Valuation Uncertainty, Market Sentiment and the Informativeness of Institutional Trades

Chiraphol N. Chiyachantana, Jeremy Goh, Lisa Yang

Abstract

Prior studies indicate that institutional investors are informed, in the sense that their trades predict price changes. In this study we show that institutional trading profits arise (after controlling for size, book-to-market, and momentum), exclusively from institutional sales of hard-to-value stocks during times of positive market sentiment. These results support the notion that these stocks tend to be overvalued during periods of bullish market sentiment, and that institutions contribute to market efficiency by identifying and trading on these overpriced stocks.

"Security analysis would be used not to discover undervalued securities about to undergo a rapid price increase (an activity which competition should prevent from yielding appreciable returns over cost), but to avoid purchasing (or to sell if already owned) the occasional overvalued security which less informed investors have bid up".

---- Miller (1977)

In the span of five decades, institutional ownership in the US equity market has increased from 8 to more than 68 percent, and institutional trades account for more than 96 percent of NYSE trading volume in the recent data.[1] As a result, the role of institutions in terms of market liquidity and price formation has been the subject of increasing research attention.

A number of studies provide evidence that institutions are informed traders. For example, Alexander, Cici, and Gibson (2007) find that the stocks purchased by mutual funds earn significantly higher returns than the stocks they sell. Yan and Zhang (2009) report that the trades of institutional investors with short investment horizons exhibit higher levels of return predictive ability. Several authors, including in particular Chordia, Roll, and Subrahmanyam (2011) and Boehmer and Kelley (2009) present evidence that increased institutional trading has contributed to improved market efficiency. Consistent with the reasoning that enhanced competition between institutions has reduced mispricing, Barras, Scaillet and Wermers (2010) show that the superior predictive ability of institutional trades for future prices changes has declined since the 1990s.

In this paper, we assess whether institutional trades continue to contain predictive ability, and, if so, whether the predictive ability varies across market states. We focus in particular on

[1] According to the Federal Reserve Board's Flow of Funds report, year 2009 and Boehmer and Kelley (2009).

institutional sales during periods of positive market sentiment As Miller (1977) has noted, uninformed investors may occasionally bid up share prices beyond fundamental value. This is most likely to occur during periods of widespread positive market sentiment. Such overvaluation would present profit opportunities, but as Pontiff (2006) emphasizes, firm specific risk creates costs that impede arbitrage.[2] Such risk will particularly pronounced during those time periods and for those securities where valuation uncertainty is enhanced. We therefore assess separately the predictive ability of institutional purchases versus sales, we distinguish whether the trades occur during periods of high or low market sentiment, and we assess the role of informational uncertainty.

Our analysis is related to the existing literature on valuation uncertainty and market sentiment. Baker and Wurgler (2006) show that the prices of high valuation uncertainty stocks are bid up during periods of optimistic market sentiment, resulting in lower future stock returns. Stambaugh, Yu, and Yuan (2012) combine market sentiment and Miller (1977)'s short sale argument. They document that the return on the short leg of several long-short strategies is lower following high sentiment periods.

In light of these findings, we hypothesize that well-informed institutional investors should be able to profit from selling high valuation uncertainty stocks during periods of high investor sentiment. In other words, we assess whether institutional traders take advantage of these patterns in stock returns.

[2] Several studies find evidence that firm specific idiosyncratic volatility makes it risky for risk-averse arbitrageur to take positions. For example, Mendenhall (2004) finds that magnitude of post-earnings-announcement drift is strongly positively related to the idiosyncratic risk. Mashruwala, Rajgopal, Shevlin (2006) find accrual anomaly is concentrated in firms with high idiosyncratic stock return volatility.

To test this hypothesis, we obtain institutional trading data from the CDA/Spectrum quarterly institutional holdings database (13F). The 13F dataset contains the universe of all large institutions with greater than $100 million of securities under management.[3] We employ two broadly used proxies for valuation uncertainty in related literature: firm age (1/age) and idiosyncratic risk (Baker and Wurgler (2006), Zhang (2006), and Kumar (2009)).[4] We categorize a trading portfolio formation quarter as a positive or negative sentiment quarter based on the composite investor sentiment index developed by Baker and Wurgler (2006). We then track the performance of the stocks that institutions intensively buy or sell by each quarter, and report subsequent stock returns adjusted by the Daniel, Grinblatt, Titman, and Wermers (DGTW 1997) characteristics. We report abnormal returns for stocks grouped based on levels of valuation uncertainty, during high versus low sentiment periods, respectively.

Our results indicate that the predictive ability of institutional trades is mainly found in in stocks which have high valuation uncertainty and are subject to positive investor sentiment. Specifically, high uncertainty stocks that institutions intensively sell significantly underperform stocks with similar firm sizes, book-to-market values, and past returns. In contrast, there are no significant positive abnormal returns following institutional buys. We further find that the predictive ability is limited to institutional sales completed during times of positive market sentiment even for such

[3] Using quarterly institutional holding data from 13F may underestimate institutional investors' stock selection skills. As such, using this dataset will negatively bias against the test of our hypothesis.

[4] We use other proxies for valuation uncertainty such as return volatility and stock turnover, firm capitalization, and analyst uncertainty. Results from these proxies are qualitatively similar to the two that are reported in this study. Thus, for the sake of brevity, we report results on most commonly used VU proxies: 1/age and idiosyncratic risk. Results on other proxies are available upon request.

highly uncertain stocks, consistent with the notion that market sentiment is the key driver of the overvaluation of uncertain stocks.

In light of the evidence reported by Barras et al. (2010) that institutional trading performance declines since the mid-1990s, we partition our sample into pre-1994 and post-1994 periods. Consistent with their study, we find that predictive power of institutional trades for future returns is weaker in the post-1994 period, which likely reflects the fact that dramatic increase in institutional ownership and trading have significantly improved market efficiency. However, even in the post-1994 data we find that institutional selling in highly uncertain stocks during optimistic market sentiment periods continues to predict statistically significant negative future returns.

This paper extends and refines the literature on the information content of institutional trades. Our paper is the first to show that the evidence that institutional trades have significant predictive power is largely confined to sell trades. This evidence is consistent with the reasoning of Miller (1977) that differences of opinion can give rise to overvaluation.[5] Institutional selling helps to correct the mispricing. Further, by documenting that the predictive ability of institutions is confined to the trading of highly uncertain stocks during period of optimistic market sentiment, our results support and extends the findings of Baker and Wurgler (2006).

In our opinion, this study is most closely related to Stambaugh, Yu and Yuan (2012), who argue that impediments to short selling are the major obstacle to eliminating overpricing in the

[5] For example, Yan and Zhang (2009) and Schultz (2010) suggest that profitable trading opportunities are more likely to arise for small and growth stocks.

presence of market-wide sentiment. They examine a broad set of well-documented anomalies relative to the Fama and French three-factor model. They document that adjusted profits from a long-short strategy are confined to months following high investor sentiment, and that the profit from exploiting the anomalies are attributable to the short-leg portfolio. A key difference between our study and theirs is that we focus on institutional trades, as we assess institutional investors are able to exploit and correct the overpricing. To the extent that institutional investors are dominant players in today's stock market, our results shed light on both stock market efficiency and the informativeness of institutional investors' trades. In this regard, our paper compliments that of Stambaugh, Yu and Yuan (2012).

The remainder of the paper is structured as follows. Section 1 develops the hypothesis; section 2 describes the data and variables constructed. In section 3 we present our empirical findings, and section 4, robustness checks. Section 5 concludes the paper.

1. Related Literature and Hypothesis Development

Existing research findings on the informativeness of institutional trades are mixed. Proponents of efficient markets argue that given the fierce competitiveness of institutions in the equity market, any mispricing will be arbitraged away instantaneously. Studies supporting this notion include Gompers and Metrick (2001), Barras et al. (2010), and Lewellen (2011).

However, there are numerous studies that find evidence suggesting that market may not be as efficient as proponents of efficient market make them out to be, as there are occasional mispriced

stocks in the market.[6] One particular explanation for mispricing is by Miller (1977), who proposes that if pessimists face short-sales constraints, the price of an asset reflects the valuation of optimists and predicts that stocks with higher valuation uncertainty tend to be overpriced. Chen, Hong and Stein (2002), Diether, Malloy, and Scherbina (2002), and Zhang (2006) provide supporting empirical evidence that young, volatile, and other "valuation uncertain" stocks and stocks with higher valuation dispersion, are subject to persistent overvaluation.

In the next two sections, we will review the literature on the effect of valuation uncertainty and market sentiment on stock returns. We will then use implications from these two strands of research to form our hypothesis on the informational content of institutional trades.

1.1 Valuation Uncertainty and Stock Returns

The concept of valuation uncertainty originates from Miller (1977), who argues that when uncertainty is high, disagreement will be widened regarding stock value, which in combination with short-sale constraints that keep pessimistic opinions from being reflected in price and informed traders from arbitraging it away instantaneously, can lead to stock overpricing.[7]

It is further argued that overpricing, or mispricing in general, is a result of an uninformed demand shock caused by sentiment investors and that informed arbitrage against these investors can be costly and risky. Such sentiment investors are presumed to be "overconfident", and they

[6] Mispricing in general is argued to be a result of an uninformed demand shock caused by sentiment investors and that informed arbitrage against these investors can be costly and risky. For further details, see De Long, Shleifer, Summers, and Waldmann (1990), Shleifer and Vishny (1997), Barberis and Thaler (2003, P. 1056), and Baker and Wurgler (2006).

[7] Valuation uncertainty refers to information *sparsity* or *ambiguity*. The concept of valuation uncertainty dates to revolutionary work by Knight (1921). Uncertainty is distinguished from risk in that risk reflects randomness with known probability while uncertainty is randomness with unknown probabilities.

tend to overweight their private information and underweight public information as they update beliefs about stock values, which results in divergence of opinions about security valuation.[8] Under greater uncertainty, disagreement is more pronounced because investors' private valuations are more diffused and solid feedback on the quality of their private signal is more difficult to obtain (Daniel, Hirshleifer, and Subrahmanyam (1998, 2001), Hirshleifer (2001), and Kumar (2009)). Further, such valuation uncertain stocks also tend to be difficult to arbitrage, due to elevated information risk and cost associated with trading against mispricing (Baker and Wurgler (2006) and Shleifer and Vishny (1997)). Consequently, highly uncertain stocks will earn lower subsequent returns as the uncertainty is resolved and negative valuations are eventually priced (Chen, Hong and Stein (2002)). [9]

1.2 Market Sentiment and Stock Returns

For hard to value stocks, there will be disagreement among investors and with binding short-sales constraints, Miller (1977) concludes that these stocks will be overpriced. Baker and Wurgler (2006) add another dimension to this hypothesis by maintaining that market sentiment plays an important role. They find that the overpricing of highly uncertain stocks is particularly prominent during episodes of high market sentiment. Specifically, when beginning period of sentiment is high, highly uncertain stocks earn significantly lower subsequent returns and when sentiment is low, these patterns attenuate or reverse. Baker and Wurgler's logic is as follows. They posit that mispricing is the result of both a demand shock by uninformed investors and a

[8] The "overconfidence" bias is argued in Odean (1998) to explain excess trading activities, in Hong and Stein (2003) and Scheinkman, and Xiong (2003) to explain investors' disagreement and excess trading volume, in Daniel, Hirshleifer and Subrahmanyam (1998) to theorize market underreaction and overreaction.

[9] Extant empirical studies have largely confirmed Miller's (1977) hypothesis by documenting negative relationship between binding short sale constraints, divergence of opinion, and subsequent stock returns, such as Desai, Ramesh, Thiagarajan and Balachandran (2002), Chen, Hong, and Stein (2002), Diether, Malloy, and Scherbina (2002), Danielsen and Sorescu (2001), Boehme, Danielsen, and Sorescu (2006), Zhang (2006), and Jiang, Lee, and Zhang (2005).

limit on arbitrage. They claim that uninformed investors exhibit increased systematic optimism and speculative demand during periods of optimistic sentiment. However, with binding short-sales constraint, informed arbitrage against these investors become riskier and more costly.[10] Indeed, they document that highly uncertain stocks traded during period when investors are optimistic earn even lower subsequent returns. In a recent study, Stambaugh, Yu, and Yuan (2012) examine a broad set of well documented anomalies relative to the Fama and French three-factor model and find results showing these anomalies are stronger following high levels of investor sentiment. They conclude that impediments to short selling are the major obstacle to eliminating sentiment-driven mispricing. They also show greater profits (of each anomaly) are driven solely by the short leg of the portfolio.

1.3 Hypothesis - Market Sentiment and Institutional Trades

Empirical evidence reported by Zhang (2006) and Barker and Wurgler (2006) suggest that highly uncertain stocks are persistently subject to overvaluation during high market sentiment periods. Their findings have both cross sectional and inter-temporal implications for informed trading strategies by institutional investors. As Miller pointed out, any profit from skilled analysis may be derived from *selling* the overvalued securities with high valuation uncertainty after less informed investors have pushed the prices significantly higher than their fundamental values.

We hypothesize that any distinctive informational advantages of institutional investors, either due to their access to more precise information or due to their expertise in interpreting public

[10] Sentiment, broadly defined, refers to whether an individual feels excessively optimistic or pessimistic about a situation: a bullish (bearish) investor overestimates (underestimates) asset value (Baker and Wurgler (2006) and Antoniou, Doukas, and Subrahmanyam (2010)).

information, will be manifested in their ability to identify and sell overvalued stocks, especially during high sentiment periods. As such, highly uncertain stocks that institutions sell during optimistic market sentiment periods are expected to earn significantly negative subsequent returns.[11]

2. Data, Methodology, and Variables Construction

Our sample consists of common stocks (share code equals 10 or 11) listed on the NYSE, AMEX and NASDAQ (exchange code equals 1, 2, or 3) during the period from the first quarter of 1981 to the fourth quarter of 2010. We form the institutional trading portfolios during the period from the second quarter of 1981 to the fourth quarter of 2007 when needed data are all available, we then track the subsequent returns till the fourth quarter of 2010.

We obtain quarterly institutional holdings for all common stocks from the CDA/Spectrum Institutional (13F) database.[12] We obtain monthly stock returns from the Centre for Research in Security Prices (CRSP) monthly tapes, and daily returns and trading volume from daily tapes, respectively. We require at least 12 months since the first appearance of a stock's return in CRSP to exclude firms in the stage of initial IPO. In line with previous studies, stocks with a price less than $5 are excluded from the sample (Zhang (2006)). After implementing the deletion criteria, the remaining sample has a minimum of 2792 firms and a maximum of 5017 firms with an average of 3643 firms per quarter in our sample.

[11] We do not expect institutional buys in highly uncertain stocks will be associated with significant positive abnormal returns. If there is any mispricing or undervaluation, it will be arbitraged away instantaneously due to fierce competition among these informed investors.

[12] All investment managers with discretion over securities worth $100 million or more are required to report all equity positions greater than 10,000 shares or $200,000 to the SEC at the end of each quarter.

We obtain book value of equity and quarterly earnings announcement data from Compustat. The Daniel, Grinblatt, Titman and Wermers (DGTW, 1997) benchmark returns and portfolio assignments are obtained from Professor Wermers' data library.[13] DGTW abnormal returns allow controls for size, book-to-market, and past performance. We adopt the index of market sentiment developed by Baker and Wurgler (2006) as our sentiment measure, which are available on Professor Wurgler's website.[14]

For robustness checks, we obtain analyst forecast data for the construction of alternative VU proxy from Institutional Brokers' Estimate System (I/B/E/S) spanning the period from 1984 to 2007.

2.1 Institutional Trading Portfolios

We follow the Nofsinger and Sias's (1999) methodology to construct ownership-stratified institutional trading portfolios. This approach enables the calculation of changes in institutional ownership while controlling for initial ownership at the beginning of each quarter. Specifically, at the beginning of each quarter, all firms are sorted into 5 quintiles based on institutional ownership, which is defined as the ratio of the sum of shares held by total institutional investors at the end of prior quarter to the total number of shares outstanding. Firms within each initial institutional-ownership-sorted portfolio are then further sorted into 5 quintiles based on the change in institutional ownership over the quarter, resulting in 25 portfolios.

[13] We wish to thank Russ Wermers for making the data available at *http://www.smith.umd.edu/faculty/rwermers/ftpsite/Dgtw/coverpage.htm*

[14] We wish to thank Jeffrey Wurgler and Malcolm Baker for making the index available to researchers at *http://pages.stern.nyu.edu/~jwurgler/*

Firms in the quintile of stocks experiencing the largest increase (decrease) in institutional ownership within each initial ownership quintile are then re-aggregated across the initial ownership-sorted quintiles to form an intense institutional buying (selling) portfolio. Our final sample period is from the first quarter of 1981 to the fourth quarter of 2007 when portfolios are formed. Since institutional trading is calculated as the change in institutional ownership from the prior quarter to the current quarter, the first eligible observation for trading is from the second quarter of 1981.We examine the subsequent returns for the 3-month, 6-month, 1-year and 3-year holding period, till the fourth quarter of 2010.

2.2 Proxies for Valuation uncertainty (VU)

Empirical work on valuation uncertainty by Zhang (2006), Jiang et al. (2005), and Kumar (2009) have discussed comprehensively the adoption of VU proxies. We adopt four commonly used proxies for valuation uncertainty (thereafter, VU) in our main analysis: firm age, return volatility, stock turnover, and idiosyncratic volatility. For the sake of exposition, we report results for 1/age and idiosyncratic risk.[15]

- *Firm Age* (inverse). Firm age is defined as the number of months since the first appearance of a stock's return in CRSP. Firms with a long history tend to have more information available to the market (Barry and Brown (1985) and Zhang (2006), and Jiang et al. (2005)). Therefore, young firms tend to have higher level valuation uncertainty. Age is measured as the number of months since a stock's first return appears

[15] Results are qualitatively similar for all four proxies. Results using return volatility and stock turnover as proxies for valuation uncertainty are available upon requests.

in CRSP. We take the inverse of the firm age in our empirical analysis, so that a higher value represents higher uncertainty.

- *Idiosyncratic Risk.* Stocks with high idiosyncratic risk have been argued to have higher levels of valuation uncertainty, and are hence harder to value (Baker and Wurgler (2006), Kumar (2009), and Hirshleifer (2001)). The idiosyncratic risk is defined as the average monthly idiosyncratic volatility during the prior quarter before portfolio formation. Following Fu (2009) and Chua, Goh and Zhang (2010), we define monthly idiosyncratic volatility as the product of (a) the standard deviation of the regression residuals of excess daily returns on the daily Fama-French three factors (FF3), and (b) the square root of the number of observations in the month.

Two other proxies that are commonly used in the valuation uncertainty literature are stock turnover and return volatility.

- *Stock Turnover*. As postulated by Hong and Stein (2006), greater disagreement among investors may spur larger trading volume. Hence, a higher level of stock turnover may reflect a wider dispersion of opinion, which is more prominent in stocks with high valuation uncertainty. Empirically, Jiang et al. (2005) use trading volume as a proxy for valuation uncertainty. Stock Turnover is calculated as the quarterly average of the daily turnover of the stock during the trading quarter. To address inflated trading volumes on NASDAQ, we use the exchange-adjusted turnover in our calculation, which is defined as a stock's turnover minus the average turnover of all stocks listed on the same exchange (either NYSE/AMEX or NASDAQ).
- *Return Volatility*. Zhang (2006) and Jiang et al. (2005) argue that stock volatility captures information signal variation of a firm's fundamental value, which indicates that return

volatility to be a viable valuation uncertainty measure. We follow Zhang (2006) and calculate return volatility as the standard deviation of weekly returns over the year ending at the portfolio formation date.

For robustness tests, we also consider several other measures albeit with some limitations. Namely: a combined VU based on first principal component of all the four VU proxies, an analyst-based measure of valuation uncertainty (*Analyst Uncertainty)*, and market capitalization (*Size*). We use analyst uncertainty and firm size as alternative measures for valuation uncertainty because potential disadvantages of these measures. Using analyst uncertainty measure, our sample will be restricted to firms with analyst coverage information and thus bias the sample to larger firms. Firm size can be a useful measure of valuation uncertainty but is likely to capture other confounding effects which could potentially bias any inferences about valuation uncertainty (Zhang (2006)). A detailed discussion is provided in Section 4.

2.3 Market Sentiment Measure

We use the monthly composite index of market sentiment developed by Baker and Wurgler (2006) as our sentiment measure. The index is based on the first principal component of six proxies associated with market sentiment levels. The six variables are share turnover, IPO volume and first-day returns, equity share in new issues, the closed-end fund discount, and the dividend premium. Variables positively associated with sentiment levels include share turnover, IPO volume, IPO first-day returns, and the equity share in new issues, and those negatively associated are the closed-end fund discount and the dividend premium. Since our trading portfolios are formed at each quarter end, we average the monthly sentiment index during the

formation quarter as our measure of market sentiment; we then dichotomize the sample period as positive versus negative sentiment periods (quarters).

2.4 Summary Statistics

Table 1 reports the summary statistics of our sample. Panel A presents descriptive statistics for VU proxy variables and major firm characteristics. The average market capitalization is $2.17 billion and the book-to-market is 0.76, which are comparable to previous studies on valuation uncertainty (Zhang (2006)). All VU proxies have sufficient cross-sectional variation. The firm age ranges from 12 months (our minimum requirement) to 983 months (82 years), with an average age of 207 months and a median of 152 months. The average idiosyncratic risk is 10.09. The average of the institutional ownership is 38%. The institutional ownership is higher than earlier researches, which is likely due to the fact that institutional ownership increases dramatically over time. The idiosyncratic volatility are slightly lower than previous studies (Fu (2009)), as we include relatively larger firms as in Zhang (2006).

[TABLE 1 ABOUT HERE]

Panel B shows the correlation matrix for VU variables (Pearson correlations are shown above the diagonal with the Spearman correlations below). As expected, idiosyncratic risk is negatively correlated with firm age. The correlations among VU variables are moderate, which suggests that each of these variables may capture some different aspects of valuation uncertainty. The Pearson correlation coefficient on institutional ownership is positively correlated with firm age but

negatively correlated to idiosyncratic risk, suggesting that institutions tend to hold stocks with a longer history and avoid holding stocks with greater firm specific risks.

3. Empirical Results

3.1 Return Predictive Ability of Institutions in General

We begin by presenting the general return predictive ability of institutions. Table 2 reports the buy-and-hold returns on institutional trading portfolios in the first three, six, and twelve months after portfolio formation. We report the raw returns as well as the DGTW- adjusted returns on the portfolios of stocks with intense institutional buying (Intense Buy) and intense institutional selling (Intense Sell), as well as the difference in returns between the Intense Buy and Intense Sell portfolios (Intense Buy-Sell).

The DGTW-adjusted returns allow us to control for the size, book-to-market, and momentum effect, and in turn allows inferences about the abnormal trading performance of institutional trading. We compute the returns on each portfolio over a given horizon as the time-series average of the cross sectional mean returns. Additionally, the t-statistics are based on Newey–West (1987) standard errors to account for serial correlation.

[TABLE 2 ABOUT HERE]

Our findings suggest that there is only weak evidence of institutional predictive ability in general, consistent with prior literature using the same institutional dataset (Gompers and Metrick (2001), Yan and Zhang (2009)). We find that the raw return differences between the Intense Buy and

Intense Sell portfolios are statistically significant. Specifically, the raw returns differences are 0.46%, 1.09%, and 1.30% for the three, six, and twelve-month holding periods respectively. However, statistical inference for DGTW return difference between the Intense Buy and Intense Sell portfolios is insignificant for 3-month holding period though significant after 6 months. Not surprisingly, the magnitude of return differences between the Intense Buy and Intense Sell portfolios are reduced after adjusting for the DGTW benchmark. For the sake of brevity, we report only DGTW-adjusted returns thereafter.

A closer inspection at the returns on the buy and sell portfolios uncovers that the return predictive ability of institutions is driven by the sell side, as there is evidence of significant underperformance of stocks in the Intense Sell portfolios. Specifically, the DGTW-adjusted returns on the Intense Sell portfolio are statistically significant at the 1% level after 6 months and one year. In contrast, the Intense Buy portfolio exhibits no evidence of significant positive abnormal returns.

3.2 Predictive Ability of Institutions across Different Levels of Valuation uncertainty

Next, we investigate how valuation uncertainty may contribute to institutional return predictive ability. We construct institutional trading portfolios following the method described in Section 2, and then independently sort the sample of stocks into tertiles based on the proxies for firm-level valuation uncertainty. The intersections from the two independent rankings result in 15 institutional trading-VU portfolios.

[TABLE 3 ABOUT HERE]

Table 3 reports the three-, six-, and twelve-month DGTW-adjusted buy-and-hold returns of the Intense Buy and Intense Sell portfolios and their return differences. From Table 3, we can see that the return differences between the two portfolios are positive and statistically significant in the High-VU category. As exemplified by the 1/Firm Age proxy, the three month DGTW–adjusted return difference between the two portfolios of high-VU stocks is 1.14% and statistically significant and remains significant till one year after. In contrast, the return differences between the Intense Buy and Intense Sell portfolios among the Low-VU stocks are statistically insignificant.

More importantly, our results suggest that the effect of valuation uncertainty on the return predictive ability of institutional trading is driven by the institutional sales of high VU stocks. For all holding periods, the Intense Sell portfolio of high VU stocks significantly underperforms their DGTW matched firms. For example, the DGTW–return is –0.88% for three months holding period by the idiosyncratic proxy, and the underperformance persists significantly negative at –3.31% after one year. In contrast, there is no evidence of positive abnormal returns on the Intense Buy portfolios of stocks for highly uncertain stocks. Nor is there any evidence suggesting superior stock selection skill among the medium or low valuation uncertainty categories.

As such, the findings are consistent with our conjecture that the main source of institutional return predictability comes from the selling of highly uncertain stocks that tend to be persistently overpriced. The intense sales by institutional investors of such highly uncertain stocks help push the prices to the fundamental values and thus predict significant negative returns.

3.3 Future Return Predictability in Each Subsequent Quarter and Long-term Evidence

In this section, we examine the quarterly returns after the portfolio formation date. In the previous section, we have shown that the institutional return predictive ability may stem from trading in high VU stocks by using the buy-and-hold returns (BHARs). However, BHARs can give a false inference of the price adjustment to an event as the BHARs can grow with the holding period even though there is no evidence of abnormal returns after the first period (Fama (1998)). To address this concern, we follow Wermers (1999) by reporting the quarterly buy–and–hold returns over the four quarters after portfolio formation separately, which allows the examination of the institutional return predictive ability in each quarter following the portfolio formation. In addition, we investigate the long term subsequent returns after institutional trading to examine if there is evidence of return reversals.

[TABLE 4 ABOUT HERE]

Table 4 breaks down the buy-and-hold DGTW-adjusted returns reported in Table 3 for high VU stocks into subsequent quarterly returns. Not surprisingly, the quarterly return difference between the Intense Buy and Intense Sell portfolios for the high VU category decreases when the holding period is extended. The negative abnormal returns remain significant beyond three quarters for stocks with intense sell. Specifically, when using firm age as proxy, highly uncertain stocks with intensive sell underperform DGTW benchmark by 0.95% for the first quarter after institutional sale and still underperform DGTW benchmark by 0.99% during the fourth quarter after formation date.

Therefore, the return predictability over mid-term (one year) shown in previous tables is not driven by the possibility that predictability is only concentrated within first quarter after the portfolio is formed. Further, we also find no evidence of return reversals for the negative returns on the Intense Sell portfolios in the long run (QTR+5 through QTR+12), which likely suggests that stock price adjustments following institutional selling is permanent.

3.4 Market Sentiment and Institutional Return Predictability

To test the hypothesis that institutional investors are able to detect the overpricing of highly uncertain stocks driven by high sentiment, we examine return predictive ability of institutional trades during optimistic and pessimistic investor sentiment periods, respectively. We use the quarterly average of the monthly Baker-Wurgler composite index of market sentiment. A positive (negative) sentiment index represents optimistic (pessimistic) market-wide investor sentiment. Table 5 Panel A reports the results for institutional return predictive ability across different VU levels during optimistic market sentiment periods, while Panel B reports the results for the pessimistic market sentiment periods.

[TABLE 5 ABOUT HERE]

We find that institutional return predictive ability in high valuation uncertainty stocks is sensitive to market sentiment. As shown in Panel A of Table 5, the return predictive ability of institutional selling in high VU stocks during optimistic periods is significant over all holding periods. On the other hand, the results show that return predictability is statistically insignificant during

pessimistic periods. Take idiosyncratic risk as example, for stocks with high idiosyncratic risk sold during optimistic sentiment period, the three month DGTW return is –1.32%, on the other hand, it is 0.27% and statistically insignificant during pessimistic periods. Recall in Table 3, the DGTW return on the overall intense sell portfolio is -0.88% and significant, which is notably less negative than the -1.32% return on the intense sell portfolio during optimistic periods.

Overall, the findings suggest that institutional return predictive ability for high VU stocks is driven by their sales completed during optimistic market sentiment periods. These results are consistent with our hypothesis that highly uncertain stocks are overpriced by sentiment investors during optimistic periods and that institutional investors can potentially take advantage of such mispricing by selling of uncertain stock when sentiment investors are in the state of euphoria.

3.5 Sub-period Analysis

To the extent that recent studies find evidence of diminishing return predictive ability of institutional investors, we conduct sub-period analysis by splitting the sample period into two sub-samples: 1981 to 1993 and 1994 to 2007. Results are presented in Table 6, with Panel A reporting results for 1981– 1993 and Panel B for 1994 – 2007.

Consistent with Barras et al. (2010), we also find that the return predictive ability is weakened during the latter sample period (as measured by the Buy-Sell portfolios). However, for both sub-periods, the return predictive ability remains significant for sales of highly uncertain stocks during optimistic market sentiment periods. Take 1/firm age as example, the three months DGTW-return on intense sell during optimistic period is –1.55% during the period from 1981 to

1993 and is –1.41% during 1994 – 2007. As one can see, the economic magnitude of the portfolio returns is not that different.

[TABLE 6 ABOUT HERE]

4. Additional Tests and Robustness Checks

In this section, we investigate the relation between institutional trading and future earnings news. We also conduct several robustness checks by using alternative proxies of valuation uncertainty, namely, a combined VU proxy, analyst uncertainty, and firm size.

4.1 Institutional Trading and Future Earnings News

In an attempt to study mutual fund managers' stock-picking ability, Baker, Litov, Wachter, and Wurgler (2010) find that the average fund's recent buys outperform its recent sells around the next earnings announcement. Their finding suggests that institutional investors' informational advantage may come from their ability to forecast earnings-related fundamentals.

To provide more evidence on institutional investors' informational advantage in predicting stock returns, we examine the relation between institutional trading and future earnings news. Specifically, we examine 3-day window returns surrounding the earnings announcement date during the quarter that is subsequent to trading portfolio formation date.

We obtain quarterly earnings announcement dates from COMPUSTAT. The earnings announcement abnormal return is defined as the cumulative DGTW-adjusted abnormal return

over a 3-day window [–1, +1] around the earnings announcement date. Each quarter, we group stocks into five portfolios based on ownership-stratified changes in ownership then divided into high, middle, and low level of valuation uncertainty, proxied by one of our VU variables. For each portfolio at each quarter, we then calculate the mean announcement window abnormal returns for the quarter that is subsequent to institutional trading.

[TABLE 7 ABOUT HERE]

Table 7 reports the relation between earnings announcement abnormal returns during subsequent quarter to institutional trading for whole sample period, high sentiment period, and low sentiment period, respectively. For the whole sample period, institutional sells predict significantly negative abnormal returns around the earnings announcement date in the next quarter for high valuation uncertainty stocks. In contrast, institutional buys do not seem to have predictive ability. When we separate the sample period into high and low sentiment periods, we find that during high sentiment periods, institutional sales in the high VU stock predict –0.37% to –0.38% DGTW adjusted abnormal returns, depending on the VU proxy. When sentiment is low, neither institutional buys nor sells have statistically significant predictability for future earnings.[16]

Briefly, we show in this section that institutional sells during high sentiment periods predict significantly negative abnormal returns around subsequent earnings announcements. In contrast,

[16] We also check the next quarter's earnings surprises, measured by the difference between actual earnings and consensus analyst forecast, divided by stock price. We find that institutional sell in uncertainty stocks during optimistic sentiment periods predicts significantly larger negative earnings surprises than any other portfolios. Results are available upon request.

there is no predictive power for institutional buys or for trades in low VU stocks or during low sentiment periods. These results consistently suggest that institutions possess information about firms' fundamentals, especially for those stocks that tend to be overpriced during high sentiment periods.

4.2 Combined VU Proxy/First Principal Component of All Proxies

In this section, we repeat the analysis by using first principal component (FPC) of all the four proxies commonly used in the valuation uncertainty literature.[17] Specifically, we derive the FPC of firm age, return volatility, turnover, and idiosyncratic volatility and use FPC as a new proxy to repeat all the analysis. We find that the main results hold and become much stronger using FPC. For example, the DGTW-returns on intense sales of high uncertainty stocks stand at -2.25%, -3.71%, -5.91%, for three-, six-, and twelve- month holding periods, which are greater in magnitude than using any individual proxies. Consistently with main analyses, the predictive ability is amplified during high sentiment periods. In contrast, there is no evidence to support any conclusions regarding institutional return predictive ability of low-VU stocks or during low sentiment periods.

As an additional check, we follow Jiang et al. (2005), who independently sort the sample based on each valuation uncertainty proxy into two groups and classify the intersection of the four upper (lower) medians as high (low) VU stocks. Overall, the findings of institutional predictive ability are largely consistent with main analysis.

[17] We use first principal component (FPC) as robustness check since each VU proxy may capture different the aspects of valuation uncertainty that cannot be captured by FPC.

4.3 Alternative VU Proxies: Analyst Uncertainty, and Market Capitalization

We perform robustness checks using two alternative proxies for VU: Analyst-based Uncertainty and Firm Size. In some studies, analyst forecast dispersion has been deployed as a proxy for the uncertainty about future earnings or the degree of consensus among analysts or market participants (Barron, Orie, Kim, Lim, and Stevens (1998), Diether, Malloy, and Scherbina (2002), Zhang (2006)).

Barron et al. (1998) further propose an alternative measure by combining forecast dispersion, standard error in the mean forecast, and the number of forecasts. The measure is constructed as follows:

$$\text{Analyst Uncertainty} = (1-1/N)*D+SE \qquad (1)$$

Where SE is defined as the squared error in the mean forecast, D denotes the sample variance of forecasts, and N equals the number of forecasts. The measure is then scaled by the absolute value of the earnings estimate.

The results from using Analyst Uncertainty are largely consistent with the other VU proxies. The DGTW-adjusted returns for the Intense Sell portfolio are all statistically significant, and stand at -4.04%, -7.52%, and -11.01% over the three, six and twelve-month holding periods, respectively.

Next, we consider size as an alternative proxy, and divide the sample into three groups corresponding to the tertiles of the outstanding equity value at the end of the prior quarter for all

NYSE stocks. The results are qualitatively similar to the other VU proxies, as denoted by the DGTW-adjusted returns for the Intense Sell portfolios of -0.51%, -1.42% and -2.43% over the three, six and twelve-month holding periods respectively. These results are statistically significant.

5. Conclusion

If institutional investors have information advantage, stocks need to be sufficiently mispriced for the informed traders to take advantage of skilled security analysis. Paradoxically, as institutional investors, whom the market assumed to be more sophisticated, have become the dominant investors in the equity market, equity market should tend to be more efficient over time. If this is so, then it raises the question whether institutional investors will possess superior informational advantages in predicting stock returns.

It has been documented that mispricing is generally attributed to market impediment to short selling. As such, mispriced stocks are mainly overpriced stocks resulting from investors being too overly optimistic. Given significant variation in market sentiments, overpricing will be more pronounced during periods when market sentiments are high. Specifically, highly uncertain firms such as young, volatile firms are found to be overpriced during periods of high investor sentiment and consequently will earn significantly lower subsequent returns. As a result, the sentiment-driven overvaluation in highly uncertain stocks provides both cross sectional and inter temporal implications for skilled security analysis.

We hypothesize and provide evidence that stock selection skills of institutional investors are reflected in their trading in stocks with high valuation uncertainty, particularly during periods of optimistic market sentiment. Specifically, we find that institutional sells of high valuation uncertainty stocks predicts significantly negative subsequent returns. Further, this predictive ability is driven by sales of highly uncertain stocks completed during optimistic market sentiment periods. Sub-period analysis suggests that these results survive for more recent times, when some studies report diminished superior trading skills of institutions. Our results also support the notion that overvaluation is resolved when initially unrevealed negative information due to short sale constraints is incorporated into market prices. As such, institutional trading is beneficial to the equity market efficiency as their selling of uncertain stocks during high sentiment periods helps correct sentiment-driven overvaluation.

REFERENCES

Alexander, G., G. Cici, and S. Gibson. 2007. Does Motivation Matter when Assessing Trade Performance? An Analysis of Mutual Funds. *Review of Financial Studies* 20: 125-150.

Antoniou, C., J. Doukas, and A. Subrahmanyam. 2010. Sentiment and Momentum. Working Paper, University of Los Angeles.

Baker, M., L. Litov, J. Wachter, J.Wurgler. 2010 Can Mutual Fund Managers Pick Stocks? Evidence from Their Trades Prior to Earnings Announcements. *Journal of Financial and Quantitative Analysis* 45: 1111-1131.

Baker, M., and J. Wurgler. 2006. Investor Sentiment and The Cross Section of Stock Returns. *Journal of Finance* 61: 1645-1680.

Barberis, N., and R. Thaler. 2003. A Survey of Behavioral Finance. In G. Constantinides, M. Harris and R. Stulz, Eds, *Handbook of the Economics of Finance: Financial Markets and Asset Pricing*, North Holland, Amsterdam, pp. 1053–1124.

Barras, L., O. Scaillet, and R. Wermers. 2010. False Discoveries in Mutual Fund Performance: Measuring Luck in Estimated Alphas. *Journal of Finance* 65: 179-216.

Barron, O., O. Kim, S. Lim, and D. Stevens. 1998. Using Analysts' Forecasts to Measure Properties of Analysts' Information Environment. *The Accounting Review* 73: 421-33.

Barry, C., and S. Brown. 1985. Differential Information and Security Market Equilibrium. *Journal of Financial and Quantitative Analysis* 20: 407–422.

Boehme, R., B. Danielsen, and S. Sorescu. 2006. Short Sale Constraints, Differences of Opinion, and Overvaluation. *Journal of Financial and Quantitative Analysis* 41: 455-487.

Boehmer, E., and E. Kelley. 2009. Institutional Investors and the Informational Efficiency of Prices. *Review of Financial Studies* 22: 3563-3594.

Chen, J., H. Hong, and J. Stein. 2002. Breadth of Ownership and Stock Returns. *Journal of Financial Economics* 66: 171-205.

Chordia, T., R. Roll, and A. Subrahmanyam. 2011. Recent trends in trading activity and market quality. *Journal of Financial Economics* 101: 243-263.

Chua, C., J. Goh, and Z. Zhang. 2010. Expected Volatility, Unexpected Volatility, and the Cross-Section of Stock Returns. *Journal of Financial Research* 33:103-123.

Daniel, K., M. Grinblatt, S. Titman, and R. Wermers. 1997. Measuring Mutual Fund Performance with Characteristic-Based Benchmarks. *Journal of Finance* 52: 1035-1058.

Daniel, K., D. Hirshleifer, and A. Subrahmanyam. 1998. Investor Psychology and Security Market Under- and Over-reactions. *Journal of Finance* 53: 1839-1885.

Daniel, K., D. Hirshleifer, and A. Subrahmanyam. 2001. Overconfidence, Arbitrage, and Equilibrium Asset Pricing. *Journal of Finance* 56: 921–965.

Danielsen, B., and S. Sorescu. 2001. Why Do Option Introductions Depress Stock Prices? A Study of Diminishing Short-Sale Constraints. *Journal of Financial and Quantitative Analysis* 36: 451-484.

De Long, B., A. Shleifer, L.. Summers, R. Waldmann. 1990. Noise Trader Risk in Financial Markets. *Journal of Political Economy* 98: 703–738.

Desai, H., K. Ramesh, S, Thiagarajan; and B. Balachandran. 2002. An Investigation of the Informational Role of Short Interest in the Nasdaq Market. *Journal of Finance* 57: 2263-2287.

Diether, K., C. Malloy, and A. Scherbina. 2002. Difference of Opinion and The Cross-Section of Stock Returns. *Journal of Finance* 57: 2113-2141.

Fama, E. 1998. Market efficiency, Long-term Returns, and Behavioral Finance. *Journal of Financial Economics* 49: 283-306.

Fu, F. 2009. Idiosyncratic Risk and the Cross-Section of Expected Stock Returns. *Journal of Financial Economics* 91: 24-37.

Gompers, P., and A. Metrick. 2001. Institutional Investors and Equity Prices. *Quarterly Journal of Economics* 116: 229-259.

Hirshleifer, D. 2001. Investor Psychology and Asset Pricing. *Journal of Finance* 56: 1533–1597.

Hong, H., and J. Stein. 2003. Differences of Opinions, Short-Sales Constraints, and Market Crashes. *Review of Financial Studies* 16: 487–525.

Hong, H., and J. Stein. 2006. Disagreement and the Stock Market. *Journal of Economic Perspectives* 21: 109-128.

Jiang, G., C. Lee, and Y. Zhang. 2005. Information Uncertainty and Expected Returns. *Review of Accounting Studies* 10: 185-221.

Knight, F.1921. *Risk, Uncertainty and Profit*. Hougton Mifflin, Boston/New York.

Kumar, A. 2009. Hard-To-Value Stocks, Behavioral Biases, and Informed Trading. *Journal of Financial and Quantitative Analysis* 44: 1375-1401.

Lewellen, J. 2011. Institutional investors and the limits of arbitrage. *Journal of Financial Economics* 102: 62-80.

Mashruwala, C., S. Rajgopal, T. Shevlin.2006. Why is the accrual anomaly not arbitraged away? The role of idiosyncratic risk and transaction costs, *Journal of Accounting and Economics* 42:3-33.

Mendenhall, R. 2004. Arbitrage Risk and Post-Earnings-Announcement Drift. *The Journal of Business* 77: 875-894.

Miller, E. 1977. Risk, Uncertainty, and Divergence of Opinion. *Journal of Finance* 32: 1151-1168.

Newey, W., and K. West. 1987. A Simple Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix. *Econometrica* 55: 703–708.

Nofsinger, J., and R. Sias. 1999. Herding and Feedback Trading by Institutional and Individual Investors. *Journal of Finance* 54: 2263-2295.

Odean, T. 1998. Are Investors Reluctant to Realize Their Losses?. *Journal of Finance* 53: 1775–1798.

Pontiff, J. 2006. Costly arbitrage and the myth of idiosyncratic risk. *Journal of Accounting and Economics* 42: 35–52.

Scheinkman, J., and W.Xiong. 2003. Overconfidence and Speculative Bubbles. *Journal of Political Economy* 111: 1183-1219.

Schultz, P. 2010. Rational Cross-Sectional Differences in Market Efficiency: Evidence from Mutual Funds. *Journal of Financial and Quantitative Analysis* 45: 847-881.

Shleifer, A. and R. Vishny. 1997. The Limits of Arbitrage. *Journal of Finance* 52: 35-55.

Stambaugh, J. Yu, Y. Yuan. 2012. The short of it: Investor sentiment and anomalies. *Journal of Financial Economics* 104: 288–302.

Wermers, R. 1999. Mutual Fund Herding and the Impact on Stock Prices. *Journal of Finance* 54: 581-622.

Yan, X. and Z. Zhang. 2009. Institutional Investors and Equity Returns: Are Short-Term Institutions Better Informed?. *Review of Financial Studies* 22: 893-924.

Zhang, F. 2006, Information Uncertainty and Stock Returns. *Journal of Finance* 6: 105-137.

Table 1 Descriptive Statistics

This table reports the descriptive statistics. The sample period is from the second quarter of 1981 to the fourth quarter of 2010. Panel A reports the summary statistics for the key variables. Market capitalization (in millions of dollars) is calculated at the end of each quarter. Book-to-Market is calculated as book value for the fiscal year ended before the most recent June 30, divided by market capitalization of December 31 during that fiscal year. Firm Age is the number of months since firm has return history in CRSP. Institutional ownership is defined as the ratio of the sum of shares held by total institutional investors at the end of a given quarter to the total number of shares outstanding. Idiosyncratic Volatility is the quarterly average of monthly idiosyncratic volatility, calculated as the product of (a) the standard deviation of the regression residuals of excess daily returns on the daily Fama-French three factors (FF3), and (b) the square root of the number of observations in the month. Panel B presents the pair-wise correlations between key variables, Pearson Correlation coefficients are shown above the diagonal, while Spearman correlation coefficients are shown below the diagonal.

Panel A: Descriptive Statistics

	Firm-Quarters	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
Market Capitalization ($MM)	327,348	2168.29	11694.03	0.65	70.83	232.93	911.05	602432.90
Book-to-Market – B/M	321,875	0.76	0.65	0.00	0.38	0.63	0.97	36.40
Institutional Ownership (%)	327,348	38.35	25.17	0.00	16.60	35.68	57.83	100.00
Firm Age (Months)	327,348	207.64	181.71	12.00	78.07	151.96	271.96	983.01
Idiosyncratic Volatility	327,264	10.09	5.44	2.60	6.10	8.80	12.72	29.59

Panel B: Correlation Matrix (Pearson Correlations Are Shown Above The Diagonal With Spearman Below)

	Firm Age	Idiosyncratic Volatility	Institutional Ownership
Firm Age	1.00	-0.38	0.20
Idiosyncratic Volatility	-0.31	1.00	-0.17
Institutional Ownership	0.2	-0.16	1.00

Table 2 Institutional Trades and Future Stock Returns

This table reports the subsequent returns on portfolios sorted by the quarterly changes in institutional ownership. At the end of each quarter, we construct 5 portfolios of initial institutional ownership stratified, quarterly changes in institutional ownership. Specifically, all eligible NYSE/AMEX/NASDAQ stocks are sorted into quintiles based on the fraction of shares held by institutional investors (IO) at the end of prior quarter. Stocks within each initial IO-sorted portfolio are further sorted into quintiles based on changes in IO during current quarter. Stocks in the quintile of largest increase (decrease) in IO within each initial-IO quintile are then aggregated across the initial-IO-sorted quintiles to form 5 initial-ownership-stratified, largest increase (decrease) in IO portfolios. Intense Buy represents the largest increase in institutional ownership. Intense Sell represents the largest decrease in institutional ownership. The time-series average of buy-and-hold returns for the top and bottom quintiles as well as the difference between the top and bottom quintiles (Intense Sell – Buy) are reported. Columns (1) to (3) report the raw returns, Columns (4)-(6) report the DGTW benchmark-adjusted returns. All returns are in percentage. T-statistics in parentheses are adjusted by Newey-West serial correlation with up to 4 lags. Returns statistically significant at 10% are in bold.

Returns After	Raw Return			DGTW-Adjusted Return		
	3 Months	6 Months	One Year	3 Months	6 Months	One Year
	(1)	(2)	(3)	(4)	(5)	(6)
Intense Buy	**3.65**	**7.46**	**14.45**	0.14	0.32	-0.13
	(3.46)	**(4.22)**	**(4.53)**	(1.13)	(1.42)	(-0.27)
Intense Sell	**3.19**	**6.37**	**13.15**	-0.21	**-0.74**	**-1.33**
	(3.29)	**(3.99)**	**(4.61)**	(-1.30)	**(-2.45)**	**(-2.30)**
Intense	**0.46**	**1.09**	1.30	0.34	**1.07**	1.20
Buy–Sell	**(1.81)**	**(2.27)**	(1.50)	(1.50)	**(2.33)**	(1.50)

Table 3 Valuation uncertainty and Return Predictability of Institutional Trading

This table reports the return predictive ability of institutional trading, conditional on different levels of valuation uncertainty of the stocks. At the end of each quarter, all eligible NYSE/AMEX/NASDAQ stocks are sorted based on their rankings of the initial-ownership-stratified changes in institutional ownership and independently sorted on one of the VU proxies. Within each VU level group, Time series average of the buy-and-hold DGTW-adjusted returns of the top and bottom quintiles of institutional trading as well as the differences of top and bottom institutional trading quintiles are reported. All returns are in percentage. T-statistics are adjusted by Newey-West serial correlation with up to 4 lags. Returns statistically significant at 10% are in bold.

Returns After	3 Months				6 Months				One Year			
	High VU	Mid VU	Low VU	High-Low	High VU	Mid VU	Low VU	High-Low	High VU	Mid VU	Low VU	High-Low
Valuation uncertainty Proxied by 1/Firm Age												
Intense Buy	0.19	**0.45**	**-0.30**	0.48	0.08	**1.00**	-0.35	0.44	-0.78	1.03	**-1.26**	0.48
	(0.62)	**(2.66)**	**(-1.69)**	(1.29)	(0.15)	**(3.43)**	(-1.26)	(0.70)	(-0.73)	(1.64)	**(-2.18)**	(0.36)
Intense Sell	**-0.95**	0.00	0.05	**-1.00**	**-1.92**	-0.38	-0.33	**-1.59**	**-3.24**	-0.53	-0.95	**-2.30**
	(-3.58)	(-0.01)	(0.24)	**(-2.90)**	**(-5.04)**	(-0.90)	(-0.80)	**(-3.02)**	**(-4.37)**	(-0.76)	(-1.13)	**(-2.34)**
Intense	**1.14**	0.45	-0.35	**1.49**	**2.00**	**1.38**	-0.03	**2.03**	**2.46**	**1.56**	-0.32	**2.78**
Buy-Sell	**(3.09)**	(1.63)	(-1.46)	**(3.99)**	**(3.24)**	**(2.50)**	(-0.06)	**(3.86)**	**(1.87)**	**(1.75)**	(-0.45)	**(2.22)**
Valuation uncertainty Proxied by Idiosyncratic Risk												
Intense Buy	-0.03	**0.37**	-0.02	-0.01	0.04	**0.79**	0.19	-0.15	-0.79	0.79	0.04	-0.83
	(-0.08)	**(2.03)**	(-0.07)	(-0.02)	(0.05)	**(2.45)**	(0.33)	(-0.12)	(-0.50)	(1.19)	(0.03)	(-0.31)
Intense Sell	**-0.88**	0.12	0.42	**-1.30**	**-2.04**	-0.10	0.26	**-2.30**	**-3.31**	-0.35	0.04	**-3.36**
	(-2.78)	(0.47)	(1.25)	**(-2.28)**	**(-4.04)**	(-0.20)	(0.39)	**(-2.23)**	**(-3.87)**	(-0.35)	(0.03)	**(-1.73)**
Intense	**0.85**	0.25	**-0.44**	**1.29**	**2.08**	**0.89**	-0.07	**2.15**	**2.52**	1.14	0.00	**2.52**
Buy-Sell	**(2.23)**	(1.01)	**(-2.38)**	**(3.31)**	**(2.76)**	**(1.87)**	(-0.25)	**(3.02)**	**(1.85)**	(1.42)	(0.00)	**(2.01)**

Table 4 Subsequent Quarterly Returns and Long-run Returns on Institutional Trading Portfolios: High Valuation Uncertainty Stocks Only

This table reports the subsequent quarterly returns and long term returns on portfolios sorted by initial-institutional-ownership-stratified changes in institutional ownership. At the end of each quarter, all eligible NYSE/AMEX/NASDAQ stocks are sorted independently based on initial-ownership-stratified change in institutional ownership and on one of the VU proxies. Quarterly buy-and-hold DGTW benchmark adjusted returns during the second, third and fourth quarter after the formation date as well as two-year holding period return from one year after portfolio formation are reported for the top and bottom quintiles of institutional trading, and the differences of the top and bottom quintiles of institutional trading. We report the portfolios for the highest uncertainty group only. All returns are in percentage. Returns statistically significant at 10% are in bold.

	QTR+1	**QTR+2**	**QTR+3**	**QTR+4**	**QTR+5 through QTR+12**
Valuation uncertainty Proxied by 1/Firm Age					
Intense Buy	0.19	-0.45	**-0.97**	**-0.90**	-1.00
	(0.62)	(-1.50)	**(-3.45)**	**(-2.82)**	(-0.52)
Intense Sell	**-0.95**	**-1.47**	**-1.12**	**-0.99**	-0.79
	(-3.58)	**(-5.02)**	**(-3.41)**	**(-2.61)**	(-0.43)
Intense	**1.14**	**1.02**	0.15	0.09	-0.22
Buy - Sell	**(3.09)**	**(3.08)**	(0.49)	(0.24)	(-0.14)
Valuation uncertainty Proxied by Idiosyncratic Risk					
Intense Buy	-0.03	-0.20	**-0.65**	**-0.88**	0.85
	(-0.08)	(-0.49)	**(-1.68)**	**(-2.10)**	(0.30)
Intense Sell	**-0.88**	**-1.24**	**-0.72**	**-0.72**	1.01
	(-2.78)	**(-3.15)**	**(-1.79)**	**(-1.77)**	(0.50)
Intense	**0.85**	**1.04**	0.07	-0.16	-0.16
Buy-Sell	**(2.23)**	**(2.90)**	(0.25)	(-0.47)	(-0.08)

Table 5 Market Sentiment and Informativeness of Institutional Trades

This table reports the informativeness of institutional trades in different levels of stock valuation uncertainty during optimistic versus pessimistic market sentiment periods. Panel A reports results for periods of optimistic market sentiment. Panel B reports results for periods of pessimistic market sentiment. Time series average of the buy-and-hold DGTW benchmark adjusted returns on the top and bottom quintiles of initial-institutional-ownership stratified changes in institutional ownership as well as the differences of top and bottom institutional trading quintiles are reported, within each VU level group. T-statistics are adjusted by Newey-West serial correlation with up to 4 lags. All returns are in percentage. Returns statistically significant at 10% are in bold.

Panel A: Optimistic Market Sentiment

Returns After	3 Months				6 Months				One Year			
	High VU	Mid VU	Low VU	High-Low	High VU	Mid VU	Low VU	High-Low	High VU	Mid VU	Low VU	High-Low
Valuation uncertainty Proxied by 1/Firm Age												
Intense Buy	0.02	**0.43**	-0.05	0.08	-0.25	**1.15**	0.11	-0.36	-1.12	**1.64**	-0.74	-0.38
	(0.06)	**(2.14)**	(-0.24)	(0.16)	(-0.37)	**(3.65)**	(0.37)	(-0.50)	(-0.83)	**(2.76)**	(-1.21)	(-0.23)
Intense Sell	**-1.47**	-0.08	0.25	**-1.72**	**-2.70**	-0.55	-0.06	**-2.64**	**-4.39**	-0.77	-0.58	**-3.82**
	(-4.49)	(-0.28)	(0.96)	**(-4.14)**	**(-6.23)**	(-0.98)	(-0.14)	**(-4.33)**	**(-4.89)**	(-0.83)	(-0.66)	**(-3.80)**
Intense	**1.50**	0.52	-0.30	**1.80**	**2.45**	**1.70**	0.17	**2.28**	**3.27**	**2.41**	-0.17	**3.44**
Buy-Sell	**(3.28)**	(1.47)	(1.06)	**(4.04)**	**(3.14)**	**(2.45)**	(0.35)	**(3.69)**	**(1.89)**	**(2.25)**	(-0.19)	**(2.10)**
Valuation uncertainty Proxied by Idiosyncratic Risk												
Intense Buy	-0.23	0.29	0.26	-0.48	-0.30	0.84	0.74	-1.04	-0.93	0.80	1.17	-2.10
	(-0.45)	(1.30)	(0.67)	(-0.58)	(-0.30)	(2.19)	(1.01)	(-0.62)	(-0.43)	(1.20)	(0.69)	(-0.56)
Intense Sell	**-1.32**	0.09	**0.72**	**-2.04**	**-2.59**	-0.49	0.79	**-3.38**	**-4.42**	-0.82	0.98	**-5.40**
	(-3.18)	(0.25)	**(1.70)**	**(-2.76)**	**(-3.97)**	(-0.74)	(0.93)	**(-2.51)**	**(-4.16)**	(-0.62)	(0.54)	**(-2.11)**
Intense	**1.09**	0.20	**-0.47**	**1.55**	**2.28**	**1.32**	-0.06	**2.34**	**3.49**	**1.62**	0.19	**3.30**
Buy-Sell	**(2.33)**	(0.66)	**(-1.99)**	**(3.19)**	**(2.47)**	**(2.18)**	(-0.16)	**(2.64)**	**(2.07)**	**(1.65)**	(0.32)	**(2.09)**

Panel B: Pessimistic Market Sentiment

Returns After	3 Months				6 Months				One Year			
	High VU	Mid VU	Low VU	High-Low	High VU	Mid VU	Low VU	High-Low	High VU	Mid VU	Low VU	High-Low
Valuation uncertainty Proxied by 1/Firm Age												
Intense Buy	0.57	0.49	**-0.86**	**1.44**	0.85	0.66	**-1.44**	**2.29**	0.01	-0.38	**-2.48**	2.50
	(1.18)	(1.55)	**(-3.23)**	**(2.32)**	(1.12)	(1.03)	**(-2.77)**	**(2.11)**	(0.01)	(-0.27)	**(-2.37)**	(1.23)
Intense Sell	0.27	0.18	-0.40	0.68	-0.10	0.03	-0.95	0.85	-0.55	0.04	-1.82	1.27
	(0.75)	(0.70)	(-0.96)	(1.31)	(-0.19)	(0.06)	(-1.12)	(1.17)	(-0.75)	(0.05)	(-1.08)	(0.89)
Intense	0.30	0.31	-0.46	0.76	0.95	0.63	-0.49	1.44	0.57	-0.42	-0.66	1.23
Buy-Sell	(0.50)	(0.70)	(-1.04)	(1.12)	(1.06)	(0.74)	(-0.62)	(1.40)	(0.38)	(-0.30)	(-0.60)	(0.76)
Valuation uncertainty Proxied by Idiosyncratic Risk												
Intense Buy	0.43	**0.56**	**-0.67**	1.10	0.84	0.69	-1.09	1.93	-0.47	0.76	-2.60	2.13
	(0.76)	**(1.72)**	**(-1.71)**	(1.30)	(0.85)	(1.14)	(-1.31)	(1.26)	(-0.31)	(0.54)	(-1.83)	(0.98)
Intense Sell	0.16	0.21	-0.29	0.44	-0.77	0.81	-1.00	0.23	-0.72	0.76	-2.16	1.44
	(0.43)	(0.69)	(-0.56)	(0.63)	(-1.22)	(1.29)	(-1.10)	(0.19)	(-0.92)	(0.71)	(-1.51)	(0.89)
Intense	0.28	0.35	-0.39	0.66	1.61	-0.12	-0.10	1.71	0.25	0.01	-0.44	0.69
Buy-Sell	(0.44)	(0.88)	(-1.30)	(1.07)	(1.24)	(-0.19)	(-0.20)	(1.45)	(0.12)	(0.00)	(-0.96)	(0.40)

Table 6 Sub-Period Analysis for Optimistic Market Sentiment Periods

This table reports sub-periods analysis for the informativeness of institutional trades completed during optimistic market sentiment times only. At the end of each quarter, all eligible NYSE/AMEX/NASDAQ stocks are independently sorted based on their rankings of the initial-ownership-stratified changes in quarterly ownership and on one of the VU proxy. Panel A reports results for year 1981 through year 1993. Panel B reports results for year 1994 through year 2007. Time series average of the buy-and-hold DGTW-adjusted returns for the top and bottom quintiles of institutional trading as well as the differences of top and bottom institutional trading quintiles are reported, within each VU level group. T-statistics are adjusted by Newey-West serial correlation with up to 4 lags. All returns are in percentage. Returns statistically significant at 10% are in bold.

Panel A: 1981-1993

	3 Months				6 Months				One Year			
	High VU	Mid VU	Low VU	High-Low	High VU	Mid VU	Low VU	High-Low	High VU	Mid VU	Low VU	High-Low
Valuation uncertainty Proxied by 1/Firm Age												
Intense Buy	0.18	0.45	0.03	0.15	-0.39	**1.19**	0.56	-0.94	-1.50	**2.28**	**0.71**	-2.22
	(0.30)	(1.54)	(0.13)	(0.25)	(-0.42)	**(2.20)**	(1.44)	(-1.12)	(-1.03)	**(2.35)**	**(1.67)**	(-1.53)
Intense Sell	**-1.55**	0.14	0.22	**-1.77**	**-2.61**	-0.16	-0.14	**-2.47**	**-4.52**	-0.43	-1.04	**-3.48**
	(-3.11)	(0.55)	(0.75)	**(-3.05)**	**(-3.84)**	(-0.32)	(-0.28)	**(-2.80)**	**(-3.45)**	(-0.46)	(-0.97)	**(-2.06)**
Intense	**1.73**	0.31	-0.19	**1.92**	**2.23**	**1.34**	0.70	**1.53**	**3.01**	**2.72**	1.76	1.26
Buy-Sell	**(2.24)**	(0.85)	(0.54)	**(2.49)**	**(2.19)**	**(1.73)**	(1.14)	**(1.79)**	**(1.99)**	**(1.93)**	(1.55)	(0.66)
Valuation uncertainty Proxied by Idiosyncratic Risk												
Intense Buy	-0.43	0.27	**0.74**	**-1.16**	-0.51	0.64	**1.72**	-2.23	-0.89	1.10	**3.11**	-3.99
	(-0.85)	(1.11)	**(2.23)**	**(-1.65)**	(-0.48)	(1.46)	**(3.13)**	(-1.49)	(-0.47)	(1.60)	**(2.53)**	(-1.33)
Intense Sell	**-1.46**	0.14	**1.26**	**-2.71**	**-2.91**	-0.12	**1.55**	**-4.46**	**-5.25**	**-0.76**	2.45	**-7.71**
	(-3.15)	(0.51)	**(3.18)**	**(-3.87)**	**(-4.56)**	(-0.34)	**(2.07)**	**(-4.26)**	**(-4.15)**	**(-2.07)**	(1.19)	**(-2.90)**
Intense	**1.03**	0.14	-0.52	**1.55**	**2.40**	**0.76**	0.17	**2.23**	**4.37**	**1.87**	0.65	**3.72**
Buy-Sell	**(1.66)**	(0.42)	(-1.46)	**(2.42)**	**(1.96)**	**(1.37)**	(0.31)	**(2.08)**	**(2.06)**	**(2.40)**	(0.59)	**(2.19)**

Panel B: 1994-2007

	3 Months				6 Months				One Year			
	High VU	Mid VU	Low VU	High-Low	High VU	Mid VU	Low VU	High-Low	High VU	Mid VU	Low VU	High-Low
Valuation uncertainty Proxied by 1/Firm Age												
Intense Buy	-0.11	0.42	-0.12	0.01	-0.13	**1.12**	-0.26	0.13	-0.80	1.10	**-1.95**	1.15
	(-0.22)	(1.49)	(-0.37)	(0.02)	(-0.13)	**(3.01)**	(-0.60)	(0.12)	(-0.37)	(1.60)	**(-2.18)**	(0.43)
Intense Sell	**-1.41**	-0.26	0.28	**-1.69**	**-2.77**	-0.88	0.01	**-2.77**	**-4.29**	-1.05	-0.19	**-4.10**
	(-3.20)	(-0.55)	(0.67)	**(-2.82)**	**(-4.92)**	(-0.93)	(0.01)	**(-3.25)**	**(-3.47)**	(-0.69)	(-0.14)	**(-3.43)**
Intense	**1.30**	0.69	-0.40	**1.70**	**2.64**	**2.00**	-0.27	**2.91**	3.48	2.15	-1.76	**5.25**
Buy-Sell	**(2.40)**	(1.21)	(-0.91)	**(3.31)**	**(2.29)**	**(1.81)**	(-0.36)	**(3.38)**	(1.20)	(1.35)	(-1.64)	**(2.18)**
Valuation uncertainty Proxied by Idiosyncratic Risk												
Intense Buy	-0.06	0.30	**-0.14**	0.08	-0.13	1.00	-0.08	-0.05	-0.96	0.56	-0.43	-0.53
	(-0.08)	(0.85)	**(-0.22)**	(0.06)	(-0.08)	(1.67)	(-0.06)	(-0.02)	(-0.26)	(0.51)	(-0.15)	(-0.08)
Intense Sell	**-1.20**	0.04	0.28	-1.48	**-2.32**	-0.79	0.17	-2.48	**-3.73**	-0.86	-0.24	-3.49
	(-1.83)	(0.07)	(0.40)	(-1.21)	**(-2.16)**	(-0.67)	(0.12)	(-1.08)	**(-2.29)**	(-0.36)	(-0.08)	(-0.86)
Intense	**1.14**	0.25	-0.42	**1.56**	2.19	**1.80**	-0.24	**2.43**	2.77	1.42	-0.19	2.96
Buy-Sell	**(1.65)**	(0.51)	(-1.35)	**(2.15)**	(1.60)	**(1.78)**	(-0.55)	**(1.77)**	(1.09)	(0.84)	(-0.35)	(1.16)

Table 7 Institutional Trading and Future Earnings News

This table reports the abnormal returns around subsequent earnings announcements on portfolios sorted by institutional trades of different levels of valuation uncertainty for the whole sample periods, optimistic sentiment periods, and low sentiment periods, respectively. The earnings announcement abnormal return is calculated over the three days around the earnings announcement date during the next quarter subsequent to trading portfolios formation quarter. We report the time-series average of cross-sectional mean values of DGTW benchmark adjusted returns. All returns are in percentage. Returns statistically significant at 10% are in bold.

	Whole Sample Periods				Optimistic Sentiment Periods				Pessimistic Sentiment Periods			
	High VU	Mid VU	Low VU	High-Low	High VU	Mid VU	Low VU	High-Low	High VU	Mid VU	Low VU	High-Low
Valuation uncertainty Proxied by 1/Firm Age												
Intense Buy	-0.06	0.03	0.00	-0.06	-0.09	0.08	0.04	-0.13	0.01	-0.11	-0.09	0.11
	(-0.70)	(0.40)	(0.03)	(-0.59)	(-0.88)	(1.17)	(0.66)	(-1.10)	(0.09)	(-0.82)	(-0.69)	(0.51)
Intense Sell	**-0.30**	**-0.11**	**-0.11**	**-0.20**	**-0.37**	**-0.17**	-0.11	**-0.26**	-0.16	0.02	-0.11	-0.05
	(-3.25)	**(-1.73)**	**(-1.75)**	**(-1.77)**	**(-3.09)**	**(-2.08)**	(-1.52)	**(-1.85)**	(-1.11)	(0.19)	(-0.87)	(-0.29)
Intense	**0.24**	0.14	0.11	0.14	0.28	**0.25**	0.15	0.13	0.17	-0.13	0.01	0.16
Buy-Sell	**(1.78)**	(1.45)	(1.20)	(0.85)	(1.57)	**(2.22)**	(1.42)	(0.64)	(0.82)	(-0.76)	(0.08)	(0.59)
Valuation uncertainty Proxied by Idiosyncratic Risk												
Intense Buy	-0.10	0.04	0.03	-0.13	-0.11	0.03	0.07	**-0.18**	-0.07	0.06	-0.06	-0.01
	(-1.38)	(0.62)	(0.65)	(-1.49)	(-1.25)	(0.45)	(1.20)	**(-1.65)**	(-0.58)	(0.42)	(-0.69)	(-0.08)
Intense Sell	**-0.28**	-0.09	**-0.12**	**-0.16**	**-0.38**	-0.10	**-0.11**	**-0.27**	-0.05	-0.08	-0.13	0.09
	(-3.60)	(-1.37)	**(-2.37)**	**(-1.66)**	**(-4.37)**	(-1.22)	**(-1.81)**	**(-2.36)**	(-0.29)	(-0.64)	(-1.59)	(0.47)
Intense	**0.18**	0.13	**0.15**	0.03	**0.27**	0.13	**0.18**	0.09	-0.03	0.15	0.07	-0.10
Buy-Sell	**(1.75)**	(1.35)	**(2.23)**	(0.27)	**(2.31)**	(1.09)	**(2.21)**	(0.67)	(-0.13)	(0.78)	(0.62)	(-0.43)