transaction costs broadly to include interest lost on margin accounts or short-sell proceeds etc.

structure in the option market.⁵ In brief, relative to trading in the underlying equity, option traders may find more favorable implicit borrowing rates, lower margin requirements, and less stringent restrictions on short-selling (both in terms of the "Uptick Rule" in equity markets and the interest on the proceeds of short-selling). Moreover, certain types of private information, such as information related to future volatility of stock prices, is much easier to exploit in the options market. For traders with private information and wealth constraints, these differences translate into greater leverage per dollar invested. Traders with short-lived private information about upcoming news events, in particular, should gravitate toward the option market. Thus, the option market may be preferred by informed traders around earnings releases.

In this study, we investigate three issues related to the role of option trading in the dissemination of earnings news. First, we document the extent and speed of option volume increases around the release of earnings news. That is, we examine the extent to which traders use the option market as an alternative vehicle of response to earnings news. The abnormal trading volume across the two markets can be used to assess the relative speed of adjustment in the options and equity markets. Second, we use directional trading volume to examine whether option traders are better informed about earnings information than stock traders. Finally, we evaluate the economic incentives for trading in the option market by studying the returns to option trades initiated immediately around earnings announcements.

2.1 Do Option Traders React to Earnings News?

Our first goal is to provide large sample evidence on the extent of option trading associated with earnings news releases. Schachter (1988) shows that open interest declines prior to earnings announcements, particularly for contracts whose values are most sensitive to volatility. But, since open interest measures only the total number of contracts outstanding, it does not capture investor reaction associated with earnings information.⁶ Anthony (1988a) studies option trading around earnings news, using a sample of only 10 firms. He does not examine directional volume and its relation to earnings news. We use a sample

⁵ By the same token, Vijh (1990) observed that noise traders who mistakenly believe they have price-relevant information might also prefer the option market.

⁶ An option trader may initiate one of four transactions: open a purchase contract, open a sale contract, close a purchase contract, and close a sale contract. In the first two instances, the trader buys an option he does not already hold as a writer, thus increasing open interest. In the latter two instances, he cancels his position as a writer of some options, thereby reducing open interest. Consequently, increased trading in options could either increase or lower open interest, depending on whether contracts are being opened or closed.

consisting of all firms cross-listed on the American or New York Stock Exchange (AMEX or NYSE) and the Chicago Board of Options Exchange (CBOE) to evaluate the extent of option trading around earnings news releases. Since the option market provides lower costs for some traders, we expect greater option activity around an earnings announcement.

The extant evidence on the relative speed of price and volume adjustment across the two markets is mixed. Manaster and Rendleman (1982) and Battacharya (1987) suggest the option market leads the equity market, but Stephan and Whaley (1990) raise questions about their test design. Using daily data and the Granger (1969) and Sims (1972) causality test, Anthony (1988b) reports that trading volume in the option market leads trading volume in the equity market by one day. However, using intraday data, Stephan and Whaley (1990) report price changes and volume in the equity market lead the option market by fifteen minutes or more. Most recently, Chan, Chung and Johnson (1993) show that the Stephan and Whaley (1990) result on price changes is due largely to nonsynchronous trading problems in the option market. Using midspread quote prices, they show that price changes are approximately contemporaneous across the two markets. However, the volume results in Stephan and Whaley (1990) are not challenged.

In contrast to these earlier studies, we examine the speed of adjustment by conditioning on a news event: the Broad Tape release of quarterly earnings. Using a specific event time and intraday methodology allows us to evaluate both the speed and trade direction of volume reaction in the two markets. The exogenous earnings signal, time-stamped to the nearest minute, provides an alternative context in which to examine the relative speed of adjustment in the two markets.

We hypothesize that the volume reaction in the option market will lead the equity volume, for two reasons. First, option traders might take anticipative positions before earnings announcements to adjust their exposure to price volatility risk. Earnings news are known to increase price volatility, and traders may wish to manage this risk with options.⁷ If option volume increases prior to earnings news due to volatility plays, option volume will lead volume in the equity market. Secondly, to capitalize on their private information, better informed traders may gravitate toward the option market. If price discovery occurs

⁷ Some option traders may place volatility bets which cannot be implemented by trading in stocks. Others may close out positions to avoid the earnings announcement risk. Note that even investors who hold hedged positions in options and the underlying stock are subject to increased risk during earnings announcements. This risk arises from the non-linear relation between the stock price and the option price which, during a large price move, will expose the holder to risk.

first in the option market, option volume will again lead equity volume. We investigate both possibilities.

2.2 Are option traders better informed?

To assess the information brought to market by option traders, we examine the proportion of long and short positions being taken by "active-side" option traders immediately before earnings news. The option market on the CBOE is a continuous auction, in which competing market makers post tradable quotes. In a continuous auction microstructure, it is generally possible to identify an "active-side" to each trade, defined as the side which initiated the trade.

As explained in Section 4, we use an algorithm similar to Harris (1989) and Lee and Ready (1991) to identify each trade as either buyer- or seller-initiated. We then classify option trades as either long and short positions relative to the underlying stock. A long position is the purchase of a call or the sale of a put option. A short position is the purchase of a put or the sale of a call option. If initiators of option trades have knowledge of forthcoming news, we expect to observe a greater proportion of long (short) position trades immediately before good (bad) news announcements.

Prior studies suggest that the buy/sell direction of block trades [Seppi (1992)] and insider trades [Seyhun (1992)] anticipate earnings news. However, Lee (1992) shows that, on average, the buy/sell imbalance of equity trades immediately before earnings announcements does not foreshadow upcoming news. Using Lee's approach, we conduct a similar test with option data. If option markets help enhance overall price efficiency by allowing informed traders to trade at lower costs, we expect option traders to better anticipate the direction of earnings news than equity traders.

2.3 Do option traders make systematic profits?

We can also assess the informativeness of option trades through their profitability. Earlier studies based on the Black-Scholes model suggest options markets may not be perfectly price efficient [e.g., Galai (1977, 1978)]. However, later studies suggest that after transaction costs, it is difficult to make systematic abnormal returns by trading options. In particular, Phillips and Smith (1980) identify the bid-ask spread as the largest cost facing option traders. Empirically, Phillips and Smith show that quoted spreads on options are typically 6 to 10% of the contract price, while quoted spreads on stocks are typically less

than 1% of the stock price. If market makers set sufficiently wide spreads in options, option traders will not, on average, make abnormal trading profits.

The finding that spreads are wider for option contracts than stocks is consistent with the presence of more informed traders in the option market. If options market makers face a greater risk of trading with informed traders than do their equity counterparts, bid-ask spreads should be wider in the option market.⁸ Faced with generally wider spreads, it is no longer clear whether informed traders are always better off trading in options.

This tension between increased leverage and wider spreads is modeled by John, Koticha and Subrahmanyam (1991). Their model examines the vehicle of choice for informed traders when concurrent trading is available in options and equities. In equilibrium, they find that both informed and liquidity traders divide their trades between the option and equity markets. However, their model does not address the pattern of informed trading immediately before an information event. In theory, market makers should respond to increased information asymmetry risk by widening spreads prior to an anticipated earnings release.⁹ However, unless the timing of the event is fully anticipated, market makers are unlikely to set sufficiently wide spreads to deter all informed trading. Consequently, informed traders may still find an advantage in preannouncement trading, despite generally wider spreads. Empirically, we evaluate this proposition by examining the profitability of option trades before and after accounting for the bid-ask spread.

3. Data and Sample Selection

The firms for this study were selected from the Institute for the Study of Security Markets (ISSM) and the Berkeley Options (CBOE) databases for 1988 and 1989. The ISSM data contain trade and quote information for all NYSE and AMEX firms and the CBOE data contains similar information for option contracts on firms listed at the Chicago Board of

⁸ Relative spreads may differ across the two markets due to factors other than information asymmetry risk. The market microstructure literature identifies three components to the bid-ask spread, of which information asymmetry risk is only one [see Stoll (1989) for a good summary]. The other two factors are inventory costs and order processing or administrative costs. However, most market makers in options close the day "even" and bear little inventory risk. Moreover, the capital requirements and initiation fees for market making in options are generally much lower than those needed to become a specialist in equity trading. Therefore, these two factors are unlikely explanations for wider options spreads.

⁹ Using intraday data, Lee, Ready and Mucklow (1993) show that in equity markets spreads widen and depths drop immediately before earnings news. Using daily closing quotes, Anthony (1987) finds no evidence of this in the option market. As pointed out by Lee, Mucklow and Ready (1993) in an equity context, the failure to detect this effect may be due to the coarseness of daily data. In this draft, we do not examine the effect of earnings announcements on the size of the bid-ask spread in the option market. We plan to investigate this issue in later drafts.

Options Exchange. A total of 147 firms were listed for the two full years on both the CBOE and the ISSM tapes. Of these, three were utilities, with regulated earnings of limited interest to traders; two firms were off-shore ADR's (Hanson PLC and Hitachi Ltd. ADR); one was Student Loan Marketing, for which only the non-voting shares are traded. Eliminating these 6 firms resulted in a final sample of 141 firms, which represents essentially all the cross-listed firms on the two markets over the study period. These firms are listed in Appendix A. Except for three AMEX companies (AMH, FRX, PLL), all our sample firms are listed on the NYSE.

The CBOE data contain all option trades and quote revisions, time-stamped to the nearest second. For each put or call traded, the database contains the time of execution, expiration date, strike price, trade price and volume, as well as the stock price of the last equity trade at the time of option execution. Each quote revision contains the execution time, expiration date, strike price, and bid and ask prices, as well as the concurrent stock price.¹⁰ The Chicago Board of Options Exchange begins trading each day at 8:30 a.m. CST (9:30 a.m. EST) and concludes at 3:15 p.m. CST (4:15 p.m. EST). Option trading commences at the same time equity trading begins on the New York Stock Exchange, and ends 15 minutes after the New York market closes. Our study period pre-dates the multiple-listing of options on several exchanges, so our dataset captures the entire options volume for the sample firms.

We obtained the intraday time of earnings announcements for our sample firms from the *Dow Jones News Retrieval service* (DJNS, or Broad Tape). All quarterly earnings announcements were identified for our sample of 141 firms. The DJNS news release provides the time of the release to the nearest minute. In case of multiple releases about the same earnings news, we select the first release after the fiscal quarter end. Since the DJNS begins each day around 6:45 a.m. CST and continues until approximately 5:45 p.m. CST, an announcement may occur before the option market opens or after it closes. For our daily analysis, we categorize announcements made when the CBOE is closed (hereafter, overnight announcements) as arriving immediately before opening the next day.

¹⁰ Besides trade and quote information on calls and puts, the CBOE data also report trading in straddles and spreads. A spread is a simultaneous long and short position in two or more contracts that differ in either their strike price (a money spread) or expiration date (a time spread). A straddle is a simultaneous long or short position in a put and a call with the same expiration date and strike price. Since the trading in spreads and straddles is minimal, these trades are excluded.

In some of our tests, we use the *Value Line Investment Survey* forecast of quarterly earnings per share (EPS) from the most recent issue immediately preceding the announcement date to proxy for market expectations about earnings. Announcements in which the actual reported EPS exceed the Value Line forecast are deemed "good" news, while those where actual EPS is lower than the Value Line forecast are deemed "bad" news. To ensure EPS is calculated consistently, we checked the reported EPS from the DJNS against the actual EPS from the Value Line issue immediately after the announcement. In the few cases where differences were found, we use the Value Line figure.

Although all 141 firms are cross-listed, several firms had very little actual option trading volume. To reduce outliers caused by skewed non-announcement reference distributions, in some of our tests we required firms to meet minimal levels of option trading activity. Specifically, in our daily analyses, we required that firms have an average of at least one option trade per day, eliminating 9 firms from the sample.

4. Results

4.1 Daily volume analyses

To evaluate trading volume across the two markets around earnings announcements, we first document the daily abnormal trading in each market. Figure 1 reports the daily abnormal trading volume in the market for the underlying stock, as well as in call and put options. For this analysis, the event window is the 21 days centered on the DJNS announcement date. Daily abnormal volume for each firm is defined as the actual daily volume (in contracts or shares traded), minus the mean daily volume for the firm from non-event days, expressed as a percentage deviation from the non-event period mean. The reported average abnormal trading volume is the daily abnormal volume averaged across all firms. We report results at 1, 5 and 10% significance levels based on two-tailed cross-sectional t-tests.

Figure 1a shows that the stock market volume reaction is focused on day 0 and day +1, relative to the DJNS announcement. On these two days, the trading volume in stocks is approximately 35% higher than normal. The magnitude of this increase is comparable to volume increases found for large firms in earlier studies [e.g., Lee (1992), Bamber (1986, 1987)]. Consistent with prior work, we find that trading volume in the stock market remains persistently high for over a week after the earnings news release. Also consistent

with prior results, we find little evidence of increased stock trading in the days immediately prior to the DJNS announcement.

Figures 1b and 1c report the abnormal volume reaction to earnings news in call and put contracts. These figures show that option trading increases around the release of earnings information. As with the stock market reaction, the abnormal volume in options is most pronounced on day 0 and day +1, when abnormal option volume is also approximately 35% higher than normal. These findings support the hypothesis that option markets provide traders with an alternative vehicle for responding to earnings announcements.

In Figure 1, the most striking difference between the stock and option volume reactions are in the days leading up to the announcement. For both call and put options, we find increased levels of trading at least 3 days before the announcement. This finding is consistent with Anthony (1988a), who finds that option trading volume increases as early as 10 days before earnings announcements. This increased preannouncement volume may reflect speculation based on expectations of higher volatility, investors closing out positions, or informed trading. We examine this issue in our intraday analyses.

Since trading across the option and equity markets are contemporaneously correlated, we also examine the option market volume reaction after controlling for stock volume. We present the results of this analysis in Table 1. The dependent variables for these regressions are the daily number of trades in either calls (CTrd) or puts (PTrd). The independent variables are the daily number of stock trades (STrd) and stock shares (SVol) transacted, as well as indicator variables for the 13 trading days around quarterly earnings announcements. All volume measures are expressed as percentage deviations from non-event period means. Models 1 and 2 regress option volume on the event indicator variables; Models 3 and 4 regress CTrd or PTrd on the stock volume variables; and Models 5 and 6 combine both event period indicators and stock volume variables.

Regressing on stock volume provides adjusted R^2 s of 42.3% and 16.6% for call volume and put volume, respectively. These results indicate that stock volume accounts for a significant portion of the daily variations in option market volume. Interestingly, controlling for the increase in stock volume, we find that the abnormal volume in options occurs primarily in the days *before* the DJNS news release (Models 5 and 6). On days -4 to -2, we observe unusually high option trading relative to the stock trading. Again, the evidence shows elevated levels of option trading immediately before earnings news.

4.2 *Intraday Analyses*

As discussed earlier, the increased activity in options before earnings releases may be due to either volatility concerns or informed trading. If option traders have information about the upcoming earnings news, the direction of their preannouncement trades should be correlated with the earnings news. As a first test of this hypothesis, we compute the proportion of long and short positions taken on the options traded immediately around the release of earnings news. We define long and short positions in terms of the underlying stock. Therefore, a long position is the purchase of a call or the sale of a put option, while a short position is the purchase of a put or the sale of a call option. If initiators of option trades have foreknowledge of earnings news, we would expect a greater proportion of long (short) position trades immediately before good (bad) news announcements.

To implement this test, we need an algorithm for classifying option trades into buyer- and seller-initiated transactions. Similar to Harris (1989) and Lee and Ready (1991), we infer the buy/sell direction of each trade by comparing the trade price to the prevailing quote prices for the given option contract. We classify each trade as buyer-initiated if it is closer to the ask price and seller-initiated if it is closer to the bid price. Trades that are exactly at the mid-point of the prevailing spread ("midspread" trades) are considered indeterminable in direction and are excluded. Lee and Ready (1991) use a "tick test", based on prior price changes, to classify midspread trades in their study of equity trading. Since trading in a given option contract is much less frequent than it is in a stock, the tick test is not as reliable for option markets. Moreover, our preliminary tests indicate that midspread trades are far less frequent in options, so the advantage of the "tick test" for this study is minimal.

Table 2 reports the frequency and proportion of long and short positions taken in the option market in the 50 trades immediately before and after earnings releases. For this analysis, good (bad) news events are those in which the actual reported earnings are greater (less) than the most recent Value-Line forecast. Announcements with no Value-Line forecast or with actual earnings equal to forecasted earnings are excluded. Long positions are buyer-initiated calls or seller-initiated puts; short-positions are seller-initiated calls or buyer-initiated puts. To simplify the table, we report trades in groups of ten. We include all trades classifiable as buys and sells between the beginning of trading on day -2 and the end of trading on day +2.¹¹

¹¹ We do not distinguish between different option contracts. In theory, an informed trader with capital constraints will obtain the greatest leverage by trading options with the highest price elasticity. However,

Consistent with Vijh (1988), Table 2 shows a greater proportion of long positions for both good news and bad news announcements.¹² More importantly, we find good news announcements are preceded by a greater percentage of long position option trades than bad news announcements. Before good news announcements, 55.1% of option trades are long positions, compared to 53.5% for bad news announcements. The pattern is similar in the postannouncement period, with a greater proportion of long positions in the good news sample. Statistically, the difference is significant at the 1% level in a two-tailed Chi-squared test. This finding suggests the direction of option trades foreshadows the subsequent earnings news.

Table 3 shows results for the same test, using the sign of the price change, rather than the sign of the Value-Line forecast error, as an indicator of good or bad news. The price change is the change in stock price from the time of the announcement to the end of trading on day +2. This analysis eliminates two potential problems with the test in Table 2. First, Value-Line forecasts are a "noisy" proxy for market expectations of earnings at the time of the announcement. Value-Line forecasts may be stale (issued up to 7 weeks earlier) and may not reflect market "consensus" about earnings expectations. Thus, conditioning on the Value-Line forecast error may introduce noise about the nature of the news event, making informed trading more difficult to detect. Secondly, the DJNS announcement time may not be precisely aligned with CBOE trading times. If earnings news is publicly available to option traders before the DJNS time stamp, Table 2 findings may not represent privately informed option trading. By using the price change *after* the DJNS announcement time to classify announcements, we ensure that preannouncement trades took place *before* the subsequent price move.

Table 3 shows that, when announcements are partitioned on the basis of the actual price change, we find a greater difference between the good and bad news samples. Once again, a greater proportion of long positions are taken before good news than before bad news. Before good news announcements, 56.6% of the option trades represent long positions in

in practice these options are typically out-of-the money, and have the highest relative bid-ask spreads. Given the trade-off between leverage and transaction costs, it is unclear which contracts will be most attractive to informed investors. As a practical matter, we find a vast majority of the volume is in at- or near-the-money options, so we did not separately analyze the different contracts.

¹² Vijh (1988) shows that a greater proportion of option trades are executed at the ask price than at the bid price. Since call volume is much higher than put volume, our results on long and short positions are consistent with his findings. Vijh (1988) does not speculate on why there are, on average, more buys than sells in options. We suspect this result may be due to the fact that some contracts expire without being exercised.

the underlying stock. However, before bad news announcements, only 52.4% of the option trades represent long positions. The z-statistic for this difference is 6.00.

Table 3 results suggest that active-side option trades anticipate the nature of earnings news, but these results may be subject to two problems. First, the Chi-squared statistics may be biased upwards if option trades are positively serially correlated -- that is, long (short) positions tend to follow long (short) positions. Secondly, active-side trades may anticipate future price moves even when no earnings news is announcement. If option prices are generally sensitive to order imbalances, then Table 3 results may not be related to earnings information. We address these issues in the next section using a pseudo-announcement methodology.

4.3 Trading profits

In addition to examining the direction of option trades, we also examine their profitability. To compute trading profits, we assume the active-side of each trade and assess the profits under three different trading strategies. In the first strategy, we compute the "midsread return" (MsRet). That is, we assess the information content of buys and sells by assuming that positions can be taken at the average of the bid and ask price (midsread price) at the time of the trade. Thus, we compute returns using the midsread price at the time of the trade and the midsread price at the end of day +2 for that particular contract. In effect, we compute the profit that the trade initiator would realize without paying the spread. If traders are uninformed about upcoming price changes, then the expected return computed from midsreads should be close to zero. Conversely, if trade initiators are informed about future price changes, this strategy should yield a positive return.

In the second strategy, we initiate the position at the actual trade price and unwind at the bid (ask) price at the end of day +2 for buys (sells). This strategy mimics the trading profit of an option trader who closes her position at the end of day +2 at the quoted price. In effect, it represents the trading profit after costs due to bid-ask spreads. However, since trades often take place inside the quoted spread, our measure understates the actual trading profit from this strategy. We refer to this return as the "realizable return" (ReRet).

In the third strategy, we assume the long or short position by trading in the underlying stock. Each option trade is accompanied by the corresponding stock price based on the last trade in the equity market. We assume a long (short) position in the stock for purchases (sales) of calls, and a short (long) position in the stock for purchases (sales) of puts. We

then unwind the position at the closing stock price at the end of day +2 in computing the "equity return" (EqRet). This trading rule mimics the returns the option trader would have received in the equity market. Since the last equity trade could be either a buy or a sell, the returns do not include the cost of the bid-ask spread. Thus, EqRet is comparable to MsRet in the option market.

In our analysis of trading profits, 3228 trades (around 7%) involve contracts that expire on or before day +2. For these trades, we do not have closing quotes two days after the announcement, so we substitute the value of the contract at expiration for the closing quote price. Specifically, we compute trading profits for these trades using the following option value at expiration:

Call Options: $\text{Max}[S - X, 0]$

Put Options: $\text{Max}[X - S, 0]$

where X is the strike price of the contract and S is the stock price based on the last trade on day +2. This approach attributes to the contract approximately the value that the holder would have obtained on expiration.

Table 4 reports the results of the three trading rule tests for the 50 option trades immediately before and after the earnings announcement. The MsRet results are consistently positive and significant, indicating that option traders are informed about near future price changes. The magnitude of MsRet suggests that, ignoring transaction costs, option traders gain approximately 6% on their contracts in the days around the earnings release. In contrast, the ReRet results show that although initiators of option trades may anticipate the price move, high bid-ask spreads in the option market make such trades generally unprofitable.

This result merely demonstrates that option traders do not, on average, make abnormal profits. It does not mean that traders are irrational for choosing to trade options. To assess whether these traders behaved rationally (i.e., optimally), we need more information about costs and benefits for comparable trades in the stock market. Moreover, it is worth noting that approximately one third of the option trades had positive ReRets. For these traders, this simple strategy proved profitable.

The EqRet results show that, ignoring bid-ask spreads, trades executed in the equity market would also yield positive returns. The t-statistics on the EqRet results are lower, but still

statistically significant. This suggests that the information brought to market by the active-side option traders was not yet impounded in the stock price at the time of the option trade. However, Table 4 shows that EqRets are much smaller than MsRets. The average EqRet for preannouncement option trades is only around 16 basis points, compared to 600 basis points for MsRet. This difference reflects the greater leverage available in the option market. It also provides a potential explanation for why these trades are executed in the option market rather than in the equity market.

As mentioned earlier, one possible concern with Table 4 is that the MsRet results are not attributable to the release of earnings news. Prior studies [e.g., Hasbrouck (1988), Lee and Ready (1991), Petersen and Umlauf (1991)] have shown that the active-side of each trade foreshadows subsequent price moves. That is, buyer (seller) initiated trades tend to be followed by increases (decreases) in stock prices. This pattern reflects the adverse selection problem faced by market makers. Since market makers are relatively uninformed, they infer the arrival of information from incoming active-side orders. That is, they respond to buyer-initiated trades by moving the price up and seller-initiated trades by moving the price down. This phenomenon may result in a positive MsRet even when no earnings news is being released.

To examine the relative profitability of active-side trades across event and non-event periods, we generate a sample of "pseudo-announcements." For each announcement in our sample, we create a pseudo-announcement by retaining the same time-of-day and randomly drawing a date distribution of non-announcement dates for the same firm. For each pseudo-announcement, we also draw the nearest 50 trades immediately before and after the announcement time (provided these trades take place after the opening of trading on day -2 and before the close of trading on day +2). We then replicate the three trading profit tests using this random sample of pseudo-announcements.

Table 5 reports the results for our pseudo-announcements. This table shows that the average MsRet during non-announcement periods is approximately 2.5%. Consistent with findings in the market microstructure literature on equity trading, the active-side of option trades do contain some ability to forecast future price changes even without an earnings announcement. Nevertheless, the information advantage of the active option trades is much higher immediately before the earnings news release. The midspread-to-midspread return on option trades (MsRet) is over 5%, or approximately twice as large, for option positions established immediately before earnings announcements. Evidently active-side option

trades are more profitable around the earnings release date. This finding is consistent with option traders establishing positions with foreknowledge of earnings news.

Finally, to evaluate the *incremental* trading profit accruing to active-side option trades around earnings news, we subtract the returns on pseudo-announcement trades from the returns on trades around actual earnings announcements. Table 6 reports the average abnormal trading profit of option trades after controlling for corresponding trades from pseudo-announcements. The midspread returns in this table shows that even after controlling for the general information advantage of active-side trading, option traders make abnormal profits immediately before and after earnings announcements. For trades -30 to +20, active option trades earn abnormal profits of around 3 to 4 percent. Interestingly, the results for the realizable returns (ReRet) are also statistically significant and just slightly lower in magnitude, at approximately 3 percent. This suggests that spreads may have increased slightly during the announcement period, but even net of spreads gains to active trading increases around the earnings release. The equity return (EqRet) shows that the information advantage in option trades can also be detected using equity trade prices.

5. Conclusion

This study investigates the abnormal trading volume in option markets around the announcement of earnings news. We show that option trading increases in the days immediately before and after earnings reports. As in the equity markets, this abnormal volume is most pronounced on day 0, relative to the DJNS report, and persists for several days after the earnings announcement. On day 0, call option volume is 35% and put option volume is 55% higher than normal. However, after controlling for contemporaneous trading in the stock market, abnormal option trading is concentrated in the three to four days *before* the quarterly earnings announcement.

We also investigate the extent to which the differential cost structures across the two markets result in an information asymmetry between traders in each market. We hypothesize that informed traders gravitate to the option market, where their short-lived proprietary news can be leveraged to yield higher returns. Consistent with this hypothesis, we find that option traders take a greater proportion of long (short) positions immediately before good (bad) earnings news. After controlling for a variety of transaction costs, we show that the information advantage that the option traders bring to market seems to be earnings-related.

Our findings suggest that for firms with listed options, a significant portion of the overall reaction in trading volume takes place in the option market. Extensive research has focused on the information content of earnings news. However, with the exception of Schachter (1988) and Anthony (1988a), this research has focused solely on the equity market reaction. Thus, our study provides the first large sample evidence on the effect of earnings news on option trading.

We also provide new insights on the dissemination of earnings news. Prior studies have suggested that the availability of option markets enhances the overall information efficiency of the market for the underlying stock. Our results on the direction of option trades suggest that this enhancement arises, at least partially, from the role of option markets in the dissemination of earnings news. In particular, we show some option traders have advance information about earnings news.

Finally, we provide new evidence on the economic role of the option market in the price discovery process. If relative cost structures lead informed traders first to the option market, then the option market may provide a cost-effective means for new information to be impounded in prices. As suggested by Grossman (1988), options are not merely redundant securities which can be substituted by dynamic trading strategies in stocks and bonds. Rather, they provide a cost efficient mechanism for price discovery. Our findings on the speed and direction of option trades support this view.

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Figure 1 Abnormal trading volume around the release of earnings

These graphs depict the abnormal trading volume around earnings news releases in the equity market, and in the market for call and put options. All firms cross-listed on the NYSE and the CBOE for both 1988 and 1989 are included. Abnormal trading is expressed as percentage deviation from the daily mean for each firm and averaged across all firms.

Two-tailed significance levels: ■ 1%; ▨ 5%; ▩ 10%.

Fig 1a: Abnormal Trading in Equity Market

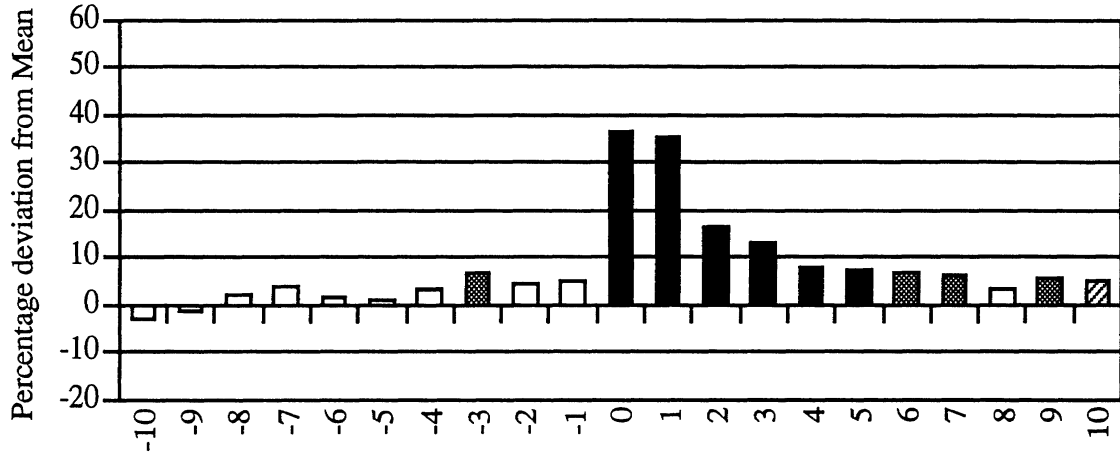


Fig 1b: Abnormal Trading in Call Options

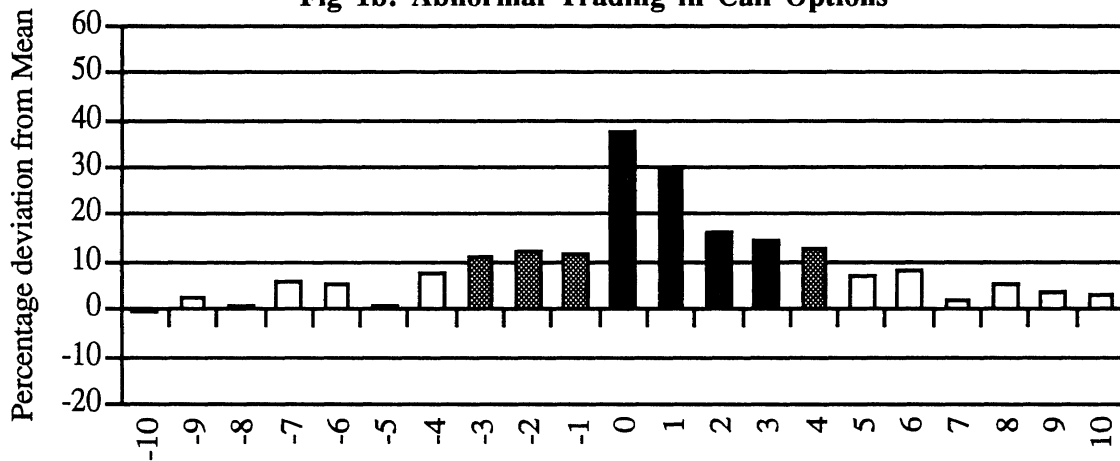
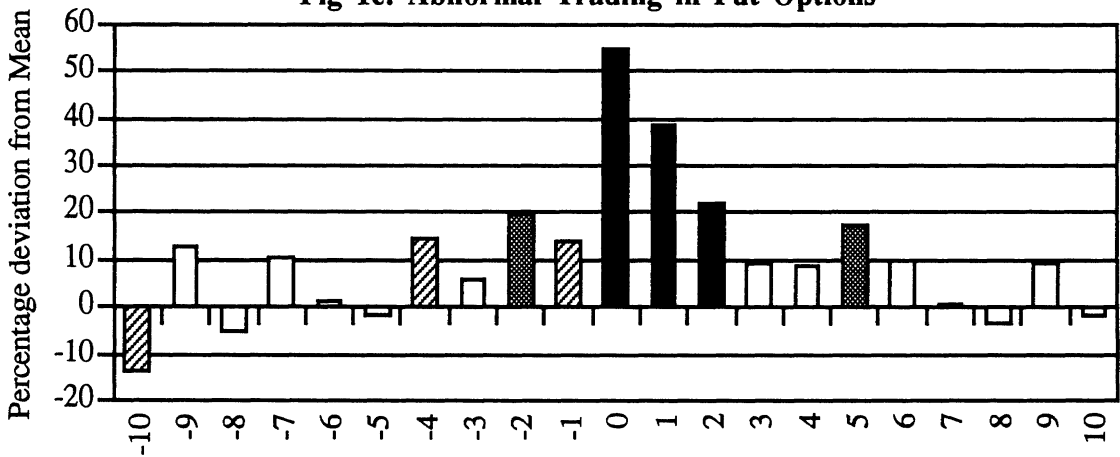


Fig 1c: Abnormal Trading in Put Options



Date relative to Announcement of Earnings News

Table 1
Volume Reaction in Calls and Puts Around Earnings Releases

This table reports the results of time-series regressions of call and put option trading volume on event period indicator variables and on trading volume in the equity market. All firms cross-listed on the NYSE and the CBOE for both 1988 and 1989 are included. The dependent variable is the daily number of trades in either calls (CTrd) or puts (PTRd). The independent variables are the daily number of trades (STrd) and shares (SVol) in the underlying security and indicator variables for the 13 trading days around quarterly earnings announcements as reported by the Dow Jones News Service (DUM_{*i*}, *i* = -6 to +6). The trading volume in stocks, calls and puts are all expressed in terms of percentage deviation from the mean daily volume of each firm. Table values represent estimated coefficients from a regression of the form:

$$(CTrd \text{ or } PTRd) = \alpha + \sum_{i=-6}^{+6} \beta_i DUM_i + \gamma_1 STrd + \gamma_2 SVol + \epsilon$$

Models 1 and 2 include only the indicator variables; Models 3 and 4 include only the stock volume variables; Models 5 and 6 combine both indicator and stock volume variables. Two-tailed significance levels at 1% (**), 5% (*) are marked.

Model	Dep. Var.	Event Period Indicator Variables													Stock Volume		Adj. R ² (%)	
		Day -6	Day -5	Day -4	Day -3	Day -2	Day -1	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	STrd	SVol		
1	CTrd	-2.91**	3.94	5.32	8.32*	13.2**	15.6**	14.2**	33.0**	29.6**	20.5**	15.4**	9.1*	7.6*	8.1*	-	-	0.3
2	PTRd	-2.97**	3.57	8.11	20.2**	10.8*	17.6**	5.6	39.6**	29.5**	8.7	13.1**	12.0*	10.1*	9.0	-	-	0.2
3	CTrd	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	1.47**	0.11**	42.3
4	PTRd	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	1.09**	0.13**	16.6
5	CTrd	-0.12	-0.9	0.8	0.13	7.3*	8.5**	4.5	-4.3	-6.6*	0.85	1.7	-2.0	-1.5	-1.1	1.47**	0.11**	42.3
6	PTRd	-0.80	-0.1	4.8	14.1**	6.1	12.2**	-1.8	10.2*	1.0	-6.6	2.4	3.4	3.0	1.9	1.09**	0.13**	16.7

Table 2
Long and short positions taken in option contracts immediately around earnings news that either exceeds ("good news") or is less than ("bad news") the most recent Value-Line earnings forecast

This table reports the frequency and proportion of long and short positions taken in the option market in the 50 trades immediately before and after "good" and "bad" news earnings releases. Long positions are buyer-initiated calls or seller-initiated puts; short-positions are seller-initiated calls or buyer-initiated puts. Good (bad) news events are those in which the actual reported earning is greater (less) than the most recent Value-Line forecast. The times of the announcements are obtained from the Dow Jones News Service (DJNS). All transactions classifiable as buys or sells are included provided they are executed within two trading days of the announcement time. The z-statistics are based on a Chi-squared test of the null hypothesis that the long and short positions taken are uncorrelated with the earnings signal.

Timing of trade relative to DJNS announcement	Good News Earnings			Bad News Earnings			Difference (z-stat)
	Long positions	Short positions	Percent long	Long positions	Short positions	Percent long	
-50 to -41	802	699	53.4	737	619	54.4	-0.49
-40 to -31	945	713	57.0	880	598	59.5	-1.44
-30 to -21	1106	843	56.7	885	814	52.1	2.82
-20 to -11	1239	996	55.4	1043	924	53.0	1.57
-10 to -1	1449	1273	53.2	1339	1295	50.8	1.76
Total Pre-announcement	5541	4524	55.1	4884	4250	53.5	2.20
+1 to +10	1611	1357	54.3	1360	1353	50.1	3.13
+11 to +20	1372	1176	53.8	1311	1039	55.8	-1.36
+21 to +30	1253	1030	54.9	1144	893	56.2	-0.84
+31 to +40	1177	850	58.1	978	896	52.2	3.69
+41 to +50	1050	819	56.2	892	851	51.2	3.01
Total Post-announcement	6463	5232	55.3	5685	5032	53.1	3.33

Table 3
Long and short positions taken in option contracts immediately around earnings news that resulted in either a positive return ("good news") or negative return ("bad news")

This table reports the frequency and proportion of long and short positions taken in the option market in the 50 trades immediately before and after "good" and "bad" news earnings releases. Long positions are buyer-initiated calls or seller-initiated puts; short-positions are seller-initiated calls or buyer-initiated puts. Good (bad) news events are those in which the actual equity market return from the announcement time to the end of day +2 is positive (negative). The times of the announcements are obtained from the Dow Jones News Service (DJNS). All transactions classifiable as buys or sells are included provided they are executed within two trading days of the announcement time. The z-statistics are based on a Chi-squared test of the null hypothesis that the long and short positions taken are uncorrelated with sign returns associated with the announcement.

Timing of trade relative to DJNS announcement	Good News Earnings			Bad News Earnings			Difference (z-stat)
	Long positions	Short positions	Percent long	Long positions	Short positions	Percent long	
-50 to -41	882	682	56.4	748	678	52.5	2.16
-40 to -31	1029	690	59.9	925	674	57.8	1.18
-30 to -21	1099	881	55.4	1017	843	54.7	0.52
-20 to -11	1281	980	56.7	1113	1066	51.1	3.73
-10 to -1	1590	1272	55.6	1367	1431	48.9	5.04
Total Pre-announcement	5881	4505	56.6	5170	4692	52.4	6.00
+1 to +10	1649	1405	54.0	1472	1456	50.3	2.88
+11 to +20	1505	1181	56.0	1327	1109	54.5	1.12
+21 to +30	1338	1086	55.2	1127	988	53.3	1.29
+31 to +40	1184	986	54.6	1032	861	54.5	0.03
+41 to +50	1106	958	53.6	913	818	52.7	0.52
Total Post-announcement	6782	5616	54.7	5871	5232	52.9	2.80

Table 4
The Profitability of Option Trades Around Earnings Announcements

This table reports the average returns obtained from taking the active side of the 50 option trades immediately before and after the release of earnings news. Results using three different trading rules are reported. MsRet is the average "mid-spread return" per trade, assuming trades are made at the middle of the bid-ask spread. For option buys (or sells), a long (or short) contract position is established at the middle of the prevailing spread at the time of the actual trade and unwound at the closing mid-spread price on day +2. The average "realizable return" (ReRet) per trade incorporates the bid-ask spread, so that buys (sells) are established at the actual trade price and unwound at the closing bid (ask) price on day +2. The average "equity return" (EqRet) is computed using the stock price in the equity market at the time of the option trade. For each option trade, a corresponding long (or short) position is taken in the equity market using the last equity trade price and unwound at the last equity trade price on day +2. All returns are expressed in percents. The times of the announcements are obtained from the Dow Jones News Service (DJNS). All transactions classifiable as buys or sells are included provided they are executed within two trading days of the announcement time. The t-statistics are based on a test of the null hypothesis that the average return is not significantly different from zero.

Timing of trade relative to DJNS event time	No. of Observations	Midspread Returns		Realizable Returns		Equity Returns	
		MsRet (%)	t-stat	ReRet (%)	t-stat	EqRet (%)	t-stat
-50 to -41	3189	3.13	3.39	-9.74	-10.6	0.133	2.06
-40 to -31	3530	6.96	6.66	-7.04	-7.10	0.224	3.78
-30 to -21	4109	6.28	5.35	-9.22	-10.0	0.136	1.96
-20 to -11	4705	6.08	6.57	-9.69	-11.0	0.135	2.75
-10 to -1	6000	5.02	7.30	-10.45	-15.1	0.207	4.69
+1 to +10	6436	7.42	9.49	-11.41	-16.8	0.102	2.70
+11 to +20	5477	5.61	7.74	-11.31	-16.9	0.092	2.13
+21 to +30	4834	4.96	6.10	-11.45	-15.6	0.063	1.22
+31 to +40	4340	4.20	4.60	-11.80	-13.4	-0.019	-0.38
+41 to +50	4023	3.30	4.01	-11.75	-14.8	0.017	0.26

Table 5
The Profitability of Option Trades Around Randomly Selected
"Pseudo-Announcement" Dates

This table reports the average returns obtained from taking the active side of the 50 option trades immediately before and after "pseudo-announcements". For each actual announcement, a "pseudo-announcement" is created using the same firm and time-of-day, but a randomly selected non-announcement date. Results using three different trading rules are reported. MsRet is the average "mid-spread return" per trade, assuming trades are made at the middle of the bid-ask spread. For option buys (or sells), a long (or short) contract position is established at the middle of the prevailing spread at the time of the actual trade and unwound at the closing mid-spread price on day +2. The average "realizable return" (ReRet) per trade incorporates the bid-ask spread, so that buys (sells) are established at the actual trade price and unwound at the closing bid (ask) price on day +2. The average "equity return" (EqRet) is computed using the stock price in the equity market at the time of the option trade. For each option trade, a corresponding long (or short) position is taken in the equity market using the last equity trade price and unwound at the last equity trade price on day +2. The times of the announcements are obtained from the Dow Jones News Service (DJNS). All transactions classifiable as buys or sells are included provided they are executed within two trading days of the announcement time. The t-statistics are based on a test of the null hypothesis that the average return is not significantly different from zero.

Timing of trade relative to DJNS event time	No. of Observations	Midsread Returns		Realizable Returns		Equity Returns	
		MsRet (%)	t-stat	ReRet (%)	t-stat	EqRet (%)	t-stat
-50 to -41	2913	1.926	2.26	-10.856	-13.15	-0.018	-0.25
-40 to -31	3236	2.624	2.96	-10.678	-12.99	0.065	1.33
-30 to -21	3775	-0.106	-0.14	-13.511	-18.44	-0.092	-1.75
-20 to -11	4724	3.075	3.39	-11.890	-15.00	-0.011	-0.24
-10 to -1	5975	3.149	4.57	-12.869	-19.42	-0.037	-1.07
+1 to +10	6260	2.980	5.37	-15.037	-27.63	-0.092	-2.70
+11 to +20	5167	2.200	4.31	-13.813	-27.22	-0.019	-0.58
+21 to +30	4418	3.613	5.61	-12.277	-19.92	0.017	0.48
+31 to +40	3891	2.955	4.12	-12.067	-17.63	-0.380	-1.70
+41 to +50	3450	1.849	2.43	-12.224	-17.08	-0.390	-1.54

Table 6
Abnormal Profitability of Option Trades Around Earnings Releases
After Controlling for Matched-sample “Pseudo-announcements”

This table reports the average abnormal returns obtained from taking the active side of the 50 option trades immediately around earnings releases. For each announcement, a “pseudo-announcement” is created using the same firm and time-of-day, but a random non-announcement date. Each trade is matched with a corresponding trade from the pseudo-announcement. Abnormal return is defined as the actual return per trade, minus the return on the matching trade, averaged across all paired trades. Three different trading rules are used. MsRet is the average “mid-spread return”, assuming trades are made at the middle of the bid-ask spread. For option buys (or sells), a long (or short) contract position is established at the middle of the prevailing spread at the time of the trade and unwound at the closing mid-spread price on day +2. The average “realizable return” (ReRet) incorporates the bid-ask spread, so that buys (sells) are established at the actual trade price and unwound at the closing bid (ask) price on day +2. The average “equity return” (EqRet) is computed using the stock price in the equity market at the time of the option trade. For each option trade, a corresponding long (or short) position is taken in the equity market using the last equity trade price and unwound at the last equity trade price on day +2. All transactions classifiable as buys or sells are included provided they are executed within two trading days of the announcement time. The t-statistics are based on a test of the null hypothesis that the average return is not significantly different from zero.

Timing of trade relative to DJNS time of actual announcement	No. of Observations	Midspread Returns		Realizable Returns		Equity Returns	
		MsRet (%)	t-stat	ReRet (%)	t-stat	EqRet (%)	t-stat
-50 to -41	1537	0.22	0.13	1.01	0.63	0.178	1.23
-40 to -31	2467	1.68	1.06	0.99	0.66	0.007	0.08
-30 to -21	3272	3.24	2.14	2.93	2.09	0.167	2.00
-20 to -11	4002	4.20	3.04	3.27	2.59	0.138	1.88
-10 to -1	5468	2.30	2.37	2.83	3.01	0.207	3.51
+1 to +10	5906	4.19	4.38	3.75	4.21	0.236	4.40
+11 to +20	4740	4.08	4.12	2.91	3.13	0.230	1.63
+21 to +30	4067	0.96	0.82	0.15	0.14	0.244	1.53
+31 to +40	3086	2.03	1.42	1.31	0.97	0.467	1.63
+41 to +50	1996	-3.59	-2.45	-4.05	-2.87	-0.077	-0.65

APPENDIX A - List of 141 Sample Firms

022224910	AA	ALUMINUM CO AMERICA	24736110	DAL	DELTA AIR LINES INC DEL
01447610	AAL	ALEXANDER ALEXANDER SER	25365110	DBD	DIEBOLD INC
02635110	AGC	AMER GEN CORP	26353410	DD	DU PONT DE NEMOURS E I CO
28176010	AGE	A.G. EDWARDS INC	25384910	DEC	DIGITAL EQUIPMENT CORP
02687410	AIG	AMERICAN INTL GROUP INC	25468710	DIS	DISNEY WALT COMPANY
02680410	AIT	AMERICAN INFORMATION TECH CO	26054310	DOW	DOW CHEMICAL CO
02390510	AMH	AMDAHL CORP	26188510	DRY	DREYFUS CORP
03189710	AMP	AMP INC	29284510	EC	ENGELHARD CORP
03190510	AN	AMOCO CORP	27746110	EK	EASTMAN KODAK CO
03251110	APC	ANADARKO PETROLEUM CORP	27805810	ETN	EATON CORP
04882510	ARC	ATLANTIC RICHFIELD CO	34537010	F	FORD MOTOR CO
05430310	AVP	AVON PRODUCTS INC	31330910	FDX	FEDERAL EXPRESS CORP
02581610	AXP	AMERICAN EXPRESS COMPANY	31818110	FFC	FIREMANS FUND CORP
09702310	BA	BOEING CO	34386110	FLR	FLUOR CORP
06605010	BAC	BANKAMERICA CORPORATION	31945510	FNB	FIRST CHICAGO CORP
07181310	BAX	BAKTER INTERNATIONAL INC	34583810	FRX	FOREST LABS INC
11704310	BC	BRUNSWICK CORP	35671410	FTX	FREEPORT MCMORAN INC
09738310	BCC	BOISE CASCADE CORP	36935210	GCN	GENERAL CINEMA CORP
09179710	BDK	BLACK DECKER CORP	36955010	GD	GENERAL DYNAMICS CORP
07785310	BEL	BELL ATLANTIC	36960410	GE	GENERAL ELECTRIC CO
05873210	BLY	BALLY MFG CORP	21932710	GLW	CORNING GLASS WORKS
07159310	BMG	BATTLE MOUNTAIN GOLD CO CLA	37044210	GM	GENERAL MOTORS CORP
11009710	BMY	BRISTOL MYERS CO	39109010	GNN	GREAT NORTH NEKOOSA CORP
12189710	BNI	BURLINGTON NORTHERN INC	36476010	GPS	THE GAP INC
08750910	BS	BETHLEHEM STEEL CORP	40018110	GQ	GRUMMAN CORP
07390210	BSC	BEAR STEARNS COMPANIES INC	39144210	GWF	GREAT WESTERN FINANCIAL CO
17119610	C	CHRYSLER CORP	36868210	GY	GENCORP INC
20491210	CA	COMPUTER ASSOCIATES INTL INC	40621610	HAL	HALLIBURTON CO
12484510	CBS	CBS INC	43739D10	HFD	HOMEFED CORP
13985910	CCB	CAPITAL CITIES /ABC INC	43507110	HIA	HOLIDAY CORP
19121910	CCE	Coca-Cola Enterprises Inc	43761410	HM	HOMESTAKE MINING CO
17303410	CCI	CITICORP	42307410	HNZ	HEINZ H.J CO
17052010	CCN	CHRIS-CRAFT INDUSTRIES INC	43850610	HON	HONEYWELL INC
21236310	CDA	CONTROL DATA CORP	41387510	HRS	HARRIS CORP
19044110	CGP	COASTAL CORP	44485910	HUM	HUMANA INC
15852510	CHA	CHAMPION INTERNATIONAL CORP	42823610	HWP	HEWLETT-PACKARD CO
12550910	CI	CIGNA CORP	32054810	I	FIRST INTERSTATE BANCORP
19416210	CL	COLGATE-PALMOLIVE CO	45920010	IBM	INTL BUSINESS MACHINES CORP
20536310	CSC	COMPUTER SCIENCES CORP	45950610	IFF	INTL FLAVORS FRAGRANCES

APPENDIX A (continued)

45988410	IGL	INTL MINERALS CHEM CORP	81238710	S	SEARS ROEBUCK CO
46014610	IP	INTERNATIONAL PAPER CO	82270360	SC	SHELL TRANS TDG PUB LTD DS
45067910	ITT	ITT CORP	82434810	SHW	SHERWIN-WILLIAMS CO
47816010	JNJ	JOHNSON AND JOHNSON	83083010	SKY	SKYLINE CORP
48258410	KM	K MART CORP	80685710	SLB	SCHLUMBERGER LTD
49238610	KMG	KERR-MCGEE CORP	87161610	SYN	SYNTEX CORPORATION
19121610	KO	COCA-COLA CO	03017710	T	AMERICAN TEL TEL CO
50545810	LAC	LAC MINERALS LTD	87538210	TAN	TANDY CORP
53802110	LIT	LITTON INDUSTRIES INC	87933510	TDY	TELEDYNE INC
54385910	LOR	LORAL CORP	87913110	TEK	TEKTRONIX INC
53271610	LTD	THE LIMITED INC	89233510	TOY	TOYS R US INC
54042410	LTR	LOEWS CORP	89604710	TRB	TRIBUNE COMPANY
84474110	LUV	SOUTHWEST AIRLINES CO	88250810	TXN	TEXAS INSTRUMENTS
57777810	MA	MAY DEPARTMENT STORES CO	90553010	UCC	UNION CAMP CORPORATION
58013510	MCD	MCDONALDS CORP	90921410	UIS	UNISYS CORP
58505510	MDT	MEDTRONIC INC	91530210	UPJ	UPJOHN COMPANY
58283410	MEA	MEAD CORP	90291110	UST	UST INC
59018810	MER	MERRILL LYNCH CO INC	91301710	UTX	UNITED TECHNOLOGIES CORP
60405910	MMM	MINNESOTA MNG MFG CO	93443610	WCI	WARNER COMMUNICATIONS INC
60705910	MOB	MOBIL CORPORATION	97463710	WGO	WINNEBAGO INDS INC
58933110	MRK	MERCK CO INC	96332010	WHR	WHIRLPOOL CORPORATION
61166210	MTC	MONSANTO CO	96945710	WMB	WILLIAMS COMPANIES
62886210	NCR	NCR CORP	93114210	WMT	WAL-MART STORES INC
66680710	NOC	NORTROP CORP	96216610	WY	WEYERHAEUSER COMPANY
65584410	NSC	NORFOLK SOUTHERN CORP	30229010	XON	EXXON CORP
63764010	NSM	NATIONAL SEMICONDUCTOR CORP	98412110	XRX	XEROX CORPORATION
66581510	NT	NORTHERN TELECOM LTD			
67634610	OG	OGDEN CORP			
67459910	OXY	OCCIDENTAL PETROLEUM CORP			
71344810	PEP	PEPSICO INC			
69642930	PLL	PALL CORP			
73109510	PRD	POLAROID CORP			
69562910	PWT	PAINE WEBBER GROUP INC			
70990310	PZL	PENNZOIL CO			
75127710	RAL	RALSTON PURINA CO			
77434710	ROK	ROCKWELL INTL CORP 1 PAR			
75511110	RTN	RAYTHEON CO			