

Overpricing and Earnings Announcements

Henk Berkman
Department of Commerce
Massey University
Auckland, New Zealand
h.berkman@massey.ac.nz

Paul D. Koch
School of Business
University of Kansas
Lawrence, KS 66045
pkoch@ku.edu

Abstract

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Corresponding author:
Paul Koch
School of Business
University of Kansas
Lawrence, KS 66045-7585
Tel: 785-864-7503, Fax: 785-864-5328
Email: pkoch@ku.edu

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JEL Classification: D82, G14, G19.

Key Words: market efficiency, limits to arbitrage, institutional ownership, transaction costs, short sale restrictions, overpricing, earnings announcements.

Introduction

Firm attributes such as stock return volatility, share turnover, and analyst forecast dispersion have been shown to predict the cross-section of stock returns.¹ Nagel (2005) suggests that this return predictability takes the form of overpricing. He appeals to Miller's (1977) theory which posits that, given short sale constraints and dispersion of opinions, a stock price will be biased upward because optimistic investors will buy the stock whereas pessimists are kept out of the market. Consistent with this hypothesis, Nagel shows that stocks with high values of these three dispersion measures, combined with low institutional ownership (his proxy for short sale constraints), have significant price declines over the following year.²

In this paper we apply Miller's (1977) theory to stock price behavior around earnings announcements. Earnings announcements provide a natural experiment to test the overpricing hypothesis, since any overpricing due to overly optimistic investors is likely to be reduced quickly when value-relevant information is disclosed and dispersion of opinions declines after the earnings release. However, before the news arrives and this correction occurs, the overpricing would be briefly exacerbated if investors temporarily increase their positions to speculate on the outcome of the announcement. Such intensified speculation, combined with short sale constraints, will result in a temporary increase in net buying pressure before the announcement.

Theoretical support for the premise that speculative trading intensifies before public announcements appears in He and Wang (1995). They build a multiperiod rational expectations model of trading, in which investors temporarily increase their long or short positions just before

1 See Ang et al. (2006) for evidence of cross-sectional return predictability based on firm-level volatility, Brennan et al. (1998) for predictability based on trading volume, and Diether et al. (2002) for predictability based on analyst forecast dispersion.

2 Turnover, volatility, and analyst dispersion have been used in previous work to proxy for dispersion of opinions (see Diether et al., 2002, Boehme et al., 2006, and Gebhardt et al., 2001). Similarly, low institutional ownership has been used in prior work as a proxy for binding short sale constraints (see Ali et al., 2003, Almazan, 2004, Asquith et al., 2005, Chen et al., 2002, D'Avolio, 2002, and Lesmond, 2007).

the announcement under the presumption that their private information will be partially revealed at the forthcoming announcement.³ The model of He and Wang implies that this behavior is more intense when there is greater dispersion of opinions, as the most optimistic (pessimistic) investors have more incentive to temporarily increase their long (short) positions.

Combining the insights of Miller (1977) and He and Wang (1995) leads to the following scenario before earnings announcements. The optimism of investors holding overpriced stocks gives them incentive to further increase their positions just before an earnings release to bet on its outcome. However, because of the limited ability or willingness of sophisticated investors to sell these overpriced stocks, the additional demand from optimists is not matched by an increase in supply from pessimists. This discussion suggests that the buying pressure associated with high dispersion of opinions and short sale constraints that allegedly underlies the overpricing in Nagel (2005) is amplified just before the earnings release. Consequently, we expect a further price increase before the earnings announcements of stocks that are already most prone to overpricing: those with high dispersion of opinions combined with low institutional ownership.

After the announcement, there are two predictable components of the price reaction for these overpriced stocks. First, overly optimistic investors will cut back the intensified speculative positions they entered just before the earnings release to bet on its outcome (He and Wang, 1995). As a result, the price run-up in the days before the announcement should naturally be followed by a reversal. Second, to the extent that stocks subject to high dispersion of opinions and limits to arbitrage were already overpriced before the event, the earnings release will reveal that investors in these stocks were too optimistic, on average, resulting in a further price

³ Christensen and Feltham (2002) corroborate this view, arguing that investors are likely to go long or short immediately before earnings announcements, based on their presumed private information, and then reverse their positions after the information from the earnings release is impounded in prices. Empirical support for this behavior appears in Chordia et al. (2001), Morse (1981), and section 4.1 of this paper.

decrease. Combining these effects, we hypothesize that stocks which are already overpriced should have a temporary additional price run-up before the announcement that is outweighed by a larger price decline after the announcement.⁴

Other recent work emphasizes the role of transaction costs as a further limit to arbitrage that exacerbates overpricing behavior. For example, Lesmond (2007) and Sadka and Scherbina (2007) find that overpricing is concentrated among stocks with high transaction costs, and that after accounting for transaction costs there is limited evidence of profitable trading strategies. In this light, we conjecture that the price run-up and reversal around earnings announcements hypothesized above should be greater in magnitude for stocks with high transaction costs.

We test these hypotheses using a sample of more than 38,000 earnings announcements for which we have the precise date and time of the earnings release. This sample is available from WSJ.com over the five-year period, 2000 - 2004. We use return volatility, turnover, and analyst forecast dispersion as proxies for dispersion of opinions, low institutional holdings as a proxy for short sale constraints, and the effective half spread as a proxy for transaction costs.

Consistent with our hypotheses, we find that stocks which are prone to overpricing - with high dispersion of opinions combined with low institutional ownership and high trading costs - experience positive abnormal returns before the announcement which are more than offset by negative abnormal returns after the announcement. Our results are robust across dispersion measures, different event windows, and different methodologies. We also confirm our findings

⁴ For other empirical evidence of a temporary price run-up and reversal in the days around earnings announcements, see Aboody et al. (2007) and Trueman et al. (2003). In his discussion of Trueman et al., Berger (2003, p. 274) observes: "The paper ... presents an intriguing apparent anomaly, but is unable to make much progress in explaining it." Additional empirical evidence of negative returns over the three days around earnings announcements can be found in Dimitrov et al. (2006).

using a large sample of earnings announcements from the merged Compustat-CRSP database over the extended period, 1990 - 2004.⁵

In additional tests, we provide evidence consistent with the premises underlying our hypotheses. First, we find that speculative trading pressure builds up in the days before earnings announcements, especially for stocks with high dispersion of opinions. We also show that, for short sale constrained stocks, this increased trading reflects a larger increase in buyer-initiated order flow than seller-initiated order flow. Finally, we find a significant tendency for dispersion of opinions to decline after earnings announcements, and we show that overpriced stocks with larger declines in dispersion have larger declines in stock returns after the announcement.

This study contributes to the literature on cross-sectional return predictability. Focusing on earnings announcements, we show that return predictability based on turnover, volatility, or analyst dispersion takes the form of overpricing, and is concentrated among stocks with low institutional ownership and high transaction costs. We also provide new evidence indicating that the forces behind Miller's optimism bias contribute to opposing price movements in the few days before versus after the announcement. Thus, in contrast to prior work, we show how Miller's optimism bias can affect stock price movements, both, away from and back toward fundamental values, and we document how these price changes manifest themselves over short time frames.⁶

The remainder of this study is organized as follows. Section 1 reviews the literature and develops our hypotheses. In section 2 we describe the data and research design. Section 3 presents the results and section 4 provides additional tests. Section 5 summarizes and concludes.

⁵ Our main analysis focuses on the smaller sample, for which we know the precise time of the earnings release. For the large sample, errors and omissions in the Compustat data on the timing of earnings announcements lead to noisy measures of returns just before and after the announcement, which require a conservative approach.

⁶ Prior empirical support for Miller (1977) is largely limited to evidence of price declines for overpriced stocks. Moreover, these price declines are observed over an extended period of months (Boehme et al., 2006, Diether et al., 2002, and Ofek and Richardson, 2003) or quarters (Asquith et al., 2005, Chen et al., 2002, and Nagel, 2005).

1. Literature Review and Hypotheses

This paper draws upon three research areas. We first review the literature on overpricing and limits to arbitrage. Second, we discuss prior work on anomalous price behavior around earnings announcements. Third, we review the theoretical and empirical literature on speculative trading around public announcements. Finally we synthesize this prior work to develop our hypotheses.

1.1 Overpricing and limits to arbitrage

Miller (1977) introduced the idea that, when there are binding short sale constraints and heterogeneous beliefs, a stock price will be biased upward because the most optimistic investors will buy the stock whereas pessimists are unable to short sell.⁷ Recent empirical evidence supports the basic Miller (1977) prediction, indicating that arbitrageurs do not always force prices back to equilibrium. Asquith et al. (2005), Chen et al. (2002), Jones and Lamont (2002), and Ofek and Richardson (2003), focus on the severity of the short sale constraints, and find that more binding constraints are associated with more dramatic overpricing and lower returns over the following months and quarters. Diether et al. (2002) use dispersion across analysts' earnings forecasts to capture the degree of investor heterogeneity, and find stocks subject to greater dispersion of opinions are more overpriced, experiencing lower returns over the following months. Boehme et al. (2006) find empirical support for the Miller hypothesis is concentrated among stocks with, both, binding short sale constraints and substantive dispersion of opinions.

Nagel (2005) extends this literature by showing that institutional ownership (his proxy for short sale constraints) helps to explain several well-known cross-sectional return anomalies.

Controlling for firm size, he finds that abnormal returns from trading strategies based on three dispersion measures - volatility, turnover, or analyst forecast dispersion - are most pronounced

⁷ More recent theoretical models such as Chen et al. (2002), Duffie et al. (2002), Morris (1996) and Scheinkman and Xiong (2003) arrive at similar predictions. In contrast, Diamond and Verrecchia (1987) and Hong and Stein (2003) argue that rational traders take into account short sale constraints so that, on average, prices are not biased.

for stocks with low institutional ownership. Furthermore, he finds these firm characteristics can predict negative returns, but not positive returns. His evidence suggests that the predictability from these three firm characteristics results from overpricing and not risk.⁸

Low institutional ownership is an effective proxy for limits to arbitrage on the sell side, since it embodies both direct and indirect short sale constraints (Nagel, 2005). Direct short sale constraints include fees for borrowing stock, which can be significant when the supply of loanable shares is scarce. Since institutional investors are the main suppliers of stock loans, low institutional ownership generally reflects low supply and high direct costs of short selling.⁹ On the other hand, over the short time frames analyzed in this study, these direct costs are likely to be small compared to other direct trading expenses (the spread, commission, and price impact).

A second, more plausible reason why low institutional ownership is important in our study rests with the indirect short sale constraints. These involve institutional and cultural barriers that effectively prevent short selling by institutional investors (Nagel, 2005). Because of these constraints, most professional investors simply never sell short, and thus cannot trade against overpriced stocks that they do not own (Almazan et al., 2004). Consequently, stocks with low institutional ownership could experience the recurring and persistent overpricing behavior that we hypothesize around earnings announcements.¹⁰

Finally, two recent studies emphasize the role of transaction costs as a further limit to arbitrage for overpriced stocks. Sadka and Scherbina (2007) show that overpricing persists for stocks with high analyst forecast dispersion, in part, because these stocks have high trading costs.

⁸ Nagel (2005) finds similar evidence for stocks with high market-to-book ratios. Other studies have shown that the anomalous behavior associated with these firm characteristics is related to firm size (e.g., see Loughran, 1997, and Griffin and Lemmon, 2002) and investor sophistication (e.g., see Ali et al., 2003).

⁹ See Asquith et al. (2005), D'Avolio (2002), Geczy et al. (2002), Jones and Lamont (2002) and Ofek et al. (2004).

¹⁰ Since institutions can always buy underpriced stocks, there are no such impediments to arbitrage on the buy side (Nagel, 2005). Other studies that also use low institutional ownership to proxy short sale constraints include Ali et al. (2003), Asquith et al. (2005), Chen et al. (2002), D'Avolio (2002), Han and Wang (2004), and Lesmond (2007).

They also find that the less liquid stocks tend to be more severely overpriced. Lesmond (2007) goes a step further by linking liquidity costs and short sale constraints to help explain the accrual-based trading anomaly. He finds the bulk of trading profits is derived from overpricing for firms with high accruals (the short side of the trade), combined with low institutional ownership and high transaction costs. Furthermore, after accounting for trading costs there is only limited evidence of profitable trading strategies based on accruals.¹¹

We evaluate both low institutional ownership and high transaction costs as factors that limit arbitrage activity, and thus affect mispricing in the days around earnings announcements.

1.2 Anomalous Price Behavior around Earnings Announcements

Trueman et al. (2003) find a return pattern around earnings announcements similar to ours, for a sample of internet firms between 1998 and 2000. They report an average price increase of about 4 percent in the days preceding the announcement, which is followed by an even larger price reversal in the days after the announcement. Like the overpriced stocks in our sample, the internet firms analyzed in Trueman et al. are characterized by high dispersion of opinions, low institutional ownership, and high trading costs (see Ofek and Richardson, 2003).

Motivated by Trueman et al. (2003), Aboody et al. (2007) examine returns before versus after earnings announcements for past winners (the top 1% of stocks based on prior 12-month returns). They find divergent abnormal returns of +1.6% in the five days before the announcement versus -1.9% in the five days after the announcement, for these positive momentum stocks. They show that this return pattern remains significant after deducting transaction costs, it is distinct from the phenomenon of post-announcement drift, and it is not due to overly optimistic analysts just before an announcement. They suggest that this return pattern is

¹¹ The role of transaction costs in mispricing is well-established in a wide range of contexts. For additional work on this issue, see Baker and Savasoglu (2002), Chen et al. (2002), Gabaix et al. (2007), Gatev et al. (2007), Korajczyk and Sadka (2004), Lesmond et al. (2004), Mitchell et al. (2002), Pontiff (1996), and Sadka (2007).

the result of the attention that past winners attract from individual investors, particularly before earnings announcements.

We have repeated our analysis, excluding past winners from the portfolio of overpriced stocks (see Table 6). We find the pattern of a stock price run-up and reversal around the earnings announcements of overpriced firms remains after this exclusion, and is thus distinct from the pattern documented in Aboody et al. (2007). Furthermore, we find evidence that dispersion of opinions, short sale constraints, and trading costs help to explain this return pattern, consistent with Miller (1977).

Several other studies also focus on earnings announcements, to address the question of whether various asset pricing anomalies represent mispricing or systematic risk premia.¹² In this research, market mispricing is indicated if a large part of the price correction is concentrated around subsequent earnings announcements. Such evidence supports the view that the new earnings information causes traders to revise their prior beliefs in a predictable way.

Two studies in this area are particularly relevant to our work. In the first paper, La Porta et al. (1997) show that high market-to-book (glamour) stocks underperform low market-to-book (value) stocks by approximately 1 percent over a 3-day window centered on the earnings announcement date. The large negative earnings announcement returns they find for glamour stocks are difficult to reconcile with a risk-based explanation.

In the second paper, Dimitrov et al. (2006) find that stocks with high information uncertainty (proxied by return volatility, share turnover, dispersion of analyst forecasts, earnings volatility, analyst coverage, or firm age) have significant downward price corrections in the three days around earnings announcements. Consistent with Miller's (1977) theory, their results show

¹² Studies that analyze returns around earnings announcements to examine market anomalies include Bernard and Thomas (1989 and 1990), Bernard et al. (1997), Chopra et al. (1992), Chan et al. (1996), Dimitrov et al. (2006), Jegadeesh and Titman (1993), La Porta (1996), and La Porta et al. (1997).

that overpricing is attenuated when uncertainty is resolved following the release of earnings information. Our study also uses volatility, share turnover and dispersion of analyst forecasts as proxies for dispersion of opinions. The results in Dimitrov et al. are similar to ours for the four-day window around the announcement. However, they do not examine the role of short sale constraints or transaction costs, and they do not distinguish between returns before and after the earnings release. In contrast, our major contribution is the finding of divergent price movements before versus after earnings announcements for overpriced firms, which are associated with the degree of dispersion of opinions, short sale constraints, and transaction costs, consistent with Miller's theory.¹³

1.3 Speculative trading around public announcements

Prior research suggests that investors act on anticipated public announcements by taking speculative positions to bet on the outcome of the announcement. For example, Kim and Verrechia (1991) show how public announcements create incentive to acquire private information, resulting in heterogeneous beliefs and speculative trading before earnings announcements. He and Wang (1995) expand on this issue by developing a multi-period rational expectations model of competitive stock trading. In their model, investors receive supply shocks that generate noise trading, as well as differential private information that generates information-based trading. The model also contains a public signal (such as an earnings announcement) that informs investors about the true value of the stock. Anticipation of this public signal generates additional information-based trading, as investors bet on the outcome of the impending announcement based on their private information. As a result, investors will intensify their

¹³ We have also conducted our analysis on earnings volatility and the standard deviation across daily net initiated order flow as alternative measures of dispersion of opinions, as well as the market-to-book ratio, with similar results.

speculative trading around a public announcement, increasing their long or short positions just before the announcement and reducing their positions after the announcement.

In support of this theory, Morse (1981) finds a temporary increase in abnormal trading volume in the few days around earnings announcements. Similarly, Chordia et al. (2001) find that trading activity and market depth increase in the two days before scheduled public announcements of GDP and the unemployment rate, and then fall back toward normal levels after the announcements. They argue that this behavior is consistent with differences of opinion and a concomitant flurry of prior uninformed trading, as well as an increase in the number of informed traders, in anticipation of the announcement.

1.4 Hypotheses

Based on this prior work, we expect increased upward price pressure in anticipation of earnings announcements, if optimistic investors further increase their speculative positions just before the announcement while pessimists are forced to remain on the sidelines. Furthermore, we expect this upward price pressure to be greatest for stocks that were already most prone to this overpricing behavior before the event: those with high dispersion of opinions and low institutional ownership. This discussion leads to our first hypothesis:

H1: Before earnings announcements, stocks with high dispersion of opinions (proxied by volatility, turnover, or analyst forecast dispersion) have a price increase that makes them outperform stocks with low dispersion of opinions, and this price increase is greatest for stocks with low institutional ownership.

After the earnings release, if optimistic investors cut back their intensified speculative positions, the price run-up before the announcement will naturally be reversed. In addition, the information released should resolve uncertainty about earnings and reduce overall dispersion of

opinions, leading to a further price decline after the event for stocks that were already overpriced before the event. This discussion leads to our second and third hypotheses:

H2: After earnings announcements, stocks with high dispersion of opinions have a price decrease that makes them under-perform stocks with low dispersion of opinions, and this price decrease is greatest for stocks with low institutional ownership.

H3: In the period around earnings announcements (before and after combined), stocks with high dispersion of opinions have a net price decrease that makes them under-perform stocks with low dispersion of opinions, and this net price decrease is greatest for stocks with low institutional ownership.

Finally, we conjecture that the price patterns embodied in these three hypotheses should be exacerbated for stocks with high transaction costs. This view motivates our fourth hypothesis:

H4: The price changes around earnings announcements for stocks with high dispersion of opinions and low institutional ownership, hypothesized in H1-H3, are greater for stocks with high transaction costs.

2. Sample Selection, Variable Construction, and Research Design

2.1 Sample Selection

Alignment of event dates around the precise time of the earnings announcement is essential in this study, because our main hypotheses predict opposite return patterns in the days before versus after the earnings release. Our sample of announcements is thus taken from a source that reports the precise time of each announcement: the earnings calendar on WSJ.com. If earnings are announced before the market's open, the time entry is the actual time or 'BMO'; for after-hours announcements the time entry is the actual time or 'AMC'; and for announcements during the trading day, the hour and minute of the announcement are reported.

Our main sample consists of earnings announcements available on WSJ.com over the five-year period from 2000 through 2004, issued by all firms in the Russell 3000 index as of 2004. This selection criterion includes stocks comprising more than 98% of the total U.S. market

capitalization. After screening, the main sample includes 38,031 earnings announcements, 17,855 of which take place after the close of trading. Event day 0 is the calendar date of the announcement if it takes place before the close of trading, and one trading day later if it takes place after the close. Appendix A provides a discussion of our sample selection procedure.

We also examine the robustness of our results by considering a broader sample of 213,180 earnings announcements for all stocks with data in both CRSP and Compustat over the period, 1990 - 2004. Consistent with Nagel (2005), we exclude from this expanded analysis stocks with a price below 5 dollars, and stocks in the two lowest NYSE/AMEX size deciles.

2.2 Variable Construction

Daily stock returns are obtained from the Center for Research in Securities Prices (CRSP). Intraday trade and quote (TAQ) data are used to generate measures of the daily spread and daily net initiated order flow. Accounting data are taken from the Compustat annual industrial files of income statements and balance sheets. Data on quarterly earnings and analyst forecasts are taken from I/B/E/S. These data are used to construct our variables as follows.

We use three established proxies for dispersion of opinions: turnover, volatility, and analyst forecast dispersion (see Diether et al., 2002, Boehme et al., 2006, and Gebhardt et al., 2001). Volatility (VOL) is the standard deviation across daily stock returns over the 45 trading days from day -50 to day -6, prior to the earnings announcement (on day 0). Turnover (TURN) is average daily turnover for the same pre-announcement period (-50,-6), where daily turnover is defined as the number of shares traded per day divided by total shares outstanding. Analyst forecast dispersion (ADISP) is the standard deviation across all valid analyst forecasts made within the 45 calendar days prior to the earnings announcement, using unadjusted data from I/B/E/S. We scale this standard deviation by total assets per share, following Johnson (2004).

Finally, we construct the quarterly earnings surprise (SURPRISE) as the difference between actual quarterly earnings released on day 0 and the most recent analyst forecast prior to day 0, scaled by the stock price ten days before the announcement. A more detailed description of the data used to construct ADISP and SURPRISE appears in Appendix B.¹⁴

Consistent with other recent work (see footnote 2), we use low institutional ownership to proxy for binding short sale constraints. Data on institutional holdings are from CDA Spectrum 13F Filings. All institutional investors that manage portfolios of \$100 Million or more must file quarterly 13F reports with the SEC. These institutions include banks, insurance companies, brokerage firms, pension funds, and other investment houses. Institutions are required to report all their equity holdings greater than 10,000 shares or \$200,000 in market value, at the end of each quarter. Consistent with prior research, we refer to institutional holdings as the equity holdings of managers that submit quarterly 13F Filings.

For each quarter we calculate the percentage of institutional holdings (INST) for every firm as the aggregate shares held by institutions scaled by total shares outstanding. If a stock is available in CRSP but lacks any information on institutional ownership from the 13F filings data, we assume this stock has zero institutional ownership (see Asquith et al., 2005, Gompers and Metrick, 2001, and Nagel, 2005). A more detailed description of our construction of this variable appears in Appendix C.

Daily transaction costs for each firm are measured by the percentage effective half spread (SPREAD), using intraday trade and quote (TAQ) data. For each trade during the day, the percentage effective half spread is defined as the absolute difference between the trade price and

¹⁴ We also consider alternative choices for the time frame before earnings announcements used to measure stock return volatility, share turnover, and analyst forecast dispersion. In addition, we examine several alternative measures of the earnings surprise, including actual earnings minus the mean or median earnings forecast over the 45 days before the announcement, all scaled by the stock price ten days before the announcement. Results are robust.

the quote midpoint, as a percent of the quote midpoint in effect at the time of the trade. Trades are matched to quotes with a lag of one second throughout the day. We then average the percentage effective half spread across all trades during the day.¹⁵

Finally, we also use the TAQ database to identify each trade as either buyer-initiated or seller-initiated. We then aggregate all trades in each category to obtain daily buyer- and seller-initiated order flow. A trade is identified as buyer-initiated (seller-initiated) if it occurs at the ask price (bid price) of the prevailing quote, or if the trade occurs within the prevailing quote but is closer to the ask (bid). Trades at the midquote are classified as buyer-initiated if the last price change was positive, and seller-initiated if the last price change was negative.

2.3 Research Design

Our main analysis is based on size-adjusted abnormal returns for windows of 2 days before and 2 days after the earnings announcement on event day 0 (the first trading day with a closing price after the announcement). *RetBefore* is the size-adjusted abnormal return over the 2 days before the announcement. It is defined as the sum of the daily (log) returns on event days -2 and -1 minus the equally-weighted return for all NYSE/AMEX firms in the same size-decile, over the same period (see Bartov et al., 2000, and Battalio and Mendenhall, 2005). *RetAfter* is the size-adjusted abnormal return over the 2 days after the announcement, defined as the sum of returns on event days 0 and +1 minus the return on the corresponding size-decile portfolio over the same period. Finally, *RetTotal* is the cumulative return over the 4-day period covering day -2 through day +1 minus the cumulative return on the corresponding size-decile portfolio over the same period. In our robustness tests, we present analogous results for windows of different lengths.

¹⁵ Lee and Ready (1991) use a five-second lag when matching trades and quotes. Bessembinder (2003) suggests that no allowance for trade reporting lags is appropriate when using data from recent periods. Our choice to match trades to quotes with a one-second lag is based on evidence from NASD's Economic Research office, which has determined that a one-second lag is optimal in their automated electronic system.

2.3.1 Portfolio Approach

Our first set of tests applies a portfolio approach in which we compare size-adjusted abnormal returns across portfolios partitioned according to transaction costs, institutional ownership (controlling for firm size), and each dispersion measure. We first partition the earnings announcements made during every quarter into halves, based on the percentage effective half spread (SPREAD) averaged over days (-5, -3), just prior to each announcement. This procedure creates two groups of announcements characterized by stocks that were subject to relatively low or high trading costs near the time of the earnings release. We analyze these two subsamples separately, and compare the results to formally test our fourth hypothesis (H4).

Second, within each spread-based subsample during each quarter, we stratify the earnings announcements by institutional ownership while controlling for firm size. We accomplish this task by initially sorting firms into terciles, based on firm size at the end of the prior quarter. Then, within each size tercile, we form three finer portfolios based on the previous quarter's percentage institutional ownership. This procedure yields tercile subsamples of earnings announcements made by firms with low, medium, or high size-adjusted institutional ownership.¹⁶

Third, within each spread-based subsample during each quarter, we also independently rank the announcements into terciles based on each of the three dispersion measures. For every quarter, this procedure yields subsamples of announcements characterized by low, medium, or high values of each dispersion measure (turnover, volatility, or analyst forecast dispersion).

¹⁶ It is important to control for firm size in this partitioning scheme, given the well-documented association between size and institutional ownership (see Nagel, 2005). We find similar results when we repeat the procedure above based on firm size and institutional ownership taken two quarters before the announcement. We have also repeated all tests using Nagel's (2005) measure of residual institutional ownership, based on a quarterly regression of the percent of institutional ownership (after a logit transformation) on (the log of) firm size and firm size squared. The conclusions are unaffected by this choice.

Finally, within each group of earnings announcements characterized by low or high spreads, we test the first three hypotheses (H1 - H3) by comparing size-adjusted abnormal returns around earnings announcements across different portfolios of stocks. We create portfolios by independently double-sorting each spread-based subsample according to: (i) size-adjusted institutional ownership, and (ii) each of the three dispersion measures. For every quarter, this approach yields a different 3 X 3 scheme of nine double-sorted portfolios for the low spread and the high spread sample, respectively.

Since many firms announce earnings on the same calendar date, standard t-tests applied to mean returns across subsamples in this portfolio approach could be biased upward due to cross-correlation of returns on the same date (Bernard, 1987). We conduct tests that are not affected by this bias. Specifically, for each spread-based subsample and for each of the 20 quarters in our sample period, we allocate stocks with earnings announcements during that quarter to one of our nine double-sorted portfolios. We then calculate equally-weighted size-adjusted returns for each portfolio during every quarter. Finally, we report the mean returns averaged across the 20 quarters for portfolios of stocks with the same characteristics (i.e., within each of our nine double-sorted portfolios for each spread-based subsample). The corresponding t-statistics are based on the time-series standard errors across the 20 quarters, and thus do not suffer from any potential bias associated with cross-sectional clustering of events (see Bernard, 1987, Fama and MacBeth, 1973, and La Porta et al., 1997).

2.3.2 Regression approach

In our second set of tests, we use a cross-sectional regression approach to investigate how earnings announcement returns are affected by trading costs, institutional ownership and each dispersion measure, while also controlling for firm size and the earnings surprise. Inclusion of

firm size as a separate explanatory variable is useful as a robustness check on the methodology in the portfolio approach that uses size-adjusted institutional ownership. Furthermore, since stock returns around earnings announcements are strongly related to the earnings surprise, inclusion of this variable in a regression framework will enhance our insight into the relation between overpricing and earnings announcement returns, after accounting for the information content of each earnings release.

3. Results

3.1 Descriptive statistics

Table 1 provides descriptive statistics for the main variables used in this study. The reported means and standard deviations in Panel A of Table 1 are calculated cross-sectionally for each quarter, and then averaged across the 20 quarters in our sample period. The average sample size for each quarter varies across the different variables, ranging from 950 earnings announcements for ADISP to 1,777 announcements for TURN, VOL, INST, and the return measures.

The mean institutional ownership (INST) is 55 percent of total shares outstanding. This number is higher than the 34 percent reported in Nagel (2005), presumably because our sample is limited to larger firms in the Russell 3000. The average RetBefore is 0.17 percent while the mean RetAfter is -0.15 percent, yielding a mean RetTotal of 0.02 percent.

In Panel B of Table 1 we report the average correlations across each pair of variables. Once again, we first calculate the cross-sectional correlation across announcements made during each quarter. Then we report the mean correlation across the 20 quarters in our sample period. First consider the mean correlations across the three dispersion measures. We find a significant positive correlation between VOL and TURN of 46 percent, which is consistent with prior work

(see Nagel, 2005). The correlations across all other pairs of the three dispersion measures are also positive, although substantially lower in magnitude.

Second, examine the mean correlations of the three dispersion measures with each return measure. While these bivariate correlations should be interpreted with caution, several interesting patterns emerge. First, two of the three dispersion measures (VOL and ADISP) are significantly positively correlated with the 2-day abnormal return before the announcement (RetBefore), while all three dispersion measures (TURN, VOL, and ADISP) are significantly negatively correlated with RetAfter and RetTotal. These latter correlations are consistent with prior work that finds stock returns are negatively associated with trading volume, stock return volatility, and analyst forecast dispersion.¹⁷

Third, consider the association between institutional ownership and stock returns around earnings announcements. The percent of institutional ownership (INST) is significantly negatively correlated with the 2-day pre-announcement return. This tendency for stocks with lower (higher) levels of institutional ownership to have higher (lower) abnormal returns before earnings announcements is consistent with our first hypothesis (H1). In contrast, INST is positively correlated with the 2-day post-announcement return and the 4-day total return. These positive correlations are consistent with prior research suggesting that institutional investors have superior stock picking skills (see Baker et al., 2004, and Ali et al., 2004), as well as with our second and third hypotheses which predict that low institutional ownership is associated with binding short sale constraints, overpricing, and a resultant price decline after the announcement.

Finally, institutional holdings are positively correlated with firm size. This association reinforces the need to control for firm size when we analyze the influence of institutional ownership in our portfolio and regression approaches. In contrast, the effective half spread is

¹⁷ For example, see Ang et al. (2006), Brennan et al. (1998), Diether et al. (2002) and Dimitrov et al. (2006).

negatively correlated with firm size and institutional holdings, as expected. In addition, the spread is positively correlated with the stock return before the earnings announcement, indicating a tendency for a larger price run-up for stocks with larger transaction costs.

3.2 Portfolios based on each dispersion measure, institutional ownership, and spreads

Table 2 provides the results of our portfolio approach. Each Panel in Table 2 reports the mean size-adjusted abnormal returns around earnings announcements for six different 3 X 3 portfolio stratification schemes. The three 3 X 3 schemes on the left side of each Panel are applied to the subsample with low spreads, while the three schemes on the right side are applied to the subsample with high spreads. Panel A presents abnormal returns over the two days before earnings announcements (RetBefore). Panel B provides the analogous 2-day post-announcement abnormal returns (RetAfter), and Panel C gives the aggregate 4-day abnormal returns around the announcement (RetTotal).

3.2.1 Abnormal returns before earnings announcements

The left (right) column of each 3 X 3 partitioning scheme in Panel A of Table 2 reports abnormal returns for portfolios of stocks with low (high) size-adjusted institutional ownership. As we move down each column, we go from stocks with low to high values of each dispersion measure.

The three 3 X 3 partitioning schemes on the left side of Panel A present the results for the low spread subsample. No cell in any of these three schemes has a mean abnormal return that is significantly different from zero at the 5 percent level. Thus, there is no evidence of a significant pre-announcement price run-up for the low spread subsample.

The three 3 X 3 schemes on the right side of Panel A provide the analogous results for the high spread subsample, and tell a different story. Now all three schemes are dominated by positive abnormal returns, with a number of cells significantly positive. These significant

abnormal returns are concentrated in the left column of these 3 X 3 partitioning schemes, in the subsample with low institutional ownership. Furthermore, the bottom row in each scheme (with high values of the dispersion measure) always contains the largest abnormal return in any given column. This outcome indicates that, among stocks with high spreads, firms with high values of the three dispersion measures tend to outperform stocks with low values in the days before earnings announcements. On the other hand, the mean difference t-test at the bottom of each column (in every scheme on the right side of Panel A) indicates that this outperformance is statistically significant only for the tercile with the lowest level of institutional ownership.

Finally, for the subsample of stocks with high spreads, high dispersion measures, and low institutional ownership (the bottom left cell of each 3 X 3 scheme on the right side of Panel A), these 2-day pre-announcement abnormal returns are economically significant. They range from +1.05 percent for the portfolio with low institutional ownership combined with high ADISP (t-value = 2.1) to +1.38 percent for the portfolio with low institutional ownership combined with high TURN (t-value = 3.5). In addition, this bottom left cell in each 3 X 3 scheme on the right side of Panel A is significantly greater than the analogous cell on the left side of Panel A.¹⁸

These results provide direct support for our first and fourth hypotheses. Among stocks with high spreads, those with high values of each dispersion measure have a pre-announcement price run-up that makes them outperform stocks with low values, and this run-up is greatest for stocks with low institutional ownership. In other words, firms that tend to be overpriced already become even more overpriced in the days before an earnings release.

¹⁸ This difference in mean abnormal returns across high spread and low spread subsamples is 1.34 percent (t = 3.7) for VOL, 1.49 percent (t = 4.6) for TURN, and 1.22 percent (t = 2.5) for ADISP.

3.2.2 *Abnormal returns after earnings announcements*

The analogous 2-day post-announcement abnormal returns are reported in Panel B of Table 2. First we focus on the three 3 X 3 stratification schemes on the right side of Panel B, for the high spread subsample. The bottom row of all three schemes now contains the largest negative abnormal return in every column. This result indicates that, among stocks with high spreads, firms with high dispersion measures consistently underperform stocks with low dispersion measures in the days after earnings announcements. The mean difference t-test at the bottom of each column indicates that this underperformance is statistically significant for the tercile with low institutional ownership, for all three dispersion measures.¹⁹

In addition, for stocks with high spreads, high dispersion measures, and low institutional ownership (the bottom left cell of each scheme on the right side of Panel B), these 2-day post-announcement abnormal returns are also economically significant. They range from from -2.72 percent for the portfolio with low institutional ownership and high VOL (t-value = -6.2) to -3.68 percent for the portfolio with low institutional ownership and high ADISP (t-value = -4.4). Finally, this bottom left cell in each 3 X 3 scheme on the right side of Panel B is significantly smaller (more negative) than the analogous cell on the left side of Panel B.²⁰

These results are consistent with our second and fourth hypotheses. Among firms with high spreads, stocks with high values of the dispersion measures have a post-announcement price decline that makes them underperform stocks with low values, and this price decline is greatest for stocks with low institutional ownership. This outcome means that, within the subsample of

19 This mean difference t-test is also significant for the tercile with medium institutional ownership, for the schemes involving VOL and TURN, as well as the tercile with high institutional ownership for the scheme involving TURN.

20 This difference in mean abnormal returns across high spread and low spread subsamples is -1.84 percent (t = -3.9) for VOL, -2.26 percent (t = -4.2) for TURN, and -2.99 percent (t = -3.4) for ADISP.

stocks with high spreads, those firms which are overpriced according to Nagel (2005) tend to have a dramatic price correction in the days after the subsequent earnings release.

Finally, it is interesting to note that the low spread subsample, on the left side of Panel B, displays the same kind of post-announcement price decrease that is hypothesized for the high spread subsample, although this decrease is smaller in magnitude. For example, among firms with low spreads and low institutional ownership, stocks with high values of the dispersion measures have a post-announcement price decline that ranges from -.69 percent for ADISP (t-value = -2.1) to -1.21 percent for TURN (t-value = -2.7). Furthermore, among firms with low institutional ownership, the price decrease for stocks with high values of the dispersion measure significantly outweighs that for stocks with low values, for all three dispersion measures (VOL, TURN, and ADISP). Thus, empirical support for the second hypothesis extends to the low spread subsample, while remaining consistent with the fourth hypothesis.

3.2.3 Total abnormal returns before and after earnings announcements

Panel C of Table 2 presents the analogous results for the 4-day total returns around earnings announcements (RefTotal). These results are similar to those in Panel B, because the post-announcement 2-day price decline in each partitioning scheme of Panel B tends to outweigh the analogous pre-announcement 2-day price increase in Panel A, especially for stocks that are most prone to overpricing.

In particular, the bottom left cell of each 3 X 3 stratification scheme on the right side of Panel C is significantly negative, indicating a substantive net price decline in the four days around earnings announcements for overpriced stocks. These negative 4-day abnormal returns are also economically significant, ranging from -1.48 percent for VOL (t-value = -2.7) to -2.63 percent for ADISP (t-value = -3.5). For the low spread subsample, the analogous cell in each

scheme has a smaller absolute magnitude and a lower level of statistical significance, ranging from -0.86 (t-value = -1.6) for ADISP to -1.32 for TURN (t-value = -2.5). As a result, this bottom left cell in each scheme on the left side of Panel C tends to be dominated by the analogous cell on the right side of Panel C, although their difference is only statistically significant for one of the three dispersion measures (ADISP).²¹

In addition, the mean difference t-test at the bottom of each column in Panel C shows that stocks with high values of the dispersion measures tend to have smaller (larger negative) total earnings announcement returns than stocks with low values of the dispersion measures, especially when combined with low institutional ownership and high transaction costs. These results are consistent with our third and fourth hypotheses, indicating that stocks which are most prone to overpricing have a net price decline in the days around earnings announcements.

To summarize, the results in Table 2 support all four hypotheses. Higher values of the three dispersion measures tend to be associated with higher (lower) abnormal returns before (after) earnings announcements, especially for those firms with low institutional ownership and high transaction costs.

Finally, we emphasize that this net price decline we document in the bottom left cell of the 3 X 3 schemes in Panel C of Table 2 pertains to the subsample of overpriced stocks. When we average across all earnings announcements in the entire sample, we find a small positive average total return of 0.02% (t-ratio = 0.91) in the four days around the announcement (see Table 1). Similarly, when we use market-adjusted returns (rather than size-adjusted returns), we find the average total 4-day return across all earnings announcements equals 0.2% (t = 4.1).

These results are similar to the evidence in Cohen et al. (2007), who find an average total return

²¹ This difference in mean abnormal returns across high spread and low spread subsamples is -0.50 percent (t = -0.9) for VOL, -0.76 percent (t = -1.3) for TURN, and -1.77 percent (t = -2.3) for ADISP.

in the 3-days around earnings announcements of 0.11 percent for a sample of more than 7,000 firms in the period 1989 - 2001, as well as the evidence in Ball and Kothari (1991), who find a significant positive total return around earnings announcements of approximately 0.2%.

3.3 Cross sectional regressions

Table 3 presents the results of cross-sectional regression analysis in which we estimate the association between each dispersion measure and size-adjusted abnormal returns around earnings announcements. We specify a dummy regression model that allows the nature and strength of this association to vary across six subsamples, in which we partition the two groups based on transaction costs (SPREAD), into three finer subsamples based on the percentage of institutional ownership (INST). This approach also enables us to directly control for the influence of firm size and the earnings surprise. The model is specified as follows:

$$\begin{aligned} \text{Ret}(\text{Before}, \text{After}, \text{Total})_i = & b_0 + \\ & b_1(\text{DM}_i * \text{LowSP}_i * \text{HighINST}_i) + b_2(\text{DM}_i * \text{LowSP}_i * \text{MedINST}_i) + b_3(\text{DM}_i * \text{LowSP}_i * \text{LowINST}_i) + \\ & b_4(\text{DM}_i * \text{HighSP}_i * \text{HighINST}_i) + b_5(\text{DM}_i * \text{HighSP}_i * \text{MedINST}_i) + b_6(\text{DM}_i * \text{HighSP}_i * \text{LowINST}_i) + \\ & b_7 \text{SIZE}_i + b_8 \text{SURPRISE}_i + \varepsilon_i. \end{aligned} \quad (1)$$

The variable labelled, DM, refers to each dispersion measure (VOL, TURN, or ADISP). The variable labelled, LowSP (HighSP) is an indicator variable that assumes a value of 1 for all earnings announcements in the low (high) spread subsample, and zero otherwise. Similarly, HighINST is an indicator variable that takes a value of one for announcements in the tercile with high institutional ownership (INST) and zero otherwise, while MedINST and LowINST identify the terciles of announcements with medium and low institutional ownership, respectively.

The coefficients of the first six terms in the regression model ($b_1 - b_6$) reflect the nature and strength of the association between the dispersion measure and abnormal returns around

earnings announcements, for each of the six subsamples of interest. Since each dispersion measure, firm size, and the earnings surprise have substantial outliers, we transform these variables into decile ranks each quarter. We then scale the decile-ranks to range from 0 to 1, to facilitate interpretation of the coefficients.²²

Table 3 provides the mean regression coefficients and t-statistics obtained from estimating 20 different quarterly cross-sectional regressions over the 5-year period from 2000 through 2004. The results for the 2-day abnormal return before earnings announcements (RetBefore) are presented in Panel A of Table 3.

First consider the coefficients of firm size and the earnings surprise in Panel A (b_7 and b_8 , respectively). Firm size is significantly negatively related to RetBefore, for the regression involving TURN. The earnings surprise is significantly positive in all three regressions in Panel A, showing that pre-announcement abnormal returns are strongly associated with the earnings information that is subsequently released on announcement day. This result may reflect the activity of informed investors just prior to the earnings release.

Next observe that among the coefficients, $b_1 - b_6$, only b_6 is significantly positive, and it is so for all three dispersion measures. This evidence indicates that, for the subsample with high transaction costs and low institutional holdings, stocks with higher values of the three dispersion measures tend to have a larger pre-announcement price increase. This evidence corroborates the results in Panel A of Table 2 that support our first and fourth hypotheses.

²² The same regression framework is used in Nagel (2005). Using raw measures (after log-transformation of the dispersion measures and firm size) does not change any of the conclusions. We have also included leverage in the model to test whether the option-effect discussed in Johnson (2004) can explain our findings. We find that the leverage variable is never statistically significant, and its inclusion does not change any of our conclusions. Similarly, our results are robust to inclusion of the market-to-book ratio and a momentum factor (based on past 12 month returns).

The economic significance of these results can be illustrated by considering the first column of Panel A, using volatility (VOL) as the dispersion measure. The coefficient of VOL for the subsample with high spreads and low institutional holdings (b_6) is 1.29 percent ($t = 2.6$). This result implies that moving from the lowest to the highest VOL-decile within this subsample increases the average 2-day return before earnings announcements by approximately 1.3 percent. Similar implications hold for the other dispersion measures (TURN and ADISP).

At the bottom of Panel A in Table 3 we provide formal tests of three hypotheses, which examine whether the association between each dispersion measure and pre-announcement abnormal returns is identical across stocks characterized by high versus low institutional ownership: (i) within the low spread subsample ($H_1: b_1 = b_3$), (ii) within the high spread subsample ($H_2: b_4 = b_6$), and (iii) across the low and high spread subsamples ($H_3: b_1 = b_6$). In Panel A, we do not reject the first hypothesis, while we reject the second hypothesis for two dispersion measures (VOL and TURN), and the third hypothesis for all three dispersion measures. The first test indicates that, within the low spread subsample, the relation between each dispersion measure and the pre-announcement abnormal return is not significantly different across stocks with low versus high institutional ownership. In contrast, the second and third tests indicate that this relation is significantly more positive for stocks with low institutional ownership than for stocks with high institutional ownership, within the high spread subsample, and across the low and high spread subsamples.

Next consider Panel B of Table 3, which presents the analogous results for abnormal returns in the 2 days after earnings announcements. In contrast to Panel A, Panel B contains estimates of $b_1 - b_6$ that are mostly negative and significant. Now the subsample with low institutional holdings and high spreads yields the largest negative coefficient (b_6), for all three

dispersion measures. This evidence indicates that stocks with higher values of each dispersion measure tend to have a larger post-announcement price decline for most subsamples, but this decline is largest for the subsample with high transaction costs and low institutional holdings.

Once again, we illustrate the economic significance of these results by considering the first column of Panel B, using volatility (VOL) as the dispersion measure. The coefficient of VOL for the subsample with high spreads and low institutional holdings (b_6) is -3.57 percent ($t = -7.2$). This result implies that moving from the lowest to the highest VOL-decile within this subsample decreases the average 2-day return after earnings announcements by approximately 3.6 percent. Similar implications hold for the other dispersion measures (TURN and ADISP).

The three tests provided at the bottom of the Panel B are statistically significant, for all three dispersion measures. These results indicate that, within and across both spread subsamples, the relation between the post-announcement abnormal return and each dispersion measure is more negative for stocks with low institutional ownership than for stocks with high institutional ownership. This evidence corroborates the results in Panel B of Table 2 that support our second and fourth hypotheses.

Finally, Panel C provides the analogous regression results for total returns around earnings announcements (RetTotal). Once again, these results are similar to those provided in Panel B, indicating that the abnormal price decline following the announcement tends to dominate the pre-announcement price run-up. Together, the regression results in all three Panels of Table 3 corroborate the results in Table 2 to support all four hypotheses.

4. Additional Tests

In the first part of this section, we investigate the two premises underlying our first hypothesis, regarding the price run-up before earnings announcements. We confirm that there is increased

speculative trading activity before the announcement, especially for stocks with high dispersion of opinions. In addition, for stocks that are also short sale constrained, we confirm that buyer-initiated order flow outweighs seller-initiated order flow.

In the second part of this section, we examine the two premises underlying our second and third hypotheses, regarding the price reversal after earnings announcements. We find a significant decrease in dispersion of opinions after the announcement, especially for overpriced stocks (with low institutional ownership and high dispersion before the announcement). We also show that, for such overpriced stocks that also have high trading costs, a larger decrease in dispersion of opinions is associated with a larger decrease in stock returns.

In the third part of this section we present several robustness tests. We show that our main results in Table 2 are robust to the choice of event window, the use of unadjusted returns or market-adjusted returns, and the exclusion of past winners or low-priced stocks. We also investigate whether our results hold up after taking into account the limits of arbitrage embodied in transaction costs and in stocks that are difficult to sell short.

The fourth part of this section provides our final set of robustness tests. Here we analyze a large sample of 213,180 Compustat earnings announcements over the extended period, 1990 through 2004. After accounting for noise due to measurement error in the Compustat earnings announcement dates, we find robust evidence of a significant pre-announcement run-up and post-announcement reversal for overpriced stocks, consistent with Miller's theory.

4.1 Increased speculative activity before earnings announcements

The hypothesis that stocks with high dispersion of opinions and low institutional ownership will experience a further price increase before earnings announcements rests on two premises:

- P1: Investors increase their speculative positions before earnings announcements, especially for stocks with high dispersion of opinions (He and Wang, 1995);

- P2: For stocks that are also short sale constrained, this increased speculative pressure leads to an increase in buyer-initiated order flow that outstrips seller-initiated order flow.

In this section we provide evidence supporting both premises.

We define pre-announcement abnormal volume as the natural log of the ratio of average daily turnover in the two days before the earnings announcement, scaled by the median daily turnover in the 45-day period from day -50 through day -6. Likewise, we define pre-announcement abnormal net initiated order flow as the difference between pre-announcement abnormal buyer-initiated order flow and seller-initiated order flow. Pre-announcement abnormal buyer- (seller-) initiated order flow is defined as average daily buyer- (seller-) initiated turnover in the two days before the announcement divided by the median daily buyer- (seller-) initiated order flow in the 45-day period from day -50 to day -6.

Panel A of Table 4 presents average pre-announcement abnormal volume for six different 3 x 3 partitioning schemes of stocks based on size-adjusted institutional ownership and each dispersion measure. The three 3 X 3 schemes on the left side are applied to the subsample with low spreads, while the three schemes on the right side are applied to the subsample with high spreads. Panel B of Table 4 presents average pre-announcement net initiated order flow using the same format. For each of the nine portfolios in each scheme, we report the mean abnormal volume or abnormal net initiated order flow averaged across the 20 quarters in the sample period.

First consider the results for the first premise (P1), regarding abnormal pre-announcement turnover, in Panel A of Table 4. Observe that, in every partitioning scheme, nearly all ratios are significantly larger than zero. This result indicates that share turnover in the 2 days before the announcement is consistently higher than the median daily turnover in the 45-day benchmark period. The mean difference t-test at the bottom of each column indicates that stocks with high

dispersion of opinions tend to have greater abnormal pre-announcement turnover than stocks with low dispersion. With the exception of ADISP for the high spread sample, these differences are all significant at the 10 percent level or better. These results support our first premise (P1), indicating that the intensified speculation before earnings announcements predicted by He and Wang's (1995) model is particularly strong for stocks with high dispersion of opinions.²³

Next consider the results for the second premise (P2), regarding abnormal pre-announcement net-initiated order flow, in Panel B of Table 4. It is noteworthy that all cells in all schemes are uniformly greater than zero, with several cells significantly greater than zero in most schemes. Also note that abnormal net initiated order flow tends to be higher for the high spread subsample, in the schemes on the right side of Panel B. For this high spread subsample, the mean abnormal net initiated order flow in the bottom left corner of each scheme ranges from 4.2% for ADISP ($t = 2.5$) to 6.7% for TURN ($t = 5.9$). This outcome indicates that, for these overpriced stocks, average abnormal buyer-initiated order flow is more than 4 percent higher than abnormal seller-initiated order flow in the two days before the announcement. This result is consistent with the pre-announcement price run-up for these overpriced stocks documented in Panel A of Tables 2 and 3. The mean difference t-test at the bottom of each scheme shows that, among stocks with low institutional ownership, mean abnormal net-initiated order flow is larger for high dispersion stocks than for low dispersion stocks. For the high spread sample, this difference is significant for VOL and TURN, and for the low spread sample this difference is significant for ADISP.

Overall, the results in Table 4 are consistent with the theories of Miller (1977) and He and Wang (1995), supporting our description of trading behavior in the period immediately before the earnings announcement. There is a significant increase in abnormal trading activity

²³ For this analysis, we winzorize the abnormal turnover and net initiated order flow measures at the 5 percent level. When we do not winzorize, the signs of the mean-difference t-tests remain the same but significance levels drop. Our conclusions do not change if we use a 1-day or 5-day pre-announcement window.

during this period, especially for stocks with high dispersion of opinions. Furthermore, for stocks that are also short sale constrained, this increased speculative trading results in a significant increase in buying pressure just before the announcement.²⁴

4.2 Changes in dispersion of opinions after earnings announcements

Our next set of tests examines the change in dispersion of opinions around the earnings announcement, to provide empirical evidence regarding the following premises that underly our second and third hypotheses regarding the price decline after the announcement.²⁵

- P3: The standard deviation across analyst forecasts is significantly lower after earnings announcements than before earnings announcements, especially for overpriced stocks;
- P4: For overpriced stocks, the negative stock returns following earnings announcements are significantly larger in magnitude for announcements that are associated with greater reductions in dispersion of opinions.

We test the third premise (P3) by following Bamber et al. (1997) to examine whether the information contained in quarterly earnings announcements decreases the cross-sectional standard deviation across analyst forecasts of annual earnings. As before, we begin by calculating the standard deviation across analyst forecasts over the 45-day period preceding the event day 0 (ADISP). In addition, we now compute the standard deviation across analyst forecasts over the 30-day period after the earnings announcement, from day +1 through day +30 (ADISP_Aft). Note that, in contrast to the analysis of the previous section, this test is based on forecasts of annual earnings rather than quarterly earnings.²⁶ Once again, our measures of

24 We have also examined the behavior of abnormal trading volume and net initiated order flow over the ten days before the earnings announcement, for subsamples based on dispersion of opinions and institutional ownership. Results are omitted for brevity, but uniformly corroborate the analysis in Table 4 to indicate relatively flat behavior in these measures until the two days before the announcement, and then a dramatic increase in these measures.

25 We thank the referee for the suggestion to include these additional tests.

26 For announcements of first, second, and third fiscal quarter earnings of fiscal year FY, we use analyst forecasts of annual earnings per share for the same fiscal year (FY). For announcements of fiscal fourth quarter earnings, we use analyst forecasts of annual earnings per share for the next fiscal year (FY+1). This procedure follows Bamber et al. (1997), who also use a 45-day window before the announcement and a 30-day window after the announcement.

analyst forecast dispersion (ADISP and ADISP_Aft) are estimated using unadjusted data from I/B/E/S, they are scaled by total assets per share, and they include the most recent forecast made by each analyst during the relevant period. Finally, we define the change in analyst forecast dispersion as the natural log of the ratio of the standard deviation after the announcement divided by the standard deviation before the announcement ($\Delta\text{ADISP} = \log(\text{ADISP_Aft} / \text{ADISP})$).²⁷

Panel A of Table 5 reports the results of this analysis. The first row in Panel A presents the results for all announcements in our sample where the standard deviation across analyst forecasts can be calculated for both the 45-day period before and the 30-day period after the announcement (i.e., with at least two analyst forecasts in the periods before and after the announcement). For 53 percent of these announcements, there is a decrease in analyst forecast dispersion after the announcement (the sign test is significant at the 1 percent level). The mean decrease in analyst forecast dispersion is 1.4 percent, which is significant at the .05 level. The median decrease in analyst dispersion is 2.6 percent, which is significant at the .001 level.²⁸

Since the precision of the standard deviation estimate increases with the number of analyst forecasts used, we also report the results for all announcements with at least five or ten analysts providing forecasts in the periods before and after the announcement. The second row of Panel A in Table 5 gives the results when we require at least five analyst forecasts in both periods. Analyst forecast dispersion decreases for 53.3 percent of these announcements, and the mean (median) decline in dispersion is a significant 4.2 (2.5) percent. The third row of Panel A reports the results when we require at least 10 analyst forecasts in each period. The mean (median) decrease in dispersion for this sample is 5.5 (2.4) percent, and analyst dispersion

27 This computation provides a measure of the percent change in analyst forecast dispersion. However, we lose 214 observations where the standard deviation before the announcement is 0, and 201 observations where the standard deviation after the announcement is 0. We include these observations in the sign tests in Table 5, Panel A.

28 Using the signed rank test each median in Panel A of Table 5 is significantly different from zero at the .001 level.

decreases for 53.9 percent of the earnings announcements. In summary, the first three rows of Panel A in Table 5 are consistent with Brown and Han (1992) and Bamber et al. (1997), showing a significant decrease in analyst forecast dispersion after quarterly earnings announcements.

Finally, in the fourth row of Panel A in Table 5, we provide the analogous results for the subsample of earnings announcements made by firms with high dispersion of opinions and low institutional ownership. For this group of overpriced stocks, the mean (median) decline in analyst forecast dispersion is almost 26 (13) percent, and analyst forecast dispersion decreases for more than 64 percent of these earnings announcements. Together, the results in Panel A support our third premise (P3), indicating a significant decline in dispersion of opinions following earnings announcements, especially for stocks that tend to be overpriced before the announcement.

Next we investigate the fourth premise (P4) that, for overpriced stocks, returns decline more following earnings announcements when there is a greater reduction in dispersion of opinions. We first split our sample into the group of overvalued stocks versus all other stocks. We define overvalued stocks each quarter as those in the lowest tercile based on size-adjusted institutional ownership and in the highest tercile based on each measure of dispersion of opinions, during the 45-day period before the earnings announcements. For these stocks, the dummy variable *Overval* is assigned a value of one. For all other stocks *Overval* equals zero. In addition, we further divide these overpriced stocks into those with high versus low transaction costs. The variable labelled, LowSP (HighSP) is an indicator variable that assumes a value of 1 for all earnings announcements in the low spread (high spread) subsample, and zero otherwise.

We then specify a regression model in which the return in the two days after the earnings announcement (*RetAfter*) depends upon the change in each dispersion measure around the announcement (ΔDM). This model uses dummy variable interaction terms that enable the

association between RetAfter and ΔDM to vary across three subsamples of stocks: not overvalued (b_1), overvalued with low spreads (b_2), and overvalued with high spreads (b_3). Our regression model also controls for the influence of firm size and the earnings surprise, as follows:

$$\text{RetAfter}_i = b_0 + b_1(\Delta DM_i * (1 - \text{Overval}_i)) + b_2(\Delta DM_i * \text{Overval}_i * \text{LowSp}_i) + b_3(\Delta DM_i * \text{Overval}_i * \text{HighSp}_i) + b_4 \text{SIZE}_i + b_5 \text{SURPRISE}_i + \varepsilon_i. \quad (2)$$

As in our previous regression analysis, because of substantial outliers in each proxy for dispersion of opinions, we first transform these variables into decile ranks each quarter and scale the decile-ranks to range from 0 to 1. The variable labelled, ΔDM , then refers to the change in the decile rank of each measure for dispersion of opinions (ΔVOL , ΔTURNO , or ΔADISP) from the period before the announcement to the period after the announcement.²⁹

Panel B of Table 5 provides the mean regression coefficients and t-statistics obtained from estimating 20 different quarterly cross-sectional regressions over the 5-year period from 2000 through 2004. First consider the relation between the return after the announcement and the change in dispersion, for the subsample of stocks that are not overvalued (b_1). This relation depends upon which proxy is used for dispersion of opinions. The coefficient, b_1 , is significantly negative for the model using the change in volatility (ΔVOL), significantly positive for the regression using the change in turnover (ΔTURNO), and not significantly different from zero for the model using the change in analyst dispersion (ΔADISP).

Next consider the relation between the return after the announcement and the change in dispersion for the subsamples of overpriced stocks with low spreads (b_2) and with high spreads (b_3), respectively. The coefficient, b_2 , is somewhat larger than b_1 for all three dispersion

²⁹ Volatility and turnover before the earnings announcement are calculated over the 45 trading days from day -50 to day -6, prior to the earnings announcement (see section 2). Volatility and turnover after the earnings announcement are calculated over the 45 trading days from day +5 to day +50, after the announcement (day 0). The change in ADISP is based on the 19,611 observations in the first row of Panel A in Table 5.

measures, but it is never significantly different from zero. In contrast, for all three dispersion measures, b_3 is much greater in magnitude than b_1 , and is significantly greater than zero. These results indicate that, for the subsample of overpriced stocks with high trading costs, a larger decline in dispersion of opinions is associated with a larger decline in stock returns after the announcement. This result supports our fourth premise (P4).

The last three rows of Panel B in Table 5 formally test three hypotheses associated with this fourth premise, regarding the association between the return after the announcement and the change in dispersion, as follows: $H_1: b_1 = b_2$; $H_2: b_1 = b_3$; and $H_3: b_2 = b_3$. The first test fails to reject H_1 , indicating no significant difference in this relation across the subsample of stocks that are not overvalued (b_1) and the subsample of overvalued stocks with low spreads (b_2). In contrast, we reject H_2 for all three dispersion measures, indicating that this association is significantly stronger for overvalued stocks with high transaction costs than for stocks that are not overvalued. Finally, the three t-statistics associated with H_3 are all positive, but not statistically significant at the .05 level. This result indicates that this association tends to be stronger for overvalued stocks with high spreads than it is for overvalued stocks with low spreads, although this difference is not statistically significant.

Together, the results in Table 5 support our description of trading behavior in the period immediately after the earnings announcement. There is a significant decline in dispersion of opinions during this period, especially for overpriced stocks (with low institutional ownership and high dispersion of opinions). Furthermore, for the finer subsample of overpriced stocks with high spreads, a greater decline in dispersion of opinions after the announcement is associated with a greater decline in stock returns.

4.3 Alternative event windows, return measures, no low-priced stocks, and limits to arbitrage

This section presents several tests regarding the robustness of our main results in Table 2. For each test, we report the average abnormal returns in the days before versus after earnings announcements in Panels A and B of Table 6, respectively. Once again, we analyze the low and high spread samples separately. Then, within each category of institutional ownership, we analyze the performance of zero-cost portfolios that are long the tercile of stocks with the highest values of each dispersion measure and short the tercile with the lowest values. For brevity, we only present results for the lowest and highest terciles based on institutional ownership. The base-case provided in the first row reproduces the results from Table 2, using size-adjusted abnormal returns over the two days before and after the announcement. In each subsequent test we change only one aspect of the analysis, to facilitate comparison with the base case.

The second row of tests provided in Panels A and B of Table 6 analyzes one-day windows, and obtains similar results to the base case with two-day windows, although the one-day abnormal returns are somewhat smaller in absolute magnitude. Before the announcement (in Panel A), terciles with high values for the dispersion measures significantly outperform terciles with low values over one-day windows, when spreads are high and institutional ownership is low. After the announcement (in Panel B), this result reverses so that terciles with high values of the dispersion measures underperform terciles with low values when institutional ownership is low. Similar to the base case, this post-announcement price reversal appears in both the low and high spread subsamples. The third row in Panels A and B analyzes five-day windows, and reveals signs and significance levels that are also similar to the base case, although the five-day abnormal returns on these zero-cost portfolios now tend to be larger in absolute magnitude.

Next, the fourth and fifth sets of tests in Table 6 use unadjusted returns and market-adjusted returns, respectively. These measures produce results that are robust compared to the base case using size-adjusted abnormal returns. Moreover, the sixth test in Table 6 similarly reveals robust results when we exclude stocks with an average price of \$5 or lower during the pre-announcement period (from day -50 through day -6). In the seventh test, we exclude the 10 percent of stocks with the highest raw return in the preceding 12 months. The results in Table 6 do not materially change with this exclusion, indicating that our results are distinct from the pattern documented in Aboody et al. (2006).

The eighth set of tests presented in Table 6 investigates whether our results hold up after accounting for the limits to arbitrage embodied in transaction costs. We adjust for transaction costs in RetBefore (RetAfter) from the base case, by accounting for the percentage effective half spread averaged over the two days before (after) each earnings announcement. More specifically, we adjust RetBefore by subtracting twice the effective half spread from the return on long positions, and by adding the same amount to the return on short positions. In a similar fashion, for RetAfter we add twice the effective half spread to the return on long positions, and subtract the same amount from the return on short positions.³⁰

The results in Panel A of Table 6 show that, after accounting for transaction costs, abnormal returns in the 2 days before earnings announcements are never significant, for either the low spread or the high spread subsample. Thus, after transaction costs, stocks with high dispersion measures do not significantly outperform stocks with low dispersion measures before the announcement. In contrast Panel B reveals that, after accounting for transaction costs, the

30 Since our hypothesis is that, after the announcement, stocks with high dispersion measures underperform stocks with low dispersion measures, a relevant trading strategy would involve shorting stocks with high dispersion measures and going long stocks with low dispersion measures. Note that these positions are the opposite from those assumed in Table 2 and Table 6.

negative returns in the two days after the announcement remain significantly different from zero for stocks with low institutional ownership, for both the low spread and high spread subsamples.

Finally, the last test in Table 6 accounts for further limits to arbitrage involving short sale constraints, beyond those embodied in low institutional ownership. Following Asquith et al. (2005) we exclude stocks in the decile with the highest short interest ratio during the month prior to the earnings announcement.³¹ The last row of Panel A shows that, when we exclude these severely short sale-constrained stocks, there is still evidence of a significant pre-announcement price run-up for the high spread subsample. Similarly, the last row in Panel B indicates that the post-announcement price decline for overpriced stocks remains statistically and economically significant for the high spread subsample, when we omit stocks with high short interest.

In summary, the empirical support for our four hypotheses is not sensitive to variations in research methodology that use alternative event windows or different measures of stock returns, or that exclude past winners, low priced stocks, or stocks that are difficult to short sell. However, accounting for transaction costs eliminates the positive abnormal return before the announcement and reduces the absolute value of the negative abnormal return after the announcement.

4.4 Large sample evidence

Our final set of robustness tests analyzes an extended sample of 213,180 earnings announcements over the period, 1990-2004, taken from Compustat. The use of Compustat earnings announcement dates allows us to expand the sample far beyond the coverage of WSJ.com. However, Compustat earnings announcement dates suffer from two sources of measurement error that obscure the correct alignment of event day 0, and thereby introduce noise into our measures of the return before and after the announcement (RetBefore and RetAfter).

³¹ Asquith et al. (2005) argue that stocks are severely short-sale constrained when there is both strong demand to sell short (proxied by high short interest) and a limited supply of shares to borrow (proxied by low institutional ownership).

First, the Compustat earnings announcement date is incorrect (i.e., different from the actual announcement date) for a substantial portion of all announcements made before 1998.³² Second, as discussed previously, even when the Compustat announcement date is correct, Compustat does not record whether the earnings information was released after the market's close. Thus, for all announcements made after trading hours, a correct Compustat announcement date is one day before the market can respond to the earnings release. Such announcements constitute more than 40 percent of our sample from WSJ.com.³³

These two sources of measurement error inhibit our ability to accurately measure stock returns before versus after the earnings release, as required to ensure accurate tests of our first two hypotheses. Thus, in our analysis of RetBefore and RetAfter for this expanded sample, we make two concessions that ensure a conservative approach for testing H1 and H2. First, we exclude all announcements made before 1998. This exclusion leaves a sample of 110,934 Compustat earnings announcements between 1998 and 2004, with which to analyze RetBefore and RetAfter. Second, we omit the Compustat earnings announcement date (day 0) from the computation of RetBefore and RetAfter. That is, we measure RetBefore over days -2 and -1 relative to the Compustat announcement date (day 0), and we measure RetAfter over days +1 and +2 relative to day 0. These two concessions represent a conservative approach that should make it more difficult for this expanded sample to reveal any truly significant abnormal returns before or after the Compustat earnings announcement date.

32 The Compustat earnings announcement date is accurate for more than 98 percent of all announcements since 2000, 96 percent of announcements for 1999, and 93 percent for 1998. However, this accuracy rate declines to 80 percent for 1997, 75 percent for 1996, and then declines below 70 percent before 1996 (see Berkman and Truong, 2006, and DellaVigna and Pollett, 2005).

33 The need to accurately measure RetBefore and RetAfter provides the rationale behind our focus on the smaller sample of earnings announcements from WSJ.com, for which we have the precise time of the earnings release.

In contrast, these two sources of measurement error are less critical to the accurate measurement of total stock returns in the four days around earnings announcements. Thus, in our analysis of abnormal total returns in the 4-day period around the earnings release, we use all 213,180 Compustat earnings announcements from 1990 through 2004, and we measure RetTotal as before, over days -2 through +1.

4.4.1 Large sample evidence: RetBefore and RetAfter

The large sample evidence for abnormal returns in the two days before versus the two days after earnings announcements is provided in Panels A and B of Table 7. First, consider the pre-announcement abnormal returns in Panel A of Table 7. As in Table 2, no cell in any 3 X 3 scheme on the left side of Panel A is significantly different from zero. Thus, there is no evidence of a pre-announcement price run-up for the low spread subsample. In contrast the high spread subsample yields 3 X 3 schemes on the right side of Panel A that each contains a number of significantly positive abnormal returns. Furthermore, firms with high values of the dispersion measures tend to outperform stocks with low values in the days before earnings announcements. In particular, the mean difference t-statistics provided in Panel A of Table 7 are positive for all three dispersion measures, and are statistically significant for VOL and TURN. Finally, the pre-announcement 2-day return in the bottom left cell of each 3 X 3 scheme on the right side of Panel A is significantly positive at the .05 level or better, for all three dispersion measures. Therefore, despite the weaker power of these tests due to inaccuracy of the Compustat earnings announcement dates and exclusion of event day 0, we still find a significant pre-announcement price run-up for the subsample with high spreads and low institutional holdings, for all three dispersion measures.

Panel B of Table 7 provides analogous results for the 2-day post-announcement abnormal returns. Once again, consistent with the results in Table 2, the three schemes on the right side of Panel B reveal that the high spread subsample contains stocks with the largest negative abnormal returns after the announcement. Furthermore, the mean difference t-test at the bottom of each column indicates that stocks with high dispersion measures significantly underperform stocks with low dispersion measures, especially among stocks with low institutional ownership and high spreads (i.e., the bottom left cell of each 3 X 3 scheme on the right side of Panel B). Thus, the previous empirical support for hypotheses H1 and H2 in Panels A and B of Table 2 is corroborated when we examine this expanded sample of announcements.

4.4.2 Large sample evidence: RetTotal

The large sample evidence for the total return (RetTotal) in the 4-day period around the earnings announcement (day -2 through day +1) is provided in Table 8. Note that we are unable to obtain daily measures of the effective spread for this expanded sample period. We therefore use the Amihud (2002) illiquidity measure to proxy for trading costs in this analysis.³⁴

Consistent with the results in Panel C of Table 2, the last row of each 3 X 3 stratification scheme in Table 8 is dominated by net price declines that are significant for stocks with low institutional ownership. Yet again, the bottom left cell is the largest negative abnormal return in each scheme of Table 8. These negative abnormal returns are also economically significant, especially for the high spread subsample, ranging from -1.50 percent for ADISP (t-value = -7.9) to -1.69 percent for TURN (t-value = -7.3). For the low spread subsample, the analogous cell in each scheme has a smaller absolute magnitude and a lower level of statistical significance,

³⁴ The Amihud (2002) illiquidity measure is defined as the absolute daily return divided by daily trading volume, averaged over the 45 trading days preceding each event (from day -50 through day -6). For a random sample of 300 firms in the period 1993 through 2005, Hasbrouck (2006) shows that the cross-sectional correlation between the Amihud illiquidity measure and the effective relative spread is 0.94.

ranging from -0.86 (t-value = -3.5) for ADISP to -1.46 for TURN (t-value = -5.3). Finally, as in Panel C of Table 2, the mean difference t-test at the bottom of each column in Table 8 shows that stocks with high values of the dispersion measures have smaller (larger negative) total earnings announcement returns than stocks with low values, especially when combined with low institutional ownership and high trading costs.

5. Summary and conclusions.

Miller (1977) shows that stocks may be overpriced if they are subject to high dispersion of opinions and binding short sale constraints. We analyze stock returns around earnings announcements as a natural experiment to test this overpricing hypothesis. Using event study methodology, we examine whether prices rise or fall around earnings announcements for stocks with high values of three dispersion measures - turnover, volatility or analyst forecast dispersion. In our tests we also explore how limits to arbitrage embodied in low institutional ownership and high transaction costs influence this overpricing behavior.

Based on the theories of Miller (1977) and He and Wang (1995), we argue that stocks which are already overpriced should have a further price increase just before an earnings announcement, if optimistic speculators temporarily increase their positions to bet on the outcome of the announcement, while short sale constraints prevent pessimistic speculators from doing the same. After the announcement, when optimistic investors unwind their temporarily intensified speculative positions, the pre-announcement price increase should naturally be reversed. In addition, the new earnings information should reduce dispersion of opinions and reveal that investors in these stocks were too optimistic, leading to a further price decrease. Combining these effects, we hypothesize that stocks which are already prone to overpricing

should have a temporary additional price run-up before an earnings announcement that is outweighed by a larger price correction following the announcement.

We empirically test this hypothesis using a wide array of analyses of stock returns in the days around earnings announcements. These tests provide evidence that uniformly supports the hypothesis. In particular, we find that stocks which are likely to be overpriced already - with high turnover, volatility or analyst forecast dispersion combined with low institutional ownership and high transaction costs - experience a further price increase of around 1 percent in the two days before the announcement. Then, in the two days after the announcement, these same stocks generate negative abnormal returns of around 3 percent.

We also provide evidence to support the following premises that underlie our hypothesis. First, speculative trading activity increases just before earnings announcements, especially for stocks with high dispersion of opinions. Second, for stocks that are also subject to the binding short sale constraints embodied in low institutional ownership, we find net buying outstrips net selling in the days before the announcements. Third, we show that dispersion across analyst forecasts declines significantly after earnings announcements, especially for the subsample of overpriced stocks (with high dispersion of opinions and low institutional ownership). Finally, for the finer subsample that also has high transaction costs, we find that a larger decline in dispersion around the announcement is associated with a larger decline in stock returns.

This study contributes to the growing literature on equity market overpricing in a number of ways. First, we provide evidence that stocks which are already overpriced diverge further away from fundamental value in the days before an earnings announcement. Then, when uncertainty is resolved after the earnings release, we show that these same stocks experience a reversal that dominates the pre-announcement price run-up, to converge further toward

fundamental value. Using event study methodology, we thereby support the finding in Nagel (2005) that cross-sectional return predictability based on the three dispersion measures takes the form of overpricing, and is concentrated among stocks with low institutional ownership. We further extend this literature by showing that these divergent price movements before and after earnings announcements are exacerbated for stocks with high transaction costs. Together, this evidence augments the growing body of work that establishes a relation between equity mispricing and the limits to arbitrage embodied in low institutional ownership and high liquidity costs.

Appendix A: Sample Selection.

We begin with a sample of 50,110 quarterly earnings announcements from WSJ.com, made by all stocks in the Russell 3000 index as of the end of 2004. The sample period starts in the first quarter of 2000, when WSJ.com first reports earnings announcement dates and times for 2,115 of these Russell 3000 stocks. The sample period ends in the fourth quarter of 2004, when WSJ.com reports earnings announcement information for 2,882 firms in the Russell 3000 index.

We delete 9,390 announcements because WSJ.com has no time entry, leaving 40,720 observations. Next, we exclude multiple observations for the same quarterly earnings announcement, retaining the first observation in each case. This screen leaves 39,064 earnings announcements. Finally, we only keep events with identical announcement dates reported in both WSJ.com and Compustat. These requirements reduce our final sample to 38,031 observations. In some of our tests we use IBES data. For these tests we also require that the earnings announcement dates reported in Compustat and I/B/E/S are no more than 2 days apart.

Appendix B: Construction of I/B/E/S Variables

We use unadjusted I/B/E/S data on actual earnings and analyst earnings forecasts, to correct for the problem of rounding error in the regular, split-adjusted I/B/E/S data (for a discussion of this problem, see Boehme et al., 2006, Diether et al., 2002, and Payne and Thomas, 2003). We drop all analyst forecasts that appear in the I/B/E/S exclusions file, since they are deemed stale by I/B/E/S. We base our measures of SURPRISE and ADISP on the most recent forecast made by each analyst covering the stock, within the 45 calendar days prior to every quarterly earnings announcement. These data include new forecasts made by analysts that begin coverage of a firm during this period, or revisions of earlier forecasts made by analysts that update their coverage (see Johnson, 2004).

Appendix C: Data Collection for Institutional Holdings

Following other researchers, we address problems and inconsistencies in the quarterly 13F filings data from Thomson Financial Institutional Holdings (see Asquith et al., 2005, Gompers and Metrick, 2001, Han and Wang, 2006, and Nagel, 2005). For example, one problem arises due to occasional missing or inaccurate data in the 13F filings on the number of shares outstanding at the end of the filing quarter. We resolve this problem by replacing the end-of-quarter shares outstanding from the Thomson Financial Institutional Holdings database with the analogous variable from CRSP. This value is then used to construct our measure of the percent of outstanding shares held by institutions at the end of each quarter.

Another potential problem has to do with stock splits, which can cause inaccuracies in the institutional holdings data in at least two ways. First, institutions may simply report split-adjusted holdings and trading records incorrectly during a quarter when there is a split. Second, an institution may submit a late 13F filing after the 45-day deadline imposed by the SEC following the end of a quarter, when a stock split occurred during this 45-day grace period. In this situation, CDA Spectrum adjusted the institutional holdings record even though it should not have been adjusted for the record date. In such cases there are inaccuracies due to the failure of CDA Spectrum to properly synchronize the institutional holdings data with the split-adjustment.

We find the magnitude of these potential problems is small for our sample period. We use CRSP data to document all firm-quarters from 1990 through 2004 when a stock split occurred in the dataset on 13F filings (this includes all quarters that experience changes in shares outstanding due to stock splits or stock dividends). We find that 2.5 percent of all firm-quarters in our dataset occurred during quarters with stock splits.

This evidence suggests that the potential problem associated with stock splits and late 13F filings is likely to have a minimal impact on our results. Still, we have followed several procedures to investigate the impact of this potential problem. First, we have omitted from our analysis all observations during firm-quarters when a stock split or stock dividend occurs. Second, we have dropped all firm-quarters when a split occurred during the subsequent quarter. Third, we have dropped all firm-quarters when either a stock split occurs during the quarter of record, or during the subsequent quarter. Fourth, we have replaced all quarterly observations with stock splits in either the same quarter, or the subsequent quarter, or both, with the lagged value of the percent of institutional ownership for that firm. All these procedures lead to robust results.

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Table 1. Summary Statistics and Correlations across Variables

The sample includes 38,031 earnings announcements from the earnings calendar on WSJ.com, from 2000 through 2004. The sample is limited to stocks in the 2004 Russell 3000 index. Event day 0 is the announcement date if it occurs before the close of trading, and one trading day later if it occurs after the close. TURN is average daily turnover during the pre-announcement period covering the 45 day period over days (-50,-6), prior to the event day (0), where daily turnover is the number of shares traded per day divided by total shares outstanding (times 1000). Volatility (VOL) is the standard deviation across daily returns over days (-50, -6). Analyst forecast dispersion (ADISP) is the standard deviation across all analyst forecasts made within 45 days prior to the announcement, scaled by total assets per share. The percent of institutional holdings (INST) is computed from 13F Filings as aggregate shares held by institutions as a percent of total shares outstanding. The daily percentage effective half spread is the absolute difference between the trade price and the quote midpoint, as a percent of the quote midpoint in effect at the time of the trade, averaged across all trades during the day. SPREAD is the daily percentage effective half spread averaged over days (-5,-3). Firm size (SIZE) is market capitalization. Our size-adjusted abnormal return measures are calculated as the actual return minus the return on the corresponding size-decile portfolio over the same period. RetBefore is the cumulative abnormal return over days -2 and -1. RetAfter is the cumulative abnormal return over days 0 and +1. RetTotal is the total abnormal return over days -2 through +1. All descriptive statistics are calculated by computing the cross-sectional means and correlations for each quarter, and then averaging these means and correlations across the 20 quarters in the sample period. The standard deviation across the 20 quarterly correlations is used to construct the t-test for each statistic in Panel B.

Panel A: Descriptive Statistics

	TURN	VOL	ADISP	INST	SPREAD	log SIZE	RetBefore	RetAfter	RetTotal
MEAN	7.78	2.96	.0019	.55	.0019	13.87	.17	-.15	.02
STD	8.97	1.71	.0048	.28	.0023	1.57	4.83	9.11	9.96
N	1777	1777	950	1777	1724	1739	1777	1777	1777

Panel B: Correlations

TURN	1.00								
VOL	.46 **	1.00							
ADISP	.14 **	.29 **	1.00						
INST	.19 **	-.18 **	-.07 **	1.00					
Spread	-.13 **	.44 **	.22 **	-.40 **	1.00				
log SIZE	.06 *	-.34 **	-.12 **	.23 **	-.59 **	1.00			
RetBefore	.00	.06 **	.03 *	-.04 **	.08 **	-.04 **	1.00		
RetAfter	-.06 **	-.07 **	-.05 **	.04 **	-.01	.00	-.08 **	1.00	
RetTotal	-.05 **	-.04 *	-.03 *	.02 *	.03 *	-.02 *	.40 **	.88 **	1.00

* indicates statistical significance at the .05 level; and ** indicates significance at the .01 level.

Table 2. Abnormal Returns around Earnings Announcements: Portfolio Approach

The three Panels in this table report size-adjusted abnormal returns for six 3 X 3 schemes of double-sorted portfolios over the two days before, the two days after, and the four days around earnings announcements. For every quarter, we first partition the entire sample of earnings announcements into halves, according to each firm's effective half spread as a percent of the quote midpoint, averaged over days (-5,-3) prior to the announcement. The three 3 X 3 schemes on the left side of each Panel are applied to the sample with low spreads, while the three 3 X 3 schemes on the right are applied to the sample with high spreads. In each 3 X 3 partitioning scheme, we independently double-sort the sample of announcements every quarter into terciles, based on the firm's size-adjusted percent of institutional ownership and each of the three dispersion measures. For each of the nine portfolios in every 3 X 3 scheme, we report size-adjusted returns averaged across the 20 quarters in the sample period. At the bottom of each column in every 3 X 3 scheme we provide the mean-difference t-test across portfolios with high versus low values of that dispersion measure, conditional on size-adjusted institutional ownership and the effective half spread. All variables are defined in Table 1.

Panel A: Size-adjusted Abnormal Return in the 2 days before Earnings Announcements

Dispersion Measure		Low Spreads			High Spreads		
		Size-Adjusted INST			Size-Adjusted INST		
		Low	Medium	High	Low	Medium	High
VOL	Low	-0.03	-0.03	-0.07	0.24 *	0.12	0.17
	Med	-0.03	-0.13	0.04	0.53 *	0.32	0.04
	High	-0.10	-0.04	0.07	1.24 **	0.73	0.41
High-Low		-0.07	0.00	0.14	1.00	0.61	0.24
T-stat		-0.2	0.0	0.5	2.5 **	1.7	1.0
TURN	Low	0.01	-0.09	-0.10	0.52 *	0.19	0.14
	Med	-0.10	-0.03	0.01	0.55	0.40	-0.01
	High	-0.11	-0.14	0.09	1.38 **	0.60	0.38
High-Low		-0.13	-0.05	0.19	0.86	0.41	0.24
T-stat		-0.4	-0.2	0.8	2.7 **	1.0	1.0
ADISP	Low	-0.15	0.04	0.11	0.21	0.14	0.12
	Med	-0.01	0.10	0.26	0.62	-0.15	-0.33
	High	-0.17	-0.02	0.06	1.05 *	0.58	0.40
High-Low		-0.02	-0.07	-0.05	0.84	0.45	0.28
T-stat		0.1	-0.6	-0.3	2.1 *	1.2	0.8

* indicates statistical significance at the .05 level, and ** indicates significance at the .01 level.

Table 2, continued

Panel B: Size-adjusted Abnormal Return in the 2 days after Earnings Announcements

Dispersion Measure		Low Spreads			High Spreads		
		Size-Adjusted INST			Size-Adjusted INST		
		Low	Medium	High	Low	Medium	High
VOL	Low	0.28	0.26	0.44	0.30 *	0.34 *	0.35
	Med	0.38	0.26	0.74 *	-0.39	0.32	-0.29
	High	-0.88 *	0.29	0.02	-2.72 **	-0.46	-0.48
High-Low		-1.16	0.03	-0.42	-3.02	-0.80	-0.82
T-stat		-2.7 **	0.1	-1.7	-7.5 **	-2.1 *	-1.3
TURN	Low	0.24	0.31	0.29	0.18	0.65 *	0.55 *
	Med	0.30	0.16	0.78 *	-1.26 *	0.13	-0.12
	High	-1.21 *	0.39	0.13	-3.46 **	-0.54	-0.47
High-Low		-1.45	0.08	-0.16	-3.64	-1.19	-1.03
T-stat		-2.9 **	0.2	-0.9	-6.1 **	-2.8 **	-3.1 **
ADISP	Low	0.41 *	0.47	0.27	0.54	0.26	-0.52
	Med	0.28	0.54 *	0.04	0.13	0.36	0.28
	High	-0.69 *	-0.18	0.63 *	-3.68 **	-0.71	-1.22
High-Low		-1.11	-0.65	0.36	-4.22	-0.97	-0.70
T-stat		-2.6 **	-2.4 *	1.1	-4.2 **	-1.8	-0.8

Panel C: Size-adjusted Abnormal Return in the 4 days around Earnings Announcements

Dispersion Measure		Low Spreads			High Spreads		
		Size-Adjusted INST			Size-Adjusted INST		
		Low	Medium	High	Low	Medium	High
VOL	Low	0.25	0.22	0.38	0.55 *	0.46 *	0.52 *
	Med	0.35	0.12	0.78	0.14	0.64	-0.25
	High	-0.98	0.25	0.10	-1.48 **	0.27	-0.06
High-Low		-1.22	0.03	-0.28	-2.03	-0.19	-0.58
T-stat		-2.0	0.1	-0.8	-3.5 **	-0.3	-0.7
TURN	Low	0.25	0.22	0.19	0.70 *	0.84 *	0.70 *
	Med	0.20	0.13	0.79 *	-0.72	0.53	-0.13
	High	-1.32 *	0.25	0.22	-2.08 **	0.06	-0.09
High-Low		-1.57	0.03	0.03	-2.78	-0.78	-0.79
T-stat		-2.7 **	0.1	0.1	-4.1 **	-1.1	-1.8
ADISP	Low	0.26	0.52	0.38	0.74	0.39	-0.41
	Med	0.27	0.64 *	0.31	0.75	0.21	-0.05
	High	-0.86	-0.20	0.69 *	-2.63 **	-0.13	-0.83
High-Low		-1.13	-0.72	0.31	-3.37	-0.52	-0.42
T-stat		-2.3 *	-2.5 **	0.8	-3.9 **	-0.8	-0.4

Table 3. Abnormal Returns around Earnings Announcements: Regression Approach

This table presents mean coefficients and t-statistics across 20 quarterly cross-sectional regressions between 2000 and 2004. The dependent variable is RetBefore, RetAfter, or RetTotal. 'DM' refers to each dispersion measure (VOL, TURN or ADISP). Low(High)SP is an indicator variable assigned a value of 1 for all earnings announcements in the subsample with low (high) effective half spreads, and zero otherwise. Low(Med or High)INST is an indicator variable that takes a value of one for all announcements in the subsample with low (medium or high) institutional ownership, and zero otherwise. These variables and firm size are defined in Table 1. The earnings surprise is the difference between actual earnings released on day 0 and the most recent analyst forecast prior to day 0, scaled by the closing price on day -10. Each quarter we transform the explanatory variables, DM, Size, and Surprise, into decile ranks and scale them to range from 0 to 1. The coefficients, $b_1 - b_6$, reflect the association between abnormal returns and every dispersion measure, for each of the six subsamples partitioned according to their effective half spread and institutional ownership, while controlling for firm size and the earnings surprise.

Panel A. Dependent Variable: 2-Day Abnormal Return before Earnings Announcements

		VOL	TURN	ADISP
Intercept	a	-0.30	-0.01	-0.26
T-stat		-1.9	-0.1	-2.1 *
DM*LowSP*HighINST	b_1	0.05	-0.07	-0.09
T-stat		0.1	-0.2	-0.6
DM*LowSP*MedINST	b_2	0.25	0.05	-0.08
T-stat		0.6	0.2	-0.5
DM*LowSP*LowINST	b_3	-0.34	-0.54	-0.22
T-stat		-0.5	-0.9	-0.6
DM*HighSP*HighINST	b_4	0.12	-0.08	0.01
T-stat		0.3	-0.3	0.0
DM*HighSP*MedINST	b_5	0.51	0.24	0.57
T-stat		1.1	0.6	1.7
DM*HighSP*LowINST	b_6	1.29	1.13	0.73
T-stat		2.6 **	2.1 *	2.0 *
Size	b_7	-0.15	-0.39	0.07
T-stat		-1.2	-3.4 **	0.3
Surprise	b_8	0.65	0.65	0.57
T-stat		6.3 **	6.4 **	4.6 **
Low Spreads Low - High INST	$H_1: b_3 - b_1 = 0$	-0.38 -0.8	-0.47 -1.0	-0.13 -0.5
High Spreads Low - High INST	$H_2: b_6 - b_4 = 0$	1.17 4.9 **	1.21 3.5 **	0.72 1.9
High vs Low Spreads Low - High INST	$H_3: b_6 - b_1 = 0$	1.24 3.8 **	1.20 3.0 **	0.82 2.2 *
		Avg N = 1482 Avg R ² = .03	Avg N = 1482 Avg R ² = .02	Avg N = 980 Avg R ² = .02

* indicates significance at the .05 level, and ** indicates significance at the .01 level.

Table 3, continued

Panel B. Dependent Variable: 2-Day Abnormal Return after Earnings Announcements

		VOL	TURN	ADISP
Intercept	a	-1.49	-2.08	-2.18
T-stat		-5.0 **	-7.0 **	-6.9 **
DM*LowSP*HighINST	b ₁	-1.10	-0.56	-0.23
T-stat		-2.5 *	-2.3 *	-0.9
DM*LowSP*MedINST	b ₂	-1.59	-1.06	-0.31
T-stat		-3.1 **	-3.2 **	-1.0
DM*LowSP*LowINST	b ₃	-2.89	-2.39	-1.46
T-stat		-3.6 **	-3.9 **	-3.2 **
DM*HighSP*HighINST	b ₄	-2.25	-1.89	-1.26
T-stat		-3.3 **	-3.4 **	-1.5
DM*HighSP*MedINST	b ₅	-1.77	-1.48	-0.64
T-stat		-3.5 **	-3.3 **	-1.6
DM*HighSP*LowINST	b ₆	-3.57	-4.85	-2.91
T-stat		-7.2 **	-9.0 **	-4.6 **
Size	b ₇	-0.77	-0.06	-0.01
T-stat		-3.0 **	-0.2	0.0
Surprise	b ₈	5.82	5.86	5.31
T-stat		19.5 **	19.4 **	15.3 **
Low Spreads Low - High INST	H ₁ : b ₃ - b ₁ = 0	-1.79 -3.0 **	-1.83 -3.8 **	-1.23 -2.6 **
High Spreads Low - High INST	H ₂ : b ₆ - b ₄ = 0	-1.31 -2.8 **	-2.95 -5.5 **	-1.65 -2.9 **
High vs Low Spreads Low - High INST	H ₃ : b ₆ - b ₁ = 0	-2.47 -6.4 **	-4.28 -8.2 **	-2.68 -4.5 **
		Avg N = 1482 Avg R ² = .06	Avg N = 1482 Avg R ² = .07	Avg N = 980 Avg R ² = .06

Table 3, continued

Panel C. Dependent Variable: Total 4-Day Abnormal Return around Earnings Announcements

		VOL	TURN	ADISP
Intercept	a	-1.78	-2.09	-2.44
T-stat		-4.9 **	-7.0 **	-9.1 **
DM*LowSP*HighINST	b ₁	-1.05	-0.63	-0.32
T-stat		-1.9	-2.0	-0.9
DM*LowSP*MedINST	b ₂	-1.35	-1.00	-0.38
T-stat		-1.8	-2.0	-1.2
DM*LowSP*LowINST	b ₃	-3.22	-2.93	-1.68
T-stat		-3.2 **	-3.7 **	-2.7 **
DM*HighSP*HighINST	b ₄	-2.13	-1.97	-1.25
T-stat		-2.3 *	-3.2 **	-1.4
DM*HighSP*MedINST	b ₅	-1.27	-1.24	-0.07
T-stat		-1.5	-1.8	-0.1
DM*HighSP*LowINST	b ₆	-2.28	-3.71	-2.18
T-stat		-2.6 **	-4.1 **	-2.9 **
Size	b ₇	-0.92	-0.44	0.06
T-stat		-3.2 **	-1.5	0.2
Surprise	b ₈	6.47	6.51	5.88
T-stat		26.4 **	26.1 **	19.8 **
Low Spreads Low - High INST	H ₁ : b ₃ - b ₁ = 0	-2.18 -3.3 **	-2.30 -3.8 **	-1.37 -2.7 **
High Spreads Low - High INST	H ₂ : b ₆ - b ₄ = 0	-0.14 -0.3	-1.74 -2.7 **	-0.93 -1.5
High vs Low Spreads Low - High INST	H ₃ : b ₆ - b ₁ = 0	-1.23 -2.6 **	-3.08 -4.1 **	-1.86 -2.6 **
		Avg N = 1482 Avg R ² = .07	Avg N = 1482 Avg R ² = .07	Avg N = 980 Avg R ² = .06

Table 4. Abnormal Trading Volume and Net Initiated Order Flow before Earnings Announcements

This table presents average pre-announcement abnormal volume and net initiated order flow, for six different 3 x 3 partitioning schemes of stocks based on size-adjusted institutional ownership and each dispersion measure. Pre-announcement abnormal volume is the log of the ratio of average daily turnover in the two days before the earnings announcement scaled by median daily turnover in the 45-day period from day -50 to day -6. Pre-announcement abnormal net initiated order flow is the difference between pre-announcement abnormal buyer-initiated order flow and seller-initiated order flow. Pre-announcement abnormal buyer- (seller-) initiated order flow is defined as average daily buyer- (seller-) initiated order flow in the two days before the announcement divided by the median daily buyer- (seller-) initiated order flow in the 45-day period from day -50 to day -6. For each of the nine portfolios in every 3 X 3 scheme, we report these measures averaged across the 20 quarters in the sample period. At the bottom of each column in every scheme we provide the mean-difference t-test across portfolios with high versus low values of that dispersion measure, conditional on size-adjusted institutional ownership and the effective half spread. All other variables are defined in Table 1.

Panel A: Abnormal Trading Volume in the 2 days before Earnings Announcements

Dispersion Measure		Low Spread			High Spread		
		Size-Adjusted INST			Size-Adjusted INST		
		Low	Medium	High	Low	Medium	High
VOL	Low	0.055 **	0.087 **	0.095 **	0.019	0.039 *	0.059 **
	Med	0.069 **	0.079 **	0.104 **	0.067 **	0.083 **	0.078 **
	High	0.138 **	0.125 **	0.147 **	0.097 **	0.089 **	0.102 **
	High-Low T-stat	0.084 4.7 **	0.039 2.6 **	0.051 2.8 **	0.077 3.4 **	0.050 2.4 **	0.043 1.8
TURN	Low	0.061 **	0.095 **	0.103 **	0.035 *	0.049 *	0.031
	Med	0.076 **	0.074 **	0.107 **	0.069 **	0.067 **	0.082 **
	High	0.148 **	0.124 **	0.133 **	0.110 **	0.091 **	0.098 **
	High-Low T-stat	0.087 6.4 **	0.029 2.2 *	0.030 1.8	0.074 3.7 **	0.042 2.6 **	0.066 2.6 **
ADISP	Low	0.052 **	0.090 **	0.122 **	0.067 **	0.092 **	0.074 **
	Med	0.112 **	0.095 **	0.133 **	0.028	0.118 **	0.135 **
	High	0.130 **	0.134 **	0.156 **	0.111 **	0.081 **	0.109 **
	High-Low T-stat	0.078 5.3 **	0.044 2.0 *	0.034 2.1 *	0.044 1.1	-0.011 -0.4	0.035 1.2

Panel B: Abnormal Net initiated Order flow in the 2 days before Earnings Announcements

Dispersion Measure		Low Spread			High Spread		
		Size-Adjusted INST			Size-Adjusted INST		
		Low	Medium	High	Low	Medium	High
VOL	Low	0.008	0.003	0.001	0.021	0.017	0.013
	Med	0.020	0.018 *	0.020	0.041 **	0.036 **	0.020
	High	0.016 *	0.012	0.004	0.055 **	0.033 **	0.026
	High-Low	0.008	0.009	0.003	0.034	0.016	0.013
	T-stat	0.7	0.8	0.3	2.6 **	1.1	0.8
TURN	Low	0.012	0.007	0.009	0.039 *	0.011	0.027
	Med	0.016	0.013	0.011	0.013	0.033 *	0.024
	High	0.014	0.011	0.007	0.067 **	0.038 **	0.015
	High-Low	0.002	0.004	-0.002	0.027	0.027	-0.012
	T-stat	0.2	0.2	0.2	2.2 *	2.0 *	0.5
ADISP	Low	0.009	0.000	0.021	0.032	0.060	0.000
	Med	0.021 *	0.020 *	0.006	0.064 **	0.043 **	0.004
	High	0.034 **	0.011	0.006	0.042 **	0.004	0.001
	High-Low	0.025	0.011	-0.015	0.010	-0.056	0.000
	T-stat	2.1 *	1.0	1.3	0.5	-1.5	0.0

* indicates statistical significance at the .05 level; and ** indicates significance at the .01 level.

Table 5. Changes in Dispersion of Opinions Around Earnings Announcements

This table reports the percent change in analyst forecast dispersion around earnings announcements in Panel A, and the relation between this change and the return following earnings announcements in Panel B. Panel A gives the proportion of announcements for which analyst forecast dispersion declines after the announcement, as well as the mean and median change in dispersion. The percent change in analyst forecast dispersion ($\Delta ADISP$) is defined as the natural log of the standard deviation across analyst forecasts made in the 30 days after the announcement, divided by the standard deviation across analyst forecasts made in the 45 days before the announcement. Panel B presents mean coefficients and t-statistics across 20 quarterly cross-sectional regressions between 2000 and 2004. The regression model estimates the association between the return in the 2 days after the earnings announcement ($RetAfter$) and the change in each dispersion measure (ΔDM), over three different subsamples. For this regression, we generate the change in each dispersion measure (ΔDM) as follows. First, each dispersion measure (VOL , $TURN$, or $ADISP$) is computed over the 45-day period before and the 30-day period after the earnings announcement. Then each dispersion measure is transformed into decile ranks each quarter, and these decile ranks are scaled to range between 0 and 1. ΔDM then refers to the change in the decile rank of each dispersion measure from the period before to the period after the earnings announcement. We then interact ΔDM with a dummy variable ($Overval$) to estimate the association between ΔDM and $RetAfter$ over three subsamples. $Overval$ is assigned a value of 1 for overvalued stocks (in the lowest tercile based on institutional ownership and in the highest tercile based on each dispersion measure during the 45-day period before the announcements). $Low(High)SP$ is an indicator variable assigned a value of 1 for all earnings announcements in the Low (High) spread subsample, and zero otherwise. All other variables are defined in table 1.

Panel A: The Change in Analyst Forecast Dispersion Around Quarterly Earnings Announcements

Number of Analysts Required (sample size)	Proportion of Announcements for which $\Delta ADISP$ is Negative	Mean $\Delta ADISP$ (%)	Median $\Delta ADISP$ (%)
≥ 2 (n = 19,611)	52.6 **	-1.4 *	-2.6 **
≥ 5 (n = 11,600)	53.3 **	-4.2 **	-2.5 **
≥ 10 (n=4,872)	53.9 **	-5.5 **	-2.4 **
Overvalued Subsample (n = 1659)	64.7 **	-25.9 **	-12.9 **

Panel B: The Return after Earnings Announcements in Relation to the Change in each Dispersion Measure

Change in each Dispersion Measure (ΔDM):		ΔVOL	$\Delta TURN$	$\Delta ADISP$
intercept	a	-2.999	-3.307	-3.635
T-stat		-8.5 **	-10.5 **	-7.8 **
$\Delta DM * (1-Overval)$	b_1	-1.566	1.908	0.103
T-stat		-4.1 **	3.3 **	0.2
$\Delta DM * Overval * LowSP$	b_2	-0.735	2.987	3.268
T-stat		-0.1	1.0	0.9
$\Delta DM * Overval * HighSP$	b_3	8.712	10.925	8.124
T-stat		2.1 *	2.9 **	2.7 **
Size	b_4	0.095	0.079	0.069
T-stat		3.0 **	2.6 **	1.5
Surprise	b_5	0.652	0.639	0.713
T-stat		18.2 **	18.5 **	12.4 **
Not Overvalued	H1: $b_1 = b_2$	-0.831	1.079	3.165
vs Overvalued with Low Spreads		-0.2	0.4	0.7
Not Overvalued	H2: $b_1 = b_3$	10.278	9.017	8.020
vs Overvalued with High Spreads		2.3 *	2.4 **	2.7 **
Overvalued with Low Spreads	H3: $b_2 = b_3$	9.447	7.938	4.855
vs Overvalued with High Spreads		1.5	1.9	1.0
		Avg N = 1482	Avg N = 1482	Avg N = 826
		Avg $R^2 = .052$	Avg $R^2 = .053$	Avg $R^2 = .062$

* indicates statistical significance at the .05 level; and ** indicates significance at the .01 level.

Table 6. Robustness Tests: Alternative Windows, Market-Adjustment, Low-Priced Stocks, Winners, and Limits to Arbitrage

This table presents size-adjusted abnormal returns for portfolios that are long the tercile of stocks with high values of each dispersion measure and short the tercile with low values, conditional on size-adjusted institutional ownership and the effective half spread. For brevity, we report only results for the low and high terciles based on institutional ownership. The base-case in the first row reproduces the abnormal returns for the 2 days before or after the announcement, from Table 2. In each subsequent test we change only one aspect of the analysis to facilitate comparison with the base case. We present results using a 1-day window, a 5-day window, unadjusted returns, market-adjusted returns, a sample excluding low-priced stocks (with an average price ≤ 5 dollars over days, (-50, -6)), and excluding the 10% of stocks with the highest returns in the past 12 months. In addition, we present results after accounting for transaction costs. Finally, we omit stocks in the top decile based on relative short interest.

Panel A: Abnormal Returns before Earnings Announcements

Dispersion Measure Inst. Ownership:	Low Spreads						High Spreads					
	VOL		TURN		ADISP		VOL		TURN		ADISP	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
1. Base Case	-.07	.14	-.13	.19	-.02	-.05	1.00	.24	.86	.24	.84	.28
t-ratio	-.2	.5	-.4	.8	-.1	-.3	2.5 **	1.0	2.7 **	1.0	2.1 *	.8
2. 1-day window	.00	-.09	-.02	.07	.17	-.01	.60	.14	.45	.16	.68	.07
t-ratio	.0	-.5	-.1	.5	1.5	.0	2.4 *	.7	2.1 *	.8	2.1 *	.3
3. 5-day window	.44	.86	.68	.71	.04	.14	1.64	.38	1.55	.46	.66	-.55
t-ratio	.8	1.4	1.3	1.5	.1	.3	2.4 *	.7	2.9 **	.9	1.1	-.9
4. Unadjusted Returns	-.09	.19	-.08	.25	.07	.02	1.15	.30	.82	.27	1.00	.37
	-.3	.8	-.2	1.1	.3	.1	3.1 **	1.2	2.7 **	1.1	2.1 *	.8
5. Mkt-Adjusted Returns	-.15	.14	-.07	.12	-.01	.03	1.08	.21	.74	.13	1.28	.16
	-.5	.6	-.8	.6	.0	.2	2.7 **	.9	2.4 **	.6	2.1 *	.4
6. No Low-Priced Stocks	-.02	.14	-.10	.19	-.04	-.04	.75	.30	1.12	.27	.97	.40
	-.1	.5	-.3	.8	-.2	-.2	2.5 *	1.3	2.8 **	1.1	2.1 *	1.2
7. No Past Winners	-.07	.03	.09	.08	.11	-.04	1.02	.24	.59	.15	1.27	.02
	.2	.2	.3	.4	.5	.2	2.7 **	1.0	2.3 *	.6	1.9	.1
8. After Transaction Costs	-.22	.02	-.28	.06	-.15	-.17	.26	-.24	.15	-.24	.30	-.09
	-.7	.0	-.9	.3	-.7	-.8	.7	-1.0	.5	-1.0	.6	-.3
9. No Stocks with High Short Interest	.01	.01	.22	.09	.07	-.10	1.04	.35	.60	.12	.51	.25
	.0	.1	1.0	.5	.2	-.8	2.7 **	1.5	2.2 *	.7	1.2	.6

* indicates significance at the .05 level, and ** indicates significance at the .01 level.

Table 6, continued

Panel B: Abnormal Returns after Earnings Announcements

Dispersion Measure Inst. Ownership:	Low Spreads						High Spreads					
	VOL		TURN		ADISP		VOL		TURN		ADISP	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
1. Base Case t-ratio	-1.16 -2.7 **	-42 -1.7	-1.45 -2.9 **	-.16 -.9	-1.11 -2.6 **	.36 1.1	-3.02 -7.5 **	-.82 -1.3	-3.64 -6.1 **	-1.03 -3.1 **	-4.22 -4.2 **	-.70 -.8
2. 1-day window t-ratio	-.83 -2.4 *	-.31 -1.6	-1.14 -2.8 **	-.16 -1.2	-.81 -2.2 *	.24 .9	-2.32 -7.2 **	-.70 -1.5	-3.02 -6.4 **	-.86 -2.6 **	-2.95 -3.9 **	-.44 -.6
3. 5-day window t-ratio	-1.59 -2.5 *	-.68 -2.0	-1.75 -2.4 *	-.39 -2.0	-1.21 -2.1 *	-.07 -.2	-3.74 -5.7 **	-1.05 -1.3	-4.71 -6.2 **	-.86 -1.9	-4.40 -4.2 **	-.23 -.2
4. Unadjusted Returns	-1.18 -2.6 **	-.46 -1.6	-1.41 -2.9 **	-.07 -.3	-1.15 -2.5 **	.21 .6	-3.06 -7.2 **	-.89 -1.4	-3.74 -6.7 **	-.99 -2.9 **	-3.88 -3.4 **	-.92 -1.1
5. Mkt-Adjusted Returns	-1.17 -2.6 **	-.39 -1.4	-1.39 -3.0	-.15 -.6	-1.11 -2.4 *	.32 .8	-3.07 -6.7 **	-.83 -1.3	-3.71 -6.6 **	-1.02 -2.9 **	-3.83 -3.3 **	-.73 -.9
6. No Low-Priced Stocks	-.98 -2.3 *	-.33 -1.4	-1.27 -2.4 *	-.11 -.6	-1.08 -2.6 **	.41 1.2	-1.51 -3.8 **	-.19 -.3	-2.47 -4.1 **	-.91 -2.7 **	-3.26 -3.4 *	-.29 -.3
7. No Past Winners	-1.04 -2.7 **	-.11 -.4	-1.35 -3.0 **	.21 .7	-1.02 -2.3 *	.24 .7	-2.66 -5.8 **	-.65 -1.1	-3.42 -5.7 **	-.73 -2.0	-4.77 -3.3 **	-.71 -.9
8. After Transaction Costs	-1.00 -2.3 *	-.29 -1.2	-1.29 -2.6 **	-.03 -.2	-.97 -2.3 *	.48 1.5	-2.29 -5.9 **	-.35 -.6	-2.93 -5.0 **	-.54 -1.6	-3.68 -3.8 **	-.33 -.4
9. No Stocks with High Short Interest	-.82 -2.3 *	-.10 -.3	-.76 -1.9	.04 .1	-.72 -1.9	.30 .9	-2.89 -7.0 **	-.26 -.5	-3.69 -5.9 **	-.57 -1.4	-5.49 -2.6 **	-.06 -.1

Table 7. Large Sample Evidence before and after Earnings Announcements: 1998-2004

The two Panels in this table report size-adjusted abnormal returns over the two days before and the two days after the Compustat earnings announcement date (day 0). Due to frequent misalignment of event dates from Compustat before 1998, we restrict the sample to exclude Compustat earnings announcements before 1998. Furthermore, because Compustat does not report which announcements occur after the market close, we omit day 0 from this analysis. We therefore measure RetBefore over days -2 and -1 relative to the Compustat announcement date (before day 0), and we measure RetAfter over days +1 and +2 relative to the Compustat announcement date (after day 0). There are 110,934 announcements in this expanded dataset. All other procedures are analogous to the tests outlined in Table 2.

Panel A: Size-adjusted Abnormal Return over the 2 days before Compustat day 0

Dispersion Measure		Low Spreads			High Spreads		
		Size-Adjusted INST			Size-Adjusted INST		
		Low	Medium	High	Low	Medium	High
VOL	Low	-0.03	-0.02	-0.03	0.08	0.22 *	0.15 *
	Med	0.02	0.07	0.00	0.35 **	0.52 **	0.41 *
	High	0.32	0.19	0.12	0.66 **	0.55 **	0.56 **
High-Low		0.35	0.21	0.15	0.59	0.33	0.42
T-stat		1.6	1.0	1.0	3.3 **	1.9	2.9 **
TURN	Low	0.00	-0.03	-0.07	0.09	0.18 *	0.13
	Med	0.03	0.04	-0.02	0.57 **	0.43 **	0.26 *
	High	0.36	0.25	0.14	0.67 **	0.70 **	0.60 **
High-Low		0.35	0.27	0.22	0.59	0.52	0.47
T-stat		1.6	1.5	1.8	2.9 **	3.6 **	2.6 **
ADISP	Low	-0.02	0.05	0.12	0.23	0.26	0.10
	Med	0.14	0.05	0.09	0.62 *	0.44 *	0.24
	High	0.09	0.00	0.06	0.83 *	0.61	0.21
High-Low		0.11	-0.05	-0.06	0.60	0.35	0.11
T-stat		0.7	0.4	0.6	1.1	1.3	0.6

* indicates statistical significance at the .05 level, and ** indicates significance at the .01 level.

Table 7, continued

Panel B: Size-adjusted Abnormal Return over the 2 days after Compustat day 0

Dispersion Measure		Low Spreads			High Spreads			
		Size-Adjusted INST			Size-Adjusted INST			
		Low	Medium	High	Low	Medium	High	
VOL	Low	0.00	0.09	0.21 *	0.01	0.09	0.09	
	Med	-0.09	0.11	0.19	-0.91 **	-0.78 **	-0.15	
	High	-1.22 **	-0.54 **	-0.40	-2.22 **	-1.85 **	-1.10 **	
	High-Low	-1.22	-0.63	-0.62	-2.23	-1.94	-1.19	
		T-stat	-4.2 **	-3.6 **	-2.8 **	-9.2 **	-6.5 **	-5.2 **
TURN	Low	0.00	0.12	0.19 *	-0.16	-0.09	0.00	
	Med	-0.15	0.05	0.24 *	-1.13 **	-0.67 **	-0.09	
	High	-1.56 **	-0.53 **	-0.31	-2.59 **	-1.81 **	-0.77 **	
	High-Low	-1.57	-0.65	-0.50	-2.43	-1.72	-0.77	
		T-stat	-5.3 **	-3.9 **	-2.8 **	-11.4 **	-6.5 **	-3.8 **
ADISP	Low	0.04	0.12	0.38 *	-0.53	-0.20	-0.36 *	
	Med	0.11	0.08	-0.06	-1.65 **	-0.26	-0.14	
	High	-1.17 **	-0.50 *	-0.12	-2.34 **	-1.67 **	-1.12 *	
	High-Low	-1.21	-0.62	-0.50	-1.81	-1.47	-0.76	
		T-stat	-4.5 **	-2.6 **	-2.8 **	-3.5 **	-2.7 **	-1.1

Table 8. Large Sample Evidence around Earnings Announcements: 1990-2004

This table reports size-adjusted total returns over the four days around earnings announcements (covering day -2 through day +1 relative to Compustat day 0). The sample includes 213,180 earnings announcements from Compustat over the period from 1990 through 2004. We use the Amihud illiquidity measure to proxy trading costs, defined as the absolute daily return divided by daily trading volume, averaged over the 45 trading days from day -50 through day -6 preceding the announcement. All other procedures are analogous to the tests outlined in Table 2.

Size-adjusted Abnormal Return in the 4 days around Earnings Announcements

Dispersion Measure		Low Trading costs			High Trading Costs		
		Size-Adjusted INST			Size-Adjusted INST		
		Low	Medium	High	Low	Medium	High
VOL	Low	0.01	-0.03	0.12	0.19 **	0.13	0.14
	Med	-0.31 **	-0.16	0.01	-0.28 *	-0.20	0.00
	High	-1.28 **	-0.75 **	-0.49 *	-1.65 **	-1.19 **	-0.73 **
	High-Low T-stat	-1.29	-0.72	-0.61	-1.83	-1.32	-0.87
		-4.3 **	-2.6 **	-2.7 **	-8.6 **	-6.2 **	-4.1 **
TURN	Low	-0.01	-0.10	0.14	-0.06	0.03	0.09
	Med	-0.42 **	-0.10	0.06	-0.52 **	-0.22 *	-0.01
	High	-1.46 **	-0.78 **	-0.38 *	-1.69 **	-1.15 **	-0.43 *
	High-Low T-stat	-1.45	-0.68	-0.53	-1.63	-1.17	-0.51
		-5.1 **	-2.8 **	-3.2 **	-6.9 **	-5.7 **	-2.5 *
ADISP	Low	-0.06	0.25	0.02	-0.18	-0.31	0.03
	Med	0.14	-0.09	-0.07	-0.93 *	-0.20	0.17
	High	-0.86 **	-0.35 *	-0.21	-1.50 **	-1.05 *	-0.58
	High-Low T-stat	-0.80	-0.60	-0.23	-1.32	-0.74	-0.61
		-3.1 **	-2.5 *	-1.1	-3.7 **	-1.7	-1.2

* indicates statistical significance at the .05 level, and ** indicates significance at the .01 level.