Crash Risk and Investor Horizon

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Abstract

We examine the relation between the probability of stock crash and investor horizon using skewness as a proxy for crash risk. We find that the negative association documented between institutional ownership and skewness in equity returns is driven by short-term institutional investors, while the presence of long-term institutional investors has a positive influence on return skewness. We also document that skewness in equity returns is negatively related to short-term institutional investors' trading behavior. In addition, we show that the presence of short-term institutional investors induces corporate risk-taking behavior. Our results are robust to alternative model specifications and alternative proxies of the variables of interest. Our findings highlight the importance of the investment horizon on crash risk.

Keywords: Skewness; Crash risk; Short-term institutional ownership; Long-term institutional ownership; Investor horizon.

JEL Classification Numbers: G12, G14

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1. Introduction

This paper investigates whether and how institutions' investment horizon influences the probability of crash risk. The scale and rising frequency of crash risk in the equity markets have attracted much attention lately with particular emphasis on identifying its causes. Investigations by market regulatory bodies and the financial press following the 2008 financial crisis suggest that short-term institutional investors contributed to the risk-indifferent and short-sighted behavior of financial institutions which partly led to the collapse of stock market.[2] As a result, new regulations, such as the U.K. "Stewardship Code", have been introduced to put new responsibilities on the investor and investee communities (Heineman, 2010). Recently, Cella, Ellul, and Giannetti (2011) examine institutional trading during the Lehman Brothers' bankruptcy in September 2008, and find that investors' short horizons amplify the effects of market-wide negative shocks.

Studies on the informational roles of institutional investors focus largely on their impact on future stock returns, return volatility, and corporate behavior (Bushee, 2001, Gaspar, Massa, and Matos, 2005; Yan and Zhang, 2009). However, higher moments of return distribution are also critical to equity valuation. For instance, negatively skewed stocks are more likely to crash (Chen, Hong, and Stein, 2001; Jin and Myers, 2006). Thus, the relationship between institutions'

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[2] Another interesting event is the May 6, 2010 "Flash Crash" which led to the Dow Jones industrial average dropping by more than 600 points in a few minutes. Investigations by the U.S. Securities and Exchange Commission (SEC) and the Commodity Futures Trading Commission (CFTC) show that the "Flash Crash" was set off by one batch of trades (sellings) of 4 billion in index futures contracts by the large mutual fund firm Waddell & Reed.

investment horizon and skewness is important. We hypothesize that, to the extent short-term institutional investors trade aggressively on the basis of their short run strategies, the negative relationship between institutional ownership and equity return skewness, first documented in Aggarwal and Rao (1990), is mainly due to the presence of short-term institutional investors.

Using a large sample over the period 1981-2008, we find strong support for our prediction. First, as in Aggarwal and Rao (1990), we report that return skewness is negatively related to institutional ownership. However, this inverse relation is actually driven by short-term institutional investors. Moreover, we document that, in contrast to short-term institutional investors' trading, long-term institutional investors' holdings and trading are positively related to skewness.

One explanation for our results is that short- and long-term institutional investors differ in their needs to meet near-term earnings goals. Short-term institutional investors might exhibit overconfidence-based trading behavior stemming from the information they collect in the short run (Odean, 1999; Barber and Odean, 2000; Grinblatt and Keloharju, 2009). As a result, they trade frequently on the basis of short-term unexpected earnings news. Long-term institutional investors, however, trade less frequently because they trade only on the basis of superior information rather than short-term earnings news. This argument is in line with our findings that the change in short-term institutional investors' ownership is more sensitive to bad earnings news than do long-term institutional investors' holdings. If short-term institutional investors with near-term earnings goals trade frequently, then negative skewness in stock returns would be more pronounced around periods of asymmetric heavy trading volume. This implies that short-term institutional investors are more likely to cause negative return skewness.

An alternative explanation for our results is that short-term institutional investors create incentives for managers to engage in risk-taking behavior. In fact, we find strong evidence that short-term institutional ownership is associated with more corporate risk-taking behavior.

This paper contributes to the literature on investor horizons and stock crash risk in several ways. First, we contribute to the emerging literature investigating the factors influencing stock crash risk (e.g. Hong, and Stein, 2001; Jin and Myers, 2006; Hutton, Marcus, and Tehranian, 2009, Kim, Li, and Zhang, 2011a; Kim, Li, and Zhang, 2011b). To the best of our knowledge, ours is the first study to examine how investor horizons influence firms' crash risk. Aggarwal and Rao (1990) are the first to document a relation between the level of institutional ownership and the nature of return distribution. Since then, researchers have focused on the informational roles of institutional ownership and firms' characteristics in explaining the nature of return distribution (Bushee and Noe, 2000; Yan and Zhang, 2009). However, apart from some anecdotal evidence from the press, we know very little about the role of institutional investment horizon in stock price crashes. Moreover, the literature is inconclusive on whether short-term institutional investors are well informed and whether their trading leads to more efficient prices (Bushee and Noe, 2000; Bushee, 2001; Collins, Gong, and Hribar, 2003; Boehmer and Kelley, 2009; Yan and Zhang, 2009).

Our paper is also related to the studies on the impact of skewness on asset pricing. Numerous papers examine the effect of skewness on asset pricing (Ingersoll, 1975; Kraus and Litzenberger, 1976; Harvey and Siddique, 2000). More recent work incorporates the impact of return skewness on investor decision making, and show that investors have greater preference for skewness (Mitton and Vorkink, 2007; Boyer, Mitton, and Vorkink, 2010; Martellini and Ziemann, 2010). As a result, skewness is a priced component of security returns and is relevant to optimal or efficient portfolios. A growing number of studies also examine market skewness as a priced risk factor of security returns (Kapadia, 2006; Adrian and Rosenberg, 2008; Chang, Christoffersen, and Jacob, 2010).

We also contribute to the debate about which type of institutional ownership is more desirable to a firm. Prior studies, such as those by Porter (1992), Brancato (1997), and Bushee (2004), suggest that firms benefit from attracting long-term institutional investors rather than short-term ones. Short-term institutional investors are weak monitors (Gaspar, Massa, and Matos, 2005) and pressure managers into short-run objectives, thereby hurting firm value in the long run (Bushee, 1998; 2001). Nevertheless, Yang and Zhang (2009) show that short-term institutional investors are better informed and can predict future stock returns. The authors call into question the benefits of attracting only long-term investors since more informative prices facilitate better financing and investment decisions and may reduce cost of capital. We note, however, that firms with short-term (transient) institutional holdings have higher stock return volatility (Bushee and Noe, 2000). Our study further shows that the presence of short-term institutional investors is positively associated with crash risk. Thus, our findings are consistent with the traditional view that firms benefit from attracting long-term institutional investors.

Our study add also to the literature linking investment horizon to corporate behavior, such as R&D expenditures (Bushee, 1998), the tradeoff between dividends and repurchases (Gaspar et al., 2005), and mergers and acquisitions (Gaspar, Massa, and Matos, 2005). Specifically, we investigate how institutional investment horizon influences corporate risk-taking. Corporate risk-taking behavior has been studied in various dimensions in the literature. Hilary and Hui (2009) find that U.S. firms located in more religious counties display low risk exposure as measured by lower variances in stock returns or in operating income, lower investments in R&D and capital expenditures, and that these firms experience lower growth. Bargeron, Lehn, and Zutter (2009) show that the Sarbanes-Oxley Act (2002) reduces corporate risk-taking by reducing capital expenditures, R&D, and the standard deviation of stock returns. John, Litov, and Yeung (2008) find that corporate risk-taking and growth rates are positively associated with firms being in environments with better investor protection. Griffin et al. (2011) find a link between corporate risk-taking and national culture measured as harmony, individualism, and uncertainty avoidance.

The paper is organized as follows. Section 2 reviews the studies that provide the background to our paper, the literature on crash risk, and the investment horizon of institutional investors. Section 3 describes the data and variables we use in our empirical analysis. In Section 4 we investigate the impact of the level and the change in short- and long-term institutional investors on return skewness, and provide robustness checks on the basis of alternative measures of variables. In Section 5 we provide additional empirical analyses by examining institutions' holdings and trading behavior around earnings announcements, and by testing the relation between corporate risk-taking behavior and the investor horizon. Section 6 concludes.

2. Literature Review

Our study is related to literature that focuses on both higher moments of the equity return distribution (*i.e.*, skewness and kurtosis) and informational roles of short- and long-term institutional investors.

2.1. Crash risk and skewness

Stock crashes have become commonplace in the last few decades. Hutton, Marcus, and Tehranian (2009), for instance, document that 17.1% of the firm-years in their sample experience at least one crash over the period 1991-2005. Because one of the properties of the likelihood of crash is large negative returns or negative skewness in returns, a number of studies show that investor preferences for skewness and kurtosis are important for equity valuation (Samuelson, 1970; Rubinstein, 1973; Scott and Horvath, 1980), which implies a critical pricing role of skewness. In fact, recent papers document a negative relation between skewness and stock returns (Zhang, 2006; Boyer, Mitton, and Vorkink, 2010; Conrad, Dittmar, and Ghysels, 2008; Xing, Zhang and Zhao, 2010; Amaya et al., 2011). Mitton and Vorkink (2007), for instance, argue that skewness, and particularly idiosyncratic skewness, is a priced component of security returns. Accordingly, investors with skewness preference hold mean-variance-skewness efficient portfolios.

Further, Boyer, Mitton, and Vorkink (2010) report that stocks with high idiosyncratic skewness have low expected returns. This finding suggests that investors pay a premium for stocks that are expected to have a greater level of idiosyncratic skewness. Those findings are consistent with Martellini and Ziemann (2010), who show that optimal portfolios can be regarded as tangency points in a four-dimensional space, incorporating expected returns, and second, third, and fourth centered moments of asset returns.

The significant effect of skewness on asset pricing led a number of researchers to explain the existence of negative asymmetric volatility in market returns. For example, Chen, Hong, and Stein (2001) examine the effect of turnover, past returns, and firm size on skewness in the daily returns of individual stocks and find that negative skewness is most pronounced in stocks that have an increase in trading volume relative to trend over the prior six months, stocks that experienced positive returns over the prior 36 months, and large-cap stocks. Using return skewness as the measure of the frequency of crashes, Jin and Myers (2006) report a strong effect of opaqueness on crash likelihood on the international level. Jin and Myers's findings are in line with those of Hutton, Marcus, and Tehranian (2009) on the U.S. study.

2.2. Investment horizon of institutional investors

Many studies investigate the economic impact of aggregate institutional ownership on firms' performance and some aspects of corporate behavior. Although institutional investors share some commonalities, there are several reasons why short- and long-term institutional investors behave differently. Institutions differ in their investment horizons because of their respective investment goals, impact on corporate behavior, and informational advantages.

First, investors differ in their investment objectives, which affect the frequency with which they turn over their portfolios. Some scholars argue that short-term institutional investors are guided solely by short-term objectives and are more likely to sell their holdings to improve returns performance. For example, Bushee (2001) shows that short-term institutional investors exhibit strong preferences for solid value in the near term. Further, these investors are associated with an overweighting of short-term expected earnings, since they tend to focus on competitive pressures and frequent performance evaluations. Gaspar, Massa, and Matos (2005) also show that short-term institutional investors prefer short-term performance. Derrien, Kecskes, and Thesmar (2009) emphasize that the investment horizon matters to corporate policies only when the firm is undervalued.

Second, short-term institutional investors affect different dimensions of corporate behavior. Bushee and Noe (2000) argue that the quality of accounting disclosure determines the structure of institutional ownership (*i.e.*, transient, dedicated, and quasi-indexes), which in turn influences stock return volatility. Some studies also claim that short institutional investors have less reason to monitor fundamentals. Weak monitoring leads to aggressive financial reporting practices and induces short-sighted investment decisions. Burns, Kedia, and Lipson (2010) show that the presence of short-term institutional investors lowers the quality of financial information. Gaspar, Massa, and Matos (2005) report that short-term institutional investors are regularly associated with weak monitoring and low bargaining power in mergers and acquisitions. Hence, they are more likely to cut a deal for personal benefits at the expenses of shareholder returns.

Institutions' trading behaviors affect individual analysts' forecasts of firms' earnings, which influences firms' unexpected earnings. Accordingly investment horizon could affect firms' unexpected earnings, and might even contribute to post-earnings-announcement drift shown in Ke and Ramalingegowda (2005). More importantly, transient institutions' arbitrage trades exploit aggressively the drift returns in firms with low transaction costs. Lasser, Wang, and Zhang (2010) report that return drift after extreme good news is smaller for heavily shorted firms, suggesting that price response for short selling is mitigated for firms with extreme good or bad news.

The empirical evidence on whether short- and long-term institutional ownership has an informational advantage has been inconclusive. Several studies claim that short-term institutional investors are better informed. Because they tend to possess significant stock-picking talents, short-term institutional investors are more likely to choose stocks that outperform their benchmark (Grinblatt and Titman, 1989; Wermers, 2000). Transient institutional investors have private information about future earnings and returns (Bushee, 1998; Ke and Ramalingegowda, 2005; Ke, Ramalingegowda, and Yu, 2006). This evidence is consistent with Yan and Zhang (2009), who document that short-term institutional investors trade actively to exploit their informational advantage, which is greater for small and growth stocks. In addition, some papers point out that better-informed investors trade more aggressively, in the sense that they trade early on negative or positive news (Hotchkiss and Strickland, 2003; Ke and Petroni, 2004; Ke, Petroni, and Yu, 2008). This implies that short-term institutional investors are better informed than are long-term ones. But Chen, Harford, and Li (2007) argue that because they specialize in monitoring and influencing firms' efforts, long-term institutional investors have better information and more ability to gather and process that information more efficiently.

3. Data, Variables and Descriptive Statistics

3.1. Data and sample selection

We obtain stock returns, number of shares outstanding, and turnover data from CRSP for all common stocks listed on NYSE, AMEX, and Nasdaq. We gather quarterly institutional holdings from Thomson Financial 13 File. We exclude firms that do not have a full quarter of uninterrupted daily price data. Our sample starts with the first quarter of 1981 and ends in the fourth quarter of 2008.

3.2. Variables

We follow, among others, Chen, Hong, and Stein (2001) in using skewness in stock returns as the main measure of crash risk. We define skewness of returns, $SKEW_{i,t}$, as the third moment of daily returns divided by its standard deviation of daily returns raised to the third power for any stock *i* over quarter *t* (e.g. Aggarwal and Rao, 1990; Chen, Hong, and Stein, 2001).

$$SKEW_{i,t} = (n(n-1)^{3/2} \sum R_{i,t}^3)/((n-1)(n-2)(\sum R_{i,t}^2)^{3/2}) \quad (1)$$

where $R_{i,t}$ is the sequence of de-meaned daily returns to stock i during quarter t and n is the number of observations on daily returns during quarter t.

The daily returns we use for computing skewness are log changes in price. This measure allows for a zero mean if returns are log-normally distributed. We compute the skewness of an individual stock return based on raw stock returns, *i.e.*, the log changes in price; market-adjusted returns, *i.e.*, the log change in stock i less the log change in the value-weighted CRSP index for that day; and excess returns, which we define as the log change in stock i less the T-bill return. We follow this procedure to compute each stock's past returns as well.

In addition to $SKEW_{i,t}$, we also consider an alternative measure of return asymmetries, which we denote by $SKEW\_FF3_{i,t}$, for idiosyncratic skewness. Specifically, we use the Fama-French (1996) model to correct for systematic risk and to better match stock return co-movements.

$$RET_{i,t} = \beta_{0,i,q} + \beta_{1,i,q} MKT_t + \beta_{2,i,q} SMB_t + \beta_{3,i,q} HML_t + \epsilon_{i,t}^{FF} \quad (2)$$

where $RET_{i,t}$ is daily return of stock i on day t, MKT_t is the excess return on the market portfolio, SMB_t is the size factor, HML_t is the value factor, and $\epsilon_{i,t}^{FF}$ is the residual of the regression.

We obtain data on Fama-French factors from Kenneth French's website and estimate the model every quarter with daily data. The idiosyncratic skewness for stock i is the skewness of the residual of the Fama-French regression, $skew(\epsilon_{i,t}^{FF})$.

The other key variable we use in our analysis is institutional ownership. Following

Gompers and Metrick (2001) and Yan and Zhang (2009), we define aggregate institutional ownership as the ratio of the number of shares held by institutional investors relative to the total number of shares outstanding. We then categorize institutional investors into short- and long-term investors on the basis of how frequently they rotate their positions on all the stocks of their portfolio over the previous four quarters. If we denote the set of companies held by investor *j* by *Q*, then we define the aggregate buy and sell for each investor as follows:

$$CR\_buy_{j,t} = \sum_{i \in Q, N_{j,i,t} > N_{j,i,t-1}} |N_{j,i,t}P_{i,t} - N_{j,i,t-1}P_{i,t-1} - N_{j,i,t-1}\Delta P_{i,t}| \qquad (3)$$

$$CR\_sell_{j,t} = \sum_{i \in Q, N_{j,i,t} \leq N_{j,i,t-1}} |N_{j,i,t}P_{i,t} - N_{j,i,t-1}P_{i,t-1} - N_{j,i,t-1}\Delta P_{i,t}| \qquad (4)$$

where $CR\_buy_{j,t}$ is investor *j*'s aggregate purchase for quarter *t*, $CR\_sell_{j,t}$ is investor *j*'s aggregate sale for quarter *t*, $N_{j,i,t}$ is the number of shares of stock *i* held by investor *j* at the end of quarter *t*, and $P_{i,t}$ is the share prices for stock *i* at the end of quarter *t*. We also adjust for stock splits and stock dividends by using the CRSP price adjustment factor.

Next, we utilize the same churn rate definition as Yan and Zhang (2009) to calculate investor *j*'s churn rate, which we define as a measure of frequency in overall portfolio rotation, for quarter *t* as follows:

$$CR_{j,t} = \frac{\min(CR\_buy_{j,t}, CR\_sell_{j,t})}{\sum_{i \in Q} \frac{N_{j,i,,t}P_{i,t} + N_{j,i,t-1}P_{i,t-1}}{2}} \qquad (5)$$

To minimize the impact of investor cash flows on portfolio turnover, we also use the minimum of aggregate purchase and sale. Further, we calculate each institution's average churn rate over the past four quarters as:

$$AVG\_CR_{j,t} = \frac{1}{4}\sum_{r=1}^{4} CR_{j,t-r+1} \quad (6)$$

Based on the average churn rate, we rank all institutional investors in three tertile portfolios for each quarter. We define as short-term institutional investors with the highest $AVG\_CR_{j,t}$ in the top tertile and those in the bottom tertile as long-term institutional investors. For each stock, we define the short-term (long-term) institutional ownership as the ratio between the number of shares held by short-term (long-term) institutional investors and the total number of shares outstanding.

We also adopt Bushee's (1998) definition, using factor analysis and cluster analysis to classify institutional ownership into transient, dedicated, and quasi-indexer groups based on their past investment behavior. We first use the portfolio diversification, portfolio turnover, and momentum trading factors to obtain standardized factor scores. We then conduct *k*-means cluster analysis on the factor scores to assign institutions into three groups. Finally, we calculate the proportion of ownership held by each group of institutions for each firm, identifying the groups as transient (TRA), dedicated (DED), and quasi-indexers (QIX).

Based on the mean factor scores for each cluster, we find that transient institutional investors exhibit the highest portfolio turnover and highest trading sensitivity to current earnings, along with relatively high portfolio diversification. Thus, on the basis of the frequency of portfolio turnover we expect TRAs to have characteristics similar to short-term institutional investors. In contrast, we identify dedicated institutional investors as having low portfolio turnover with almost no use of momentum trading strategies and high concentration. Thus, we expect DEDs to exhibit characteristics similar to those of long-term institutional investors. Quasi-indexing institutional investors are also identified as having low turnover and low use of momentum trading strategies, but high diversification. We expect that QIXs might have characteristics similar to either short-term institutional investors or long-term institutional investors.

Following Chen, Hong, and Stein (2001), our control variables include $RET_{i,t-1}$, defined as the cumulative return on stock *i* over the one-quarter period *t-1*; $SIZE_{i,t-1,}$ measured as the log of firm *i*'s stock market capitalization at the end period of *t-1*; $BKMKT_{i,t-1,}$ equals to firm *i*'s book-to-market ratio at the end of period *t-1*; $LEVERAGE_{i,t-1}$, defined as firm *i*'s total liabilities divided by its total asset over period *t-1*; $DTURNOVER_{i,t-1}$, measured as the detrending turnover by subtracting from the turnover variable a moving average of its value over the prior 18 months; and time dummies, defined as an indicator variable that equals 1 if firm *i* is in quarter *t*.

3.3. Descriptive statistics

We compute quarterly measures of skewness, institutional ownership, and stock characteristics for the period beginning with the first quarter of 1981 and continuing to the fourth quarter of 2008. Table 1 provides summary statistics of the main variables used in our study. Panel A reports the mean, median, 25^{th} percentile, 75^{th} percentile, and standard deviations of all variables. For individual stocks over our sample period, there is negative skewness at the 25^{th} percentile and positive skewness at the mean, median, and 75^{th} percentiles for all different measures of skewness. The average institutional ownership is 24.9%, which is similar to Yan and Zhang (2009) who report a 25.1% average institutional ownership for the period from 1980 to

2003. On average, short-term institutional investors hold 13.4% of total shares outstanding, and long-term institutional investors hold 4.7% of total shares outstanding. The average trading of aggregate, short- and long-term institutional investors are 0.8%, 0.4%, and 0.1%, respectively. The average firm has a market capitalization of $120 million, a book-to-market ratio of 0.748, and leverage of 0.174. The monthly detrended turnover for the average firm is 0.3% compared to 0.1% reported by Chen, Hong, and Stein (2001) in their sample for 1962–1998. Both the leverage and book-to-market ratio variables are winsorized at the 1st and 99th percentiles.

Panel B of Table 1 provides correlations between skewness, institutional ownership, and various firm characteristics. The aggregate institutional ownership (IO) is positively correlated with firm size, detrended turnover, and past returns, but it is negatively related to leverage, book-to-market ratio, and the change in the aggregate short- and long-term institutional investors' ownership. Both short-term institutional ownership (SIO) and long-term institutional ownership (LIO) are positively related to institutional ownership (IO). However, SIO has stronger correlations with IO, LIO, and SIZE with correlation coefficients of 91%, 42%, and 44%, respectively. SIO and LIO have very weak (positive) correlations with past returns (i.e. 1.6% and 0.4%, respectively). Our results suggest that short- and long-term institutional investors seem to pick up much the same information despite the systematic differences between short- and long-term institutional preferences.

4. The Impact of Institutional Ownership on Stock Return Skewness

We measure the probability of crashes by skewness of returns over quarter *t*. We use the lagged institutional holdings based on the information available at the end of quarter *t-1* as our proxy for contemporary demand shocks, and use changes in the institutional holdings over quarter *t-1* as a proxy for institutional trading.[3] If institutional investors experience larger demand shock, given that institutional investors trade frequently and aggressively in an effort to safeguard their investment, then we would expect that IO_{t-1} would be more likely to lead to large negative returns. If institutional investors trade frequently on the basis of information quality, then ΔIO_{t-1} should be negatively related to skewness.

4.1. The level of aggregate, short- and long-term institutional holdings

Aggarwal and Rao (1990) document an inverse relation between aggregate institutional ownership and the skewness of stock returns. Using skewness as a proxy for crash risk, we examine the extent to which short- and long-term institutional investors influence the probability of a stock's crash risk. Prior studies such as those by Chen, Hong, and Stein (2001) and Hutton, Marcus, and Tehranian (2009) show that some stock characteristics such as the market value of equity, detrended average monthly turnover, firm's leverage, and book-to-market ratio, have a strong influence on crash risk. To ensure that the impact of investor horizon is not driven by their relation with these stock characteristics, we use the same set of

[3] To see whether the effect of institutional ownership is due to contemporary demand shock or to the informational advantage of institutional ownership, Gompers and Metrick (2001) use the lagged institutional holdings as a proxy for contemporary demand shocks and use changes in the institutional holdings as a proxy for informational advantage.

stock characteristics as control variables. Thus, we regress $SKEW_t$ against institutional ownership: IO_{t-1}, SIO_{t-1}, LIO_{t-1}; various stock characteristics: $SIZE_{t-1}$, $LEVERAGE_{t-1}$, $DTURNOVER_{t-1}$, $BKMKT_{t-1}$; and nine lags of past returns: RET_{t-1} to RET_{t-9}. We also include time dummy variables for each quarter t.

Table 2 reports the cross-sectional regression specifications. We measure the dependent variable, $SKEW_t$, on the basis of raw returns. In column (1), we include only total institutional ownership and the control variables. The coefficient on IO_{t-1} is -0.135 which is statistically significant at the 1% level, indicating that skewness declines with increasing degree of aggregate institutional ownership. This is consistent with Aggarwal and Rao (1990). In columns (2) and (3) we refine Aggarwal and Rao's findings by considering short- and long-term institutional ownership, respectively. The coefficient of SIO_{t-1} is -0.297 and statistically significant at the 1% level, but the coefficient of LIO_{t-1} is positive (i.e. 0.061) and nonsignificant. The negative sign for SIO_{t-1} suggests that an increase in short-term institutional holdings is associated with the increasing probability of crashes. When we include both SIO_{t-1} and LIO_{t-1} in the regression, the coefficient on SIO_{t-1} is negative, while the coefficient of LIO_{t-1} is positive. Both coefficients of SIO_{t-1} and LIO_{t-1} are significant at the 1% level. This implies that the probability of crashes is attributable to short-term institutional investors, and long-term institutional holdings are positively associated with skewness. Our results show that the probability of crashes is driven entirely by short-term institutional investors. In contrast, long-term institutional ownership is inversely related to the likelihood of crashes.

To check whether our findings are simply due to running our regression on a large sample size, we split the sample period into several intervals on the basis of U.S. business cycle contraction and expansion. Segregation by business cycle allows us also to control for the effect of economic conditions on stock returns characteristics (Schwert, 1989; Ferson and Harvey, 1991; Mele, 2007; 2010). Our findings remain qualitatively unchanged if we split our sample period into equal interval (results are available on request).

The first subsample period is from the first quarter of 1991 to the fourth quarter of 2001, representing one of the U.S. business cycles. The expansion period within this business cycle is March 1991 to March 2001 and the contraction period is March 2001 to November 2001. The second subsample period covers the first quarter of 2002 to the fourth quarter of 2008, representing one recent U.S. business cycle. In this cycle, the expansion period is from November 2001 to December 2007 and the contraction period is from December 2007 to December 2008.[4]

Columns (1) to (4) of Table 3 report the results for the first subsample period and columns (5) to (8) report the results for the second subsample period. Our subperiod results are similar to those for the entire sample period. Short-term institutional investors are more likely to prone the negative asymmetries of return volatility, but long-term institutional investors are not related to return skewness. These results suggest that the conclusion that short-term institutional investors

[4] http://www.nber.org/cycles.html. We only show two contractions and two expansions within our entire sample period. However, the inferences remain unchanged for the other U.S. business cycle contractions and expansions during 1981 – 2008 (results are available on request).

drive the inverse relation between return skewness and institutional ownership is robust to alternative sample periods and is not driven by the use of a large sample size.

4.2. The change in aggregate, short- and long-term institutional holdings

To differentiate between institutional holdings and trading on the basis of investment horizon, we include both lagged holdings and changes in holdings of aggregate, short- and long-term investors. We designate these factors as IO_{t-2}, ΔIO_{t-1}, SIO_{t-2}, ΔSIO_{t-1}, LIO_{t-2}, and ΔLIO_{t-1}, in the cross-sectional regression specifications.

Table 4 presents the impact of lagged holdings and changes in holdings for aggregate, short-, and long-term investors on the probability of crashes. In column (1) we focus on the effect of the level and the change in aggregate institutional ownership. In column (2) we examine the effect of the level and the change in short-term investors; in column (3) we address the effect of the level and the change in long-term investors; and in column (4) we consider the combined effect of both short- and long-term investors at the level and the change in ownership on the probability of crashes. The results are similar in all four cases. We note that when we include both lagged and changes in aggregate institutional holdings, the coefficients on both IO_{t-2} and ΔIO_{t-1} are significantly negative. This result suggests that increasing the level and magnitude of change in aggregate institutional holdings increases a firm's crash risk.

More importantly, when we include both lagged and changes in short-term institutional holdings, we find that the coefficients on both SIO_{t-2} and ΔSIO_{t-1} remain significantly negative at the 1% level and are larger in magnitude than the coefficients on IO_{t-2} and ΔIO_{t-1}. However, when we include both lagged and changes in long-term institutional holdings, we find that the coefficients on both LIO_{t-2} and ΔLIO_{t-1} are positive and not significant. This suggests that short-term institutional investors are the major driver of firm's crash risk. Further, when we consider the level and the change in both short- and long-term institutional investors, the coefficients on SIO_{t-2} and ΔSIO_{t-1} are negative (i.e. -0.348 and -0.151, respectively) and remain statistically significant at the 1% level.

We use the same sub-periods as section 3.1 to check the robustness of our results. Columns (1) to (4), in Table 5, report the results for the period from the first quarter of 1991 to the fourth quarter of 2001. Columns (5) to (8) report the results for the period from the first quarter of 2002 to the fourth quarter of 2008. Again, our subsample period results are similar to those for the entire sample period. Both short-term institutional holdings and trading behavior are more likely to induce the negative asymmetries of return volatility in all subsample periods. Additionally, neither long-term institutional holdings nor trading are related to return skewness, which suggests that short-term institutional investors are those who drive the inverse relation between return skewness and institutional ownership.

4.3. Robustness checks

4.3.1. Various measures of skewness

Table 6 provides the regression results for various measures of return skewness. In columns (1) and (2), we use excess returns as the basis for computing the $SKEW\_EX_t$ measure. In columns (3) and (4), we use market-adjusted returns for $SKEW\_MK_t$. In columns (5) and (6) we use the residual of the regression from the Fama-French three-factor model as the basis for computing idiosyncratic skewness, $SKEW\_FF3_t$. By definition, $SKEW\_FF3_t$ should have more ability to explain skewness in the purely idiosyncratic component of stock returns.

The results are similar for all three measures. The coefficients on short-term institutional stock ownership are negative and strongly statistically significant in each of the three columns. This implies that short-term institutional holdings are more likely to have large negative skewness, *i.e.*, to become more crash-prone, all else equal. The coefficients on aggregate institutional ownership remain negative and have a smaller effect on skewness than do those of short-term institutional investors. In contrast, the coefficients on long-term institutional ownership are positive and also have smaller effect on skewness than do those of short-term institutional investors. All the coefficients are statistically significant.

The results from Table 6 confirm our previous findings that the negative relation between institutional ownership and skewness is mainly driven by short-term institutional investors, and that long-term institutional ownership is positively associated with return skewness.

4.3.2. Alternative classification of investor horizons

Table 7 provides regression results of the raw return skewness ($SKEW_t$) for alternative classifications of investor horizons, transient (TRA_{t-1}), dedicated (DED_{t-1}), and quasi-indexers (QIX_{t-1}). In column (1) we investigate the effect of the level and the change in aggregate institutional ownership. In column (2) we examine the effect of the level and the change in transient institutions; in column (3) we address the effect of the level and the change in quasi-indexing institutions; in column (4) we test the effect of the level and the change in dedicated institutions; and in column (5) we consider the combined effect of three groups of institutions at the level and the change on the probability of crashes.

Our results show that increasing the level of the aggregate institutional holdings has a stronger effect on a firm's crash risk than does increasing the change in the aggregate holdings. More importantly, when we include both lagged transient institutional holdings and changes in transient institutional holdings, we see that the coefficients on both TRA_{t-2} and ΔTRA_{t-1} remain negative and significant at the 1% level, which is consistent with the effect of short-term institutional investors on crash risk. When we include both lagged and changes in quasi-indexing institutional holdings, the coefficients on both QIX_{t-2} and ΔQIX_{t-1} also remain negative and significant at the 1% level, which suggests that quasi-indexing institutions exhibit the short-term focus even though they have relatively longer investment horizons.

Our findings are consistent with Porter's (1992) claim that indexing or buy-and-hold strategies by quasi-indexers indicate that quasi-indexing institutions lack the information on the firm and have weak incentives to monitor management. In contrast, when we include both lagged and changes in dedicated institutional holdings, we find that the coefficients on DED_{t-2} are positive and not statistically significant at the 1% level, and that the coefficients on ΔDED_{t-1} are positive and statistically significant at the 1% level. This is consistent with the effect of long-term institutional investors on crash risk.

Further, when we consider the level and the change in all three groups of investor horizons, the coefficients on both TRA_{t-2} and ΔTRA_{t-1} remain statistically significant at the 1% level. An increase in transient institutional holdings leads to an increase in negative return skewness (*i.e.*, crash risk) of 68%, while an increase in the change in transient institutional holdings leads to an increase in crash risk of 46.1%. The coefficients on both QIX_{t-2} and ΔQIX_{t-1} are also negative but not significant, supporting the contrasting views on the influence of quasi-indexers. The coefficients on both DED_{t-2} and ΔDED_{t-1} remain statistically significant at the 1% level, indicating that dedicated institutions have a similar positive return skewness effect as do the long-term institutional investors. Our findings suggest that transient institutions that exhibit short-term focus are the main driver of crashes.

5. Additional Analyses

In this section we perform two additional empirical analyses. First, we consider institutions' holding and trading behavior around earnings announcements. Second, we examine whether the presence of short-term institutional investors induces corporate risk-taking behavior.

5.1. Institutions' holdings and trading behavior around earnings announcements

Meeting short-term earnings goals induces institutions to buy or sell when there is unexpected earnings news. To better understand how unexpected earnings news affects institutions' trading strategies over time, we examine the relation between different institutional ownership and earnings surprises.

We obtain data on earnings surprises from the IBES and the CRSP daily database. The sample period spans fiscal years 1996 through 2009 (56 fiscal quarters). Following previous research on post-earnings-announcement drift (e.g. Bernard and Thomas, 1990; Bartov, Radhakrishnan, and Krinsky, 2000; Ke and Ramalingegowda, 2005; Zhang, 2008), we define standardized unexpected earnings (SUE) as decile-adjusted unexpected earnings. To obtain SUE, we first calculate the firms' raw earnings surprises as the actual earnings per share minus the average of individual analyst forecasts, scaled by the standard deviation of individual analyst forecasts. Next, based on the sample distribution of earnings surprises by quarter, we sort the earnings surprises into ten deciles indexed from zero to nine, and then scale them by nine to obtain the decile-adjusted unexpected earnings.

Ke and Ramalingegowda (2005) show that earnings surprises have a significantly positive effect on transient institutional investors' ownership changes after controlling for variables such as firm size, book-to-market ratio, and current returns. To the extent that transient institutions have a short-term focus, we expect positive and negative earnings surprises to have different impacts on institutions' holding and trading behavior.

Table 8 provides the regression results of the level and the change in different institutional ownership for positive and negative earnings surprises. In columns (1) to (3), we focus on the effect of positive and negative earnings surprises on institutions' holdings on the basis of their investment horizon. In columns (4) to (6), we examine the effect of positive and negative earnings surprises on institutions' trading behavior on the basis of their investment horizon. Panel A reports aggregate institutions' holding and trading behavior around the earnings announcement. All coefficients on both SUE_{t-1} and positive SUE_{t-1} are significantly positive at the 5% level. The coefficient on negative SUE_{t-1} is significantly positive at the 5% level for the change in institutions' holdings but not significant for the level of institutions' holdings. This result suggests that, as a whole, institutions trade more actively around earnings announcements, and that both good and bad news lead aggregate institutions to trade frequently.

Panel B of Table 8 reports short-term institutional investors' holding and trading behavior around earnings announcements. All coefficients on SUE_{t-1} and positive $SUE_{t-1,}$ are positive and significant (at the 1% level) for the level of short-term institutional holdings. However, the coefficient on negative SUE_{t-1} is positive and significant (at the 1% level) for short-term institutional investors' trading behavior. These results suggest that short-term institutional investors are more likely to hold their positions around the earnings announcement if there is good earnings news, and more likely to trade (sell) frequently around earnings announcement if there is bad earnings news. Short-term institutional investors appear to amplify and overreact to the information they possess. Thus, meeting short-term earnings goals seems to be the main focus of short-term institutional investors.

Panel C in Table 8 reports long-term institutional investors' holding and trading behavior around earnings announcements. The coefficient on negative $SUE_{t-1,}$ for the level of long-term institutional holdings is significantly negative at the 1% level. All coefficients on $SUE_{t-1,}$ positive $SUE_{t-1,}$ and negative $SUE_{t-1,}$ for the change in long-term institutional investors are not statically significant. This suggests that long-term institutional investors are less likely to trade around the earnings announcement regardless of whether the earnings news is good or bad, but they are more likely to hold or even increase their positions if there is bad earnings news around earnings announcement.

The above findings suggest that a negative earnings shock induces short-term investors to trade aggressively, and that long-term investors are liquidity providers for short-term investors. Short-term institutional investors create incentives for managers to maximize short-run earnings at the expense of long-run shareholders' value.

5.2. Corporate risk-taking and investor horizon

We examine whether the presence of short-term institutional investors causes corporate risk-taking behavior by managers. Following other studies such as those by John, Litov, and Yeung (2008), Hilary and Hui (2009), and Griffin et al. (2011), we construct four different measures of corporate risk-taking behavior: (1) **StdROA1**$_t$, which we define as the standard deviation of quarterly ROA1 from quarter t to $t+5$, where ROA1 is the log of the ratio of net income (Compustat Fundamentals Quarterly: Item IBQ) to total assets (Compustat Fundamentals Quarterly: Item ATQ) lagged by one quarter; (2) **StdROA2**$_t$, measured as the standard deviation of quarterly ROA2 from quarter t to $t+5$, where ROA2 is the log of the ratio of operating income before depreciation (Compustat Fundamentals Quarterly: Item OIBDPQ) to total assets (Compustat Fundamentals Quarterly: Item ATQ) lagged by one quarter; (3) **LTD**$_t$, defined as the log of the ratio of long-term debt (Compustat Fundamentals Quarterly: Item DLTTQ) to total assets (Compustat Fundamentals Quarterly: Item ATQ) lagged by one quarter;

(4) **GROWTH$_t$**, which is the log of the ratio of market capitalization to book value of equity (Compustat Fundamentals Quarterly: Item SEQQ). Thus, StdROA1$_t$ and StdROA2$_t$ capture the total risk taken by the corporation, LTD$_t$ captures financial risk-taking, and GROWTH$_t$ captures the expected growth rate of the corporation.

We also consider the potential differences across investor horizons, that is, the total institutional investors (IO$_{t-1}$), short-term institutional investors (SIO$_{t-1}$) and long-term institutional investors (LIO$_{t-1}$). We control for firm size, book-market-ratio, monthly detrended turnover, leverage and return on equity (ROE$_{t-1}$) measured as the log of the ratio of net income (Compustat Fundamentals Quarterly: Item IBQ) to the value of equity (Compustat Fundamentals Quarterly: Item SEQQ) lagged by one quarter.

The results are reported in Table 9 show that the presence of short-term institutional investors induces corporate-risk taking. The coefficients of IOs are positive for all the four proxies of corporate risk-taking but statistically significant only for StdROA1$_t$ and LTD$_t$. When we consider investment horizon, all coefficients on SIOs are positive and statistically significant at the 1% level in all regressions. In contrast, all coefficients for LIOs are insignificant except for GROWTH$_t$, which is negative and significant at the 1% level.

Firms with a risk-averse behavior are likely to avoid projects with high payoff volatility and to invest less (Hilary and Hui, 2009). As a result, the expected growth of these firms and their risk-taking rates should be lower (John, Litov, and Yeung, 2008). Further, firms with high levels of long-term debt are pressured by interest payment and bankruptcy risk (Griffin et al., 2011).

Our results suggest that higher short-term investors' ownership is associated with more volatile corporate earnings, higher long-term debt rates, and higher growth rates.

6. Summary and Conclusions

Using skewness as a proxy for the probability of crashes, we document a significant relation between investor horizons and a stock's crash risk. More importantly, we find strong evidence that the inverse relation between institutional ownership and returns skewness (documented by Aggarwal and Rao, 1990) is driven by short-term institutional investors, while the presence of long-term institutional investors is positively related to skewness. We also report that short-term institutional investors' trading is negatively related to skewness, indicating that short-term institutional investors amplify and overact to the information they possess. Our findings stress the importance of short-term institutional investors on a stock's crash risk.

One explanation for our results is that short- and long-term institutional investors differ in their needs to meet current earnings goals. Short-term institutional investors have incentives to avoid unexpected earnings news in the short run. As a result, they might trade more frequently on the basis of their short-term earnings goals. This is consistent with our finding that the change in short-term institutional investors is more sensitive to bad earnings news around earnings announcement. On the other hand, the change in long-term institutional investors is less sensitive to either good or bad earnings news. This could be due to the fact long-term institutional investors have a monitoring role and rely on information other than earnings surprises. This is also consistent with our finding that long-term institutional investors are less likely to trade around earnings announcements. If short-term institutional investors with short-term earnings goals trade frequently, then negative skewness of stock returns would be more pronounced around periods of asymmetric heavy trading volume. Consistent with this idea we find that negative skewness in stock returns is consistently related to short-term institutional ownership.

An alternative explanation for our results is that short-term institutional investors create incentives for more risk-taking behavior by managers, while long-term institutional investors create incentives for more risk-averse behavior by managers. We find evidence that short-term institutional investors are positively related to corporate risk-taking behavior while long-term institutional investors are negatively associated with corporate risk-taking.

Our results are consistent with the view that it is beneficial for firms to target and attract long-term institutional investors (Porter, 1992; Brancato, 1997; Bushee, 2004). Even though short-term institutional investors are better informed and can better predict future stock returns (Yan and Zhang, 2009), they tend to exacerbate a firm' stock return volatility (Bushee and Noe, 2000) and, as we show here, increase the likelihood of stock price crash risk and induce more risk-taking corporate behavior.

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Table 1. Descriptive Statistics

This table summarizes the descriptive statistics. The sample period is from the first quarter of 1981 to the fourth quarter of 2008. Individual stock characteristics are from the CRSP while institutional ownership is obtained from Thomson Financial 13 File. $SKEW_t$ is the skewness, measured using daily raw returns (log changes in price), excess returns ($SKEW\_EX_t$), and market-adjusted returns ($SKEW\_MK_t$) in quarter t, respectively. $SKEW\_FF3_t$ is idionsyncratic skewness of the residual of the regression, estimated using Fama-French threes factors model. IO_{t-1} is total institutional ownership. Institutional investors are categorized as short-term investors (SIO_{t-1}) if their past four-quarter turnover rate ranks in the top tertile. Institutional investors are categorized as long-term investors (LIO_{t-1}) if their past four-quarter turnover rate ranks in the bottom tertile. $\Delta IO_{t-1,}$ $\Delta SIO_{t-1,}$ and ΔLIO_{t-1} are the change in the aggregate institutions, short-term institutions, and long-term institutions in quarter *t-1* , respectively. $SIZE_{t-1}$ is the log of market capitalization measured at the end of quarter *t-1*. $LEVERAGE_{t-1}$ is the book value of all liabilities scaled by total assets at the end of quarter *t-1* and is winsorized at the 1st percentile and 99th percentile. $DTURNOVER_{t-1}$ is average monthly turnover in quarter *t-1*, detrended by a moving average of turnover in the prior 18 months. $BKMKT_{t-1}$ is the most recently available observation of the book-to-market ratio at the end of quarter *t-1*and is winsorized at the 1st percentile and 99th percentile. RET_{t-1} to RET_{t-9} is the market-adjusted cumulative return in the three-month period from *t-1* to *t-9*, respectively.

Panel A: Variables statistics

VARIABLES	25th Percentile	Mean	Median	75th Percentile	Standard dev.
Skewness of raw returns	-0.285	0.060	0.137	0.608	1.520
Skewness of excess returns	-0.286	0.059	0.137	0.607	1.519
Skewness of market-adjusted returns	-0.279	0.058	0.136	0.595	1.444
Idionsyncratic skewness	-0.271	0.072	0.146	0.607	1.456
Total institutional ownership	0.000	0.249	0.129	0.439	0.289
Short-term institutional ownership	0.000	0.134	0.045	0.223	0.178
Long-term institutional ownership	0.000	0.047	0.018	0.073	0.072
Change in total institutional investors	0.000	0.008	0.000	0.010	0.082
Change in short-term institutional investors	-0.001	0.004	0.000	0.005	0.060
Change in long-term institutional investors	0.000	0.001	0.000	0.003	0.042
Size	16.927	18.534	18.351	20.018	2.201
Leverage	0.012	0.174	0.121	0.282	0.183
Detrended turnover	-0.016	0.003	-0.002	0.013	0.130

Book-to-market	0.319	0.748	0.581	0.954	0.692
Returns	-0.146	-0.018	0.000	0.127	0.313

Panel B: Correlations

VARIABLES	$SKEW_t$	$SKEW\_EX_t$	$SKEW\_MK_t$	$SKEW\_FF3_t$	IO_{t-1}	SIO_{t-1}	LIO_{t-1}
$SKEW_t$							
$SKEW\_EX_t$	1.000						
$SKEW\_MK_t$	0.962	0.962					
$SKEW\_FF3_t$	0.958	0.958	0.971				
IO_{t-1}	-0.058	-0.058	-0.054	-0.052			
SIO_{t-1}	-0.065	-0.065	-0.062	-0.060	0.912		
LIO_{t-1}	-0.028	-0.028	-0.025	-0.025	0.662	0.415	
ΔIO_{t-1}	0.007	0.007	0.009	0.010	-0.133	-0.098	-0.131
ΔSIO_{t-1}	0.010	0.010	0.012	0.011	-0.087	-0.153	-0.021
ΔLIO_{t-1}	0.002	0.002	0.002	0.001	-0.067	-0.012	-0.258
$SIZE_{t-1}$	-0.130	-0.130	-0.115	-0.119	0.474	0.438	0.345
$LEVERAGE_{t-1}$	0.017	0.017	0.020	0.016	-0.042	-0.010	-0.057
$DTURNOVER_{t-1}$	-0.016	-0.016	-0.014	-0.014	0.070	0.074	0.029
$BKMKT_{t-1}$	0.083	0.083	0.073	0.069	-0.194	-0.202	-0.126
RET_{t-1}	-0.071	-0.071	-0.068	-0.060	0.012	0.016	0.004

VARIABLES	ΔIO_{t-1}	ΔSIO_{t-1}	ΔLIO_{t-1}	$LEVERAGE_{t-1}$	$DTURNOVER_{t-1}$	$BKMKT_{t-1}$	RET_{t-1}
$SKEW_t$							
$SKEW\_EX_t$							
$SKEW\_MK_t$							
$SKEW\_FF3_t$							
IO_{t-1}							
SIO_{t-1}							

LIO_{t-1}						
ΔIO_{t-1}						
ΔSIO_{t-1}	0.635					
ΔLIO_{t-1}	0.483	0.046				
$SIZE_{t-1}$	0.001	0.003	-0.001			
$LEVERAGE_{t-1}$	-0.001	0.002	-0.002			
$DTURNOVER_{t-1}$	-0.006	-0.002	-0.002	0.005		
$BKMKT_{t-1}$	-0.017	-0.015	-0.004	-0.006	-0.016	
RET_{t-1}	0.043	0.037	0.017	-0.017	0.081	-0.129

Table 2. Skewness of Raw Stock Returns and Investor Horizons

This table presents the results of regressions of skewness of raw stock return on types of institutional ownership and other stock characteristics. The sample period is from the first quarter of 1981 to the fourth quarter of 2008. Individual stock characteristics are from the CRSP while institutional ownership is obtained from Thomson Financial 13 File. All of the dependent and independent variables are as defined in Table I. The independent variables are lagged one period relative to the dependent variable. Time dummies are included but not reported in the table. The robust t-statistics in parentheses are based on standard errors that are heteroskedasticity-consistent and allow clustering at the firm level.

VARIABLES	(1) $SKEW_t$	(2) $SKEW_t$	(3) $SKEW_t$	(4) $SKEW_t$
IO_{t-1}	-0.135			
	(-11.40)			
SIO_{t-1}		-0.297		-0.330
		(-16.84)		(-18.39)
LIO_{t-1}			0.061	0.263
			(1.33)	(6.72)
$SIZE_{t-1}$	-0.051	-0.049	-0.061	-0.052
	(-28.26)	(-28.38)	(-36.41)	(-29.27)
$LEVERAGE_{t-1}$	0.112	0.116	0.111	0.117
	(7.04)	(7.29)	(7.00)	(7.42)
$DTURNOVER_{t-1}$	0.013	0.018	0.008	0.019
	(0.84)	(1.17)	(0.52)	(1.24)
$BKMKT_{t-1}$	0.041	0.039	0.039	0.038
	(7.79)	(7.42)	(7.55)	(7.20)
RET_{t-1}	-0.281	-0.282	-0.278	-0.281
	(-31.23)	(-31.28)	(-30.81)	(-31.14)
RET_{t-2}	-0.203	-0.202	-0.201	-0.200
	(-22.93)	(-22.78)	(-22.69)	(-22.61)
RET_{t-3}	-0.160	-0.158	-0.159	-0.156
	(-18.91)	(-18.67)	(-18.80)	(-18.51)
RET_{t-4}	-0.131	-0.129	-0.131	-0.127
	(-15.16)	(-14.90)	(-15.12)	(-14.76)
RET_{t-5}	-0.149	-0.147	-0.149	-0.146
	(-17.69)	(-17.43)	(-17.70)	(-17.30)
RET_{t-6}	-0.120	-0.117	-0.120	-0.116
	(-14.03)	(-13.76)	(-14.07)	(-13.63)
RET_{t-7}	-0.092	-0.090	-0.093	-0.089
	(-11.00)	(-10.74)	(-11.08)	(-10.63)

RET_{t-8}	-0.055	-0.053	-0.056	-0.052
	(-6.30)	(-6.06)	(-6.41)	(-5.96)
RET_{t-9}	-0.103	-0.101	-0.104	-0.100
	(-12.32)	(-12.06)	(-12.41)	(-11.95)
Constant	0.875	0.848	1.043	0.891
	(20.10)	(19.78)	(24.75)	(20.63)
Observations	534,287	534,287	534,287	534,287
Adj-R-squared	0.031	0.031	0.030	0.031

Table 3. Skewness of Raw Stock Returns and Investor Horizons: Subperiods

This table presents the results of regressions of skewness of raw stock return on types of institutional ownership and other stock characteristics. The first subsample period is from the first quarter of 1991 to the fourth quarter of 2001 in column (1) to (4), representing one of U.S. business cycle, where the expansion period within this business cycle is from March 1991 to March 2001 and the contraction period is from March 2001 to November 2001. The second subsample period is from the first quarter of 2002 to the fourth quarter of 2008 in column (5) to (8), representing one current U.S. business cycle, where the expansion period within this business cycle is from November 2001 to December 2007 and the contraction period is from December 2007 to December 2008. Individual stock characteristics are from the CRSP while institutional ownership is obtained from Thomson Financial 13 File. All of the dependent and independent variables are as defined in Table I. Time dummies are included but not reported in the table. The robust t-statistics in parentheses are based on standard errors that are heteroskedasticity-consistent and allow clustering at the firm level.

VARIABLES	$SKEW_t$							
	U.S. Business Cycle I Expansion: Mar. 1991-Mar. 2001 Contraction: Mar. 2001-Nov. 2001				U.S. Business Cycle II Expansion: Nov. 2001-Dec. 2007 Contraction: Dec. 2007-Dec. 2008			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IO_{t-1}	-0.143				-0.191			
	(-8.99)				(-10.25)			
SIO_{t-1}		-0.304		-0.331		-0.319		-0.327
		(-12.42)		(-13.03)		(-12.26)		(-12.60)
LIO_{t-1}			-0.002	0.210			-0.073	0.107
			(-0.03)	(3.85)			(-1.03)	(1.65)
$SIZE_{t-1}$	-0.061	-0.059	-0.071	-0.061	-0.053	-0.055	-0.070	-0.057
	(-27.95)	(-27.85)	(-34.24)	(-28.12)	(-16.68)	(-18.91)	(-22.08)	(-17.55)
$LEVERAGE_{t-1}$	0.150	0.154	0.148	0.155	0.097	0.097	0.079	0.096
	(7.45)	(7.66)	(7.31)	(7.71)	(3.55)	(3.54)	(2.85)	(3.52)
$DTURNOVER_{t-1}$	0.042	0.049	0.039	0.050	0.017	0.020	0.011	0.020
	(1.74)	(2.01)	(1.56)	(2.08)	(0.75)	(0.89)	(0.46)	(0.90)
$BKMKT_{t-1}$	0.013	0.012	0.010	0.011	0.008	0.003	0.005	0.002
	(2.08)	(1.87)	(1.68)	(1.70)	(0.78)	(0.29)	(0.44)	(0.21)
RET_{t-1}	-0.269	-0.269	-0.267	-0.268	-0.285	-0.285	-0.280	-0.284
	(-24.31)	(-24.32)	(-24.08)	(-24.24)	(-16.44)	(-16.44)	(-16.10)	(-16.37)
RET_{t-2}	-0.210	-0.208	-0.209	-0.207	-0.190	-0.188	-0.187	-0.188
	(-19.75)	(-19.57)	(-19.68)	(-19.47)	(-11.16)	(-11.08)	(-10.95)	(-11.03)
RET_{t-3}	-0.173	-0.170	-0.174	-0.169	-0.179	-0.177	-0.178	-0.177
	(-16.43)	(-16.17)	(-16.45)	(-16.07)	(-11.32)	(-11.17)	(-11.24)	(-11.12)
RET_{t-4}	-0.153	-0.150	-0.154	-0.149	-0.150	-0.148	-0.151	-0.148
	(-14.09)	(-13.83)	(-14.17)	(-13.75)	(-9.17)	(-9.03)	(-9.20)	(-8.99)
RET_{t-5}	-0.155	-0.152	-0.156	-0.151	-0.131	-0.129	-0.133	-0.128

	(-14.63)	(-14.36)	(-14.69)	(-14.27)	(-8.90)	(-8.77)	(-9.03)	(-8.75)
RET_{t-6}	-0.136	-0.133	-0.136	-0.132	-0.117	-0.115	-0.120	-0.114
	(-12.62)	(-12.34)	(-12.67)	(-12.24)	(-7.53)	(-7.40)	(-7.71)	(-7.37)
RET_{t-7}	-0.094	-0.092	-0.095	-0.091	-0.127	-0.126	-0.130	-0.125
	(-8.57)	(-8.31)	(-8.62)	(-8.21)	(-9.11)	(-9.00)	(-9.30)	(-8.98)
RET_{t-8}	-0.068	-0.066	-0.069	-0.065	-0.093	-0.091	-0.097	-0.091
	(-6.21)	(-5.97)	(-6.29)	(-5.88)	(-6.24)	(-6.12)	(-6.49)	(-6.11)
RET_{t-9}	-0.100	-0.098	-0.101	-0.097	-0.111	-0.108	-0.114	-0.108
	(-9.33)	(-9.09)	(-9.44)	(-9.02)	(-8.23)	(-8.05)	(-8.43)	(-8.03)
Constant	1.228	1.195	1.371	1.221	1.083	1.102	1.316	1.131
	(26.51)	(26.02)	(30.38)	(26.37)	(16.76)	(17.83)	(20.06)	(17.24)
Observations	246,209	246,209	246,209	246,209	128,194	128,194	128,194	128,194
Adj-R-squared	0.035	0.036	0.035	0.036	0.027	0.028	0.026	0.028

Table 4. Skewness, Institutional Holdings and Trading

This table presents the results of regressions of skewness of raw stock return on the level and the change in types of institutional ownership and other stock characteristics. The sample period is from the first quarter of 1981 to the fourth quarter of 2008. Individual stock characteristics are from the CRSP while institutional ownership is obtained from Thomson Financial 13 File. All of the dependent and independent variables are as defined in Table I. Time dummies are included but not reported in the table. The robust t-statistics in parentheses are based on standard errors that are heteroskedasticity-consistent and allow clustering at the firm level.

VARIABLES	(1) $SKEW_t$	(2) $SKEW_t$	(3) $SKEW_t$	(4) $SKEW_t$
IO_{t-2}	-0.138			
	(-11.41)			
ΔIO_{t-1}	-0.085			
	(-2.77)			
SIO_{t-2}		-0.308		-0.348
		(-17.08)		(-18.82)
ΔSIO_{t-1}		-0.135		-0.151
		(-3.21)		(-3.58)
LIO_{t-2}			0.075	0.310
			(1.49)	(7.18)
ΔLIO_{t-1}			0.008	0.125
			(0.14)	(2.41)
$SIZE_{t-1}$	-0.050	-0.049	-0.061	-0.052
	(-28.05)	(-28.02)	(-36.03)	(-29.05)
$LEVERAGE_{t-1}$	0.112	0.116	0.111	0.118
	(7.03)	(7.29)	(7.00)	(7.43)
$DTURNOVER_{t-1}$	0.013	0.019	0.008	0.020
	(0.85)	(1.20)	(0.51)	(1.29)
$BKMKT_{t-1}$	0.041	0.039	0.039	0.037
	(7.81)	(7.44)	(7.54)	(7.18)
RET_{t-1}	-0.283	-0.285	-0.278	-0.284
	(-31.20)	(-31.45)	(-30.79)	(-31.31)
RET_{t-2}	-0.204	-0.203	-0.201	-0.202
	(-22.94)	(-22.92)	(-22.66)	(-22.72)
RET_{t-3}	-0.160	-0.158	-0.159	-0.157
	(-18.93)	(-18.75)	(-18.78)	(-18.55)
RET_{t-4}	-0.131	-0.129	-0.131	-0.127
	(-15.18)	(-14.94)	(-15.10)	(-14.76)
RET_{t-5}	-0.149	-0.147	-0.149	-0.145
	(-17.70)	(-17.44)	(-17.69)	(-17.27)
RET_{t-6}	-0.120	-0.117	-0.120	-0.116
	(-14.04)	(-13.75)	(-14.07)	(-13.58)

RET_{t-7}	-0.092	-0.090	-0.093	-0.088
	(-11.01)	(-10.72)	(-11.07)	(-10.57)
RET_{t-8}	-0.055	-0.053	-0.056	-0.051
	(-6.31)	(-6.05)	(-6.41)	(-5.93)
RET_{t-9}	-0.103	-0.101	-0.104	-0.100
	(-12.32)	(-12.05)	(-12.40)	(-11.92)
Constant	0.872	0.840	1.046	0.890
	(19.97)	(19.55)	(24.66)	(20.52)
Observations	534,287	534,287	534,287	534,287
Adj-R-squared	0.031	0.031	0.030	0.032

Table 5. Skewness, Institutional Holdings and Trading: Subperiods

This table presents the results of regressions of skewness of raw stock return on the level and the change in types of institutional ownership and other stock characteristics. The first subsample period is from the first quarter of 1991 to the fourth quarter of 2001 in column (1) to (4), representing one of U.S. business cycle, where the expansion period within this business cycle is from March 1991 to March 2001 and the contraction period is from March 2001 to November 2001. The second subsample period is from the first quarter of 2002 to the fourth quarter of 2008 in column (5) to (8), representing one current U.S. business cycle, where the expansion period within this business cycle is from November 2001 to December 2007 and the contraction period is from December 2007 to December 2008. Individual stock characteristics are from the CRSP while institutional ownership is obtained from Thomson Financial 13 File. All of the dependent and independent variables are as defined in Table I. Time dummies are included but not reported in the table. The robust t-statistics in parentheses are based on standard errors that are heteroskedasticity-consistent and allow clustering at the firm level.

	$SKEW_t$							
VARIABLES	U.S. Business Cycle I Expansion: Mar. 1991-Mar. 2001 Contraction: Mar. 2001-Nov. 2001				U.S. Business Cycle II Expansion: Nov. 2001-Dec. 2007 Contraction: Dec. 2007-Dec. 2008			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IO_{t-2}	-0.147				-0.196			
	(-9.06)				(-10.32)			
ΔIO_{t-1}	-0.077				-0.095			
	(-1.80)				(-1.78)			
SIO_{t-2}		-0.316		-0.349		-0.331		-0.343
		(-12.62)		(-13.30)		(-12.41)		(-12.89)
ΔSIO_{t-1}		-0.142		-0.156		-0.130		-0.133
		(-2.45)		(-2.69)		(-1.75)		(-1.77)
LIO_{t-2}			0.003	0.251			-0.068	0.147
			(0.06)	(4.11)			(-0.93)	(2.28)
ΔLIO_{t-1}			-0.023	0.103			-0.091	0.012
			(-0.32)	(1.48)			(-0.85)	(0.12)
$SIZE_{t-1}$	-0.061	-0.059	-0.071	-0.061	-0.053	-0.054	-0.070	-0.057
	(-27.82)	(-27.59)	(-33.96)	(-27.94)	(-16.44)	(-18.61)	(-21.91)	(-17.45)
$LEVERAGE_{t-1}$	0.150	0.154	0.148	0.156	0.098	0.097	0.079	0.096
	(7.44)	(7.67)	(7.31)	(7.73)	(3.56)	(3.55)	(2.84)	(3.52)
$DTURNOVER_{t-1}$	0.043	0.050	0.038	0.052	0.017	0.020	0.011	0.020
	(1.77)	(2.08)	(1.56)	(2.17)	(0.74)	(0.87)	(0.46)	(0.89)
$BKMKT_{t-1}$	0.013	0.012	0.010	0.011	0.008	0.003	0.005	0.002
	(2.11)	(1.90)	(1.67)	(1.70)	(0.80)	(0.30)	(0.44)	(0.20)
RET_{t-1}	-0.270	-0.272	-0.267	-0.271	-0.288	-0.291	-0.280	-0.290
	(-24.29)	(-24.43)	(-24.07)	(-24.35)	(-16.48)	(-16.57)	(-16.10)	(-16.49)
RET_{t-2}	-0.211	-0.210	-0.209	-0.208	-0.192	-0.191	-0.187	-0.190
	(-19.79)	(-19.68)	(-19.67)	(-19.56)	(-11.22)	(-11.20)	(-10.94)	(-11.12)

RET_{t-3}	-0.174	-0.171	-0.174	-0.170	-0.180	-0.179	-0.178	-0.178
	(-16.46)	(-16.23)	(-16.44)	(-16.10)	(-11.38)	(-11.26)	(-11.24)	(-11.19)
RET_{t-4}	-0.153	-0.150	-0.154	-0.149	-0.151	-0.149	-0.151	-0.148
	(-14.11)	(-13.84)	(-14.16)	(-13.73)	(-9.22)	(-9.09)	(-9.19)	(-9.02)
RET_{t-5}	-0.155	-0.152	-0.155	-0.150	-0.131	-0.129	-0.132	-0.128
	(-14.64)	(-14.37)	(-14.69)	(-14.25)	(-8.92)	(-8.78)	(-9.03)	(-8.73)
RET_{t-6}	-0.136	-0.132	-0.136	-0.131	-0.117	-0.115	-0.120	-0.114
	(-12.62)	(-12.31)	(-12.67)	(-12.18)	(-7.54)	(-7.40)	(-7.71)	(-7.37)
RET_{t-7}	-0.095	-0.091	-0.095	-0.090	-0.127	-0.125	-0.130	-0.125
	(-8.57)	(-8.28)	(-8.62)	(-8.16)	(-9.11)	(-8.98)	(-9.30)	(-8.94)
RET_{t-8}	-0.068	-0.066	-0.069	-0.064	-0.093	-0.091	-0.097	-0.091
	(-6.21)	(-5.96)	(-6.28)	(-5.85)	(-6.26)	(-6.13)	(-6.49)	(-6.11)
RET_{t-9}	-0.100	-0.098	-0.101	-0.097	-0.111	-0.108	-0.114	-0.108
	(-9.33)	(-9.09)	(-9.44)	(-9.00)	(-8.21)	(-8.02)	(-8.43)	(-7.99)
Constant	1.224	1.189	1.372	1.219	1.075	1.094	1.319	1.137
	(26.43)	(25.86)	(30.28)	(26.28)	(16.55)	(17.68)	(19.79)	(17.16)
Observations	246,209	246,209	246,209	246,209	128,194	128,194	128,194	128,194
Adj-R-squared	0.035	0.036	0.035	0.036	0.027	0.028	0.026	0.028

Table 6. Skewness Using Different Adjusted-returns and Investor Horizons: Robustness Checks

This table presents the results of regressions of skewness using different adjusted-returns on the level and the change in types of institutional ownership and other stock characteristics. The sample period is from the first quarter of 1981 to the fourth quarter of 2008. Individual stock characteristics are from the CRSP while institutional ownership is obtained from Thomson Financial 13 File. All of the dependent and independent variables are as defined in Table I. Time dummies are included but not reported in the table. The robust t-statistics in parentheses are based on standard errors that are heteroskedasticity-consistent and allow clustering at the firm level.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	$SKEW\_EX_t$		$SKEW\_MK_t$		$SKEW\_FF3_t$	
IO_{t-1}	-0.137		-0.146		-0.132	
	(-11.52)		(-12.23)		(-11.04)	
SIO_{t-1}		-0.332		-0.336		-0.320
		(-18.52)		(-18.19)		(-17.74)
LIO_{t-1}		0.262		0.236		0.251
		(6.72)		(5.80)		(6.46)
$SIZE_{t-1}$	-0.050	-0.051	-0.048	-0.049	-0.045	-0.046
	(-27.78)	(-28.78)	(-27.98)	(-29.08)	(-25.01)	(-25.95)
$LEVERAGE_{t-1}$	0.113	0.118	0.129	0.134	0.115	0.120
	(7.08)	(7.46)	(8.44)	(8.82)	(7.36)	(7.73)
$DTURNOVER_{t-1}$	0.012	0.019	0.016	0.022	0.007	0.013
	(0.80)	(1.20)	(0.98)	(1.36)	(0.46)	(0.87)
$BKMKT_{t-1}$	0.041	0.037	0.037	0.033	0.039	0.036
	(7.77)	(7.18)	(7.57)	(6.93)	(7.81)	(7.21)
RET_{t-1}	-0.280	-0.280	-0.291	-0.290	-0.242	-0.242
	(-31.19)	(-31.11)	(-33.09)	(-33.00)	(-28.12)	(-28.04)
RET_{t-2}	-0.202	-0.199	-0.219	-0.216	-0.176	-0.173
	(-22.85)	(-22.54)	(-25.31)	(-25.00)	(-20.99)	(-20.68)
RET_{t-3}	-0.159	-0.156	-0.175	-0.172	-0.137	-0.134
	(-18.92)	(-18.51)	(-21.32)	(-20.91)	(-17.05)	(-16.64)
RET_{t-4}	-0.130	-0.127	-0.140	-0.137	-0.116	-0.112
	(-15.11)	(-14.72)	(-16.72)	(-16.33)	(-14.07)	(-13.67)
RET_{t-5}	-0.148	-0.145	-0.145	-0.142	-0.131	-0.127
	(-17.65)	(-17.26)	(-17.74)	(-17.34)	(-16.26)	(-15.87)
RET_{t-6}	-0.119	-0.115	-0.126	-0.123	-0.112	-0.108
	(-13.98)	(-13.57)	(-15.21)	(-14.80)	(-13.63)	(-13.22)
RET_{t-7}	-0.091	-0.088	-0.108	-0.105	-0.091	-0.088
	(-10.94)	(-10.56)	(-13.20)	(-12.83)	(-11.36)	(-10.98)
RET_{t-8}	-0.054	-0.051	-0.056	-0.053	-0.050	-0.047

	(-6.29)	(-5.95)	(-6.66)	(-6.32)	(-5.97)	(-5.64)
RET_{t-9}	-0.102	-0.099	-0.111	-0.108	-0.101	-0.098
	(-12.24)	(-11.88)	(-13.70)	(-13.34)	(-12.46)	(-12.10)
Constant	1.127	1.145	0.820	0.838	1.000	1.017
	(25.84)	(26.40)	(19.64)	(20.22)	(22.98)	(23.50)
Observations	535,201	535,201	535,234	535,234	535,201	535,201
Adj-R-squared	0.031	0.031	0.028	0.029	0.024	0.024

Table 7. Alternative Classification of Investor Horizons: Robustness Checks

This table presents the results of regressions of skewness of raw stock return on the level and the change in types of institutional ownership and other stock characteristics. The sample period is from the first quarter of 1981 to the fourth quarter of 2008. Individual stock characteristics are from the CRSP while institutional ownership is obtained from Thomson Financial 13 File. The dependent variable $SKEW_t$ is as defined in Table I. The independent variables are as follows. Institutional investors are categorized as transient investors (TRA_{t-2}) if they exhibit highest portfolio turnover and highest trading sensitivity to current earnings, along with relatively high portfolio diversification. Institutional investors are categorized as dedicated investors (DED_{t-2}) if they exhibit high concentration, low turnover, and almost no trading sensitivity to current earnings. Institutional investors are categorized as quasi_indexing investors (QIX_{t-2}) if they exhibit high diversification, low turnover, and low trading sensitivity to current earnings. ΔTRA_{t-1}, and ΔDED_{t-1}, and ΔQIX_{t-1} are the changes for transient, dedicated, and quasi_indexing institutions in period *t*, respectively. All of the other independent variables are as defined in Table I. Time dummies are included but not reported in the table. The robust t-statistics in parentheses are based on standard errors that are heteroskedasticity-consistent and allow clustering at the firm level.

VARIABLES	(1) $SKEW_t$	(2) $SKEW_t$	(3) $SKEW_t$	(4) $SKEW_t$	(5) $SKEW_t$
IO_{t-2}	-0.130				
	(-13.48)				
ΔIO_{t-1}	-0.059				
	(-1.93)				
TRA_{t-2}		-0.628			-0.680
		(-22.80)			(-22.51)
ΔTRA_{t-1}		-0.429			-0.461
		(-7.80)			(-8.20)
QIX_{t-2}			-0.162		-0.007
			(-10.49)		(-0.41)
ΔQIX_{t-1}			-0.184		-0.083
			(-4.34)		(-1.94)
DED_{t-2}				0.026	0.241
				(0.88)	(8.51)
ΔDED_{t-1}				0.197	0.286
				(3.09)	(4.64)
$SIZE_{t-1}$	-0.053	-0.053	-0.055	-0.060	-0.054
	(-32.64)	(-33.53)	(-33.25)	(-38.76)	(-32.71)
$LEVERAGE_{t-1}$	0.110	0.112	0.109	0.111	0.112
	(6.91)	(7.07)	(6.87)	(6.97)	(7.09)
$DTURNOVER_{t-1}$	0.013	0.024	0.009	0.008	0.025
	(0.80)	(1.55)	(0.60)	(0.54)	(1.65)
$BKMKT_{t-1}$	0.039	0.035	0.040	0.040	0.034
	(7.48)	(6.76)	(7.62)	(7.60)	(6.60)
RET_{t-1}	-0.282	-0.283	-0.280	-0.279	-0.283
	(-31.21)	(-31.27)	(-31.11)	(-30.88)	(-31.20)
RET_{t-2}	-0.203	-0.199	-0.203	-0.202	-0.198
	(-22.93)	(-22.43)	(-22.97)	(-22.74)	(-22.34)

RET_{t-3}	-0.160	-0.153	-0.161	-0.159	-0.152
	(-18.90)	(-18.13)	(-19.03)	(-18.84)	(-18.01)
RET_{t-4}	-0.131	-0.124	-0.132	-0.131	-0.122
	(-15.14)	(-14.32)	(-15.27)	(-15.14)	(-14.17)
RET_{t-5}	-0.149	-0.142	-0.150	-0.149	-0.141
	(-17.68)	(-16.90)	(-17.82)	(-17.75)	(-16.78)
RET_{t-6}	-0.119	-0.114	-0.121	-0.120	-0.113
	(-14.00)	(-13.33)	(-14.15)	(-14.10)	(-13.24)
RET_{t-7}	-0.092	-0.087	-0.093	-0.093	-0.086
	(-10.97)	(-10.35)	(-11.12)	(-11.09)	(-10.27)
RET_{t-8}	-0.055	-0.050	-0.056	-0.056	-0.049
	(-6.28)	(-5.71)	(-6.43)	(-6.45)	(-5.67)
RET_{t-9}	-0.103	-0.098	-0.104	-0.104	-0.098
	(-12.27)	(-11.76)	(-12.43)	(-12.43)	(-11.73)
Constant	0.922	0.911	0.946	1.030	0.925
	(22.04)	(22.10)	(22.53)	(25.17)	(22.09)
Observations	534,287	534,287	534,287	534,287	534,287
Adj-R-squared	0.031	0.032	0.031	0.030	0.032

Table 8. Institutions' Holdings and Trading Behavior around Earnings Announcement

This table presents the results of regressions of the level and the change in investor horizons on the earnings surprises. The sample period is from the first quarter of 1996 to the fourth quarter of 2008. Individual analyst forecasts and quarterly earnings per share are from I/B/E/S while institutional ownership is obtained from Thomson Financial 13 File. The dependent variables IO_t, SIO_t, LIO_t, ΔIO_t, ΔSIO_t,.and ΔLIO_t are as defined in Table I. Independent variable SUE_t is standardized unexpected earnings, defined as decile-adjusted unexpected earnings. Positive SUE_t is standardized unexpected earnings when the raw earnings surprises are positive. Negative SUE_t is standardized unexpected earnings when the raw earnings surprises are negative. CAR [-1, 1] is the cumulative abnormal return around the earnings announcement, where zero represents the announcement date. All the other independent variables are as defined in Table I. Time dummies are included but not reported in the table. The robust *t*-statistics in parentheses are based on standard errors that are heteroskedasticity-consistent and allow clustering at the firm level.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Panel A:	IO_t	IO_t	IO_t	ΔIO_t	ΔIO_t	ΔIO_t
SUE_{t-1}	0.020					
	(2.59)					
Positive SUE_{t-1}		0.024			0.005	
		(2.55)			(1.54)	
Negative SUE_{t-1}			-0.008			0.010
			(-0.71)			(2.43)
SUE_{t-2}	0.010	0.028	-0.019	-0.003	-0.003	-0.006
	(1.32)	(2.71)	(-1.53)	(-1.16)	(-0.92)	(-1.34)
SUE_{t-5}	0.018	0.015	0.022	0.000	0.001	-0.001
	(2.16)	(1.43)	(1.95)	(0.03)	(0.21)	(-0.32)
$SIZE_{t-1}$	-0.020	-0.022	-0.017	-0.001	-0.002	-0.000
	(-3.80)	(-4.00)	(-2.98)	(-2.29)	(-2.54)	(-0.03)
$BKMKT_{t-1}$	-0.062	-0.069	-0.054	-0.001	0.003	-0.003
	(-2.56)	(-2.51)	(-2.13)	(-0.32)	(0.71)	(-0.55)
$CAR[-1,1]_t$	0.063	0.055	0.051	0.024	0.027	0.006
	(2.14)	(1.38)	(1.19)	(2.07)	(1.72)	(0.33)
$CAR[-1,1]_{t-1}$	0.055	0.013	0.106	0.043	0.025	0.058
	(1.76)	(0.29)	(2.16)	(3.66)	(1.68)	(3.06)
RET_{t-1}	0.048	0.038	0.049	0.007	0.005	0.008
	(4.27)	(2.64)	(2.84)	(2.47)	(1.41)	(1.61)
RET_{t-2}	0.067	0.056	0.084	0.004	0.004	0.004
	(6.34)	(4.21)	(4.87)	(1.40)	(1.07)	(0.74)
RET_{t-3}	0.071	0.071	0.076	-0.002	-0.001	-0.004
	(7.61)	(6.09)	(4.80)	(-0.48)	(-0.24)	(-0.77)
RET_{t-4}	0.059	0.059	0.053	-0.008	-0.012	-0.002
	(6.28)	(5.27)	(3.37)	(-2.34)	(-2.84)	(-0.27)

RET_{t-5}	0.051	0.070	0.014	0.002	-0.001	0.007
	(5.12)	(5.41)	(0.95)	(0.47)	(-0.30)	(1.40)
RET_{t-6}	0.036	0.046	0.017	-0.004	-0.008	0.004
	(3.83)	(3.90)	(1.04)	(-1.29)	(-2.06)	(0.67)
RET_{t-7}	0.032	0.031	0.034	-0.003	-0.007	0.003
	(3.52)	(2.70)	(2.25)	(-0.90)	(-1.64)	(0.63)
RET_{t-8}	0.024	0.025	0.023	-0.003	-0.004	-0.002
	(2.73)	(2.20)	(1.55)	(-0.89)	(-0.86)	(-0.42)
RET_{t-9}	0.003	0.005	0.003	0.000	0.000	-0.000
	(0.41)	(0.42)	(0.23)	(0.12)	(0.07)	(-0.08)
Constant	1.167	1.204	1.115	0.030	0.058	-0.010
	(9.27)	(8.86)	(8.20)	(2.39)	(2.74)	(-0.49)
Observations	14,276	8,769	5,507	14,276	8,769	5,507
Adj-R-squared	0.178	0.169	0.208	0.103	0.097	0.126

Panel B:	SIO_t	SIO_t	SIO_t	ΔSIO_t	ΔSIO_t	ΔSIO_t
SUE_{t-1}	0.026			0.002		
	(4.88)			(0.84)		
Positive SUE_{t-1}		0.029			0.006	
		(4.42)			(1.96)	
Negative SUE_{t-1}			0.008			0.011
			(1.04)			(3.60)
SUE_{t-2}	0.020	0.031	0.002	-0.001	-0.002	-0.002
	(3.78)	(4.26)	(0.26)	(-0.49)	(-0.76)	(-0.70)
SUE_{t-5}	0.020	0.019	0.022	-0.001	-0.002	-0.002
	(3.41)	(2.46)	(2.74)	(-0.72)	(-0.61)	(-0.64)
$SIZE_{t-1}$	-0.027	-0.030	-0.023	-0.000	-0.001	0.001
	(-8.15)	(-8.26)	(-6.53)	(-0.31)	(-1.94)	(1.96)
$BKMKT_{t-1}$	-0.078	-0.085	-0.069	0.001	0.002	-0.000
	(-4.75)	(-4.35)	(-4.32)	(0.33)	(0.81)	(-0.07)
$CAR[-1,1]_t$	0.056	0.045	0.029	0.017	0.024	-0.009
	(2.63)	(1.54)	(0.97)	(1.89)	(1.96)	(-0.63)
$CAR[-1,1]_{t-1}$	0.075	0.052	0.108	0.057	0.044	0.070
	(3.29)	(1.66)	(3.09)	(5.88)	(3.72)	(4.43)
RET_{t-1}	0.037	0.042	0.025	0.011	0.013	0.007
	(4.85)	(4.17)	(2.18)	(4.72)	(4.42)	(1.81)
RET_{t-2}	0.056	0.050	0.065	0.006	0.007	0.003
	(7.59)	(5.18)	(5.56)	(2.34)	(2.36)	(0.64)
RET_{t-3}	0.063	0.067	0.058	-0.003	-0.002	-0.004
	(9.63)	(8.10)	(5.40)	(-0.69)	(-0.40)	(-1.01)

RET_{t-4}	0.055	0.057	0.048	-0.005	-0.008	-0.000
	(8.28)	(7.01)	(4.31)	(-1.77)	(-2.24)	(-0.06)
RET_{t-5}	0.048	0.065	0.019	-0.001	-0.002	0.000
	(7.09)	(7.13)	(1.88)	(-0.50)	(-0.62)	(0.09)
RET_{t-6}	0.040	0.049	0.021	-0.005	-0.007	-0.000
	(6.02)	(5.78)	(1.91)	(-1.89)	(-2.27)	(-0.09)
RET_{t-7}	0.037	0.041	0.032	-0.003	-0.005	-0.001
	(5.81)	(5.07)	(2.90)	(-1.19)	(-1.45)	(-0.14)
RET_{t-8}	0.032	0.031	0.032	-0.004	-0.005	-0.004
	(4.87)	(3.72)	(3.01)	(-1.58)	(-1.37)	(-0.85)
RET_{t-9}	0.018	0.022	0.013	0.001	0.002	-0.001
	(2.94)	(2.81)	(1.20)	(0.33)	(0.56)	(-0.23)
Constant	1.009	1.122	0.915	0.014	0.027	-0.059
	(12.30)	(12.24)	(10.66)	(1.30)	(1.63)	(-3.29)
Observations	14,276	8,769	5,507	14,276	8,769	5,507
Adj-R-squared	0.146	0.151	0.153	0.124	0.115	0.150

Panel C:	LIO_t	LIO_t	LIO_t	ΔLIO_t	ΔLIO_t	ΔLIO_t
SUE_{t-1}	-0.004			-0.000		
	(-1.82)			(-0.19)		
Positive SUE_{t-1}		-0.002			0.001	
		(-0.79)			(0.48)	
Negative SUE_{t-1}			-0.011			0.001
			(-3.17)			(0.70)
SUE_{t-2}	-0.004	-0.000	-0.011	-0.001	0.001	-0.003
	(-1.79)	(-0.14)	(-2.87)	(-0.67)	(0.63)	(-1.36)
SUE_{t-5}	-0.000	-0.002	0.003	0.000	-0.000	0.000
	(-0.15)	(-0.69)	(0.99)	(0.16)	(-0.07)	(0.27)
$SIZE_{t-1}$	0.010	0.011	0.010	-0.000	0.000	-0.000
	(7.45)	(7.26)	(6.54)	(-0.41)	(0.11)	(-0.62)
$BKMKT_{t-1}$	0.007	0.010	0.004	0.000	0.001	-0.001
	(1.13)	(1.35)	(0.58)	(0.45)	(1.02)	(-0.58)
$CAR[-1,1]_t$	0.006	0.012	0.006	0.001	-0.000	0.000
	(0.82)	(1.36)	(0.57)	(0.15)	(-0.06)	(0.06)
$CAR[-1,1]_{t-1}$	-0.003	-0.018	0.013	-0.003	-0.010	0.005
	(-0.42)	(-1.54)	(1.09)	(-0.81)	(-1.94)	(0.80)
RET_{t-1}	0.005	-0.001	0.011	0.001	0.001	0.003
	(1.84)	(-0.21)	(2.35)	(0.85)	(0.34)	(1.61)
RET_{t-2}	0.006	0.002	0.012	0.000	-0.002	0.004
	(1.87)	(0.67)	(2.37)	(0.06)	(-1.55)	(2.23)

RET_{t-3}	0.004	0.003	0.006	0.002	0.002	0.002
	(1.50)	(0.92)	(1.55)	(2.12)	(1.71)	(1.21)
RET_{t-4}	0.002	0.000	0.004	-0.002	-0.002	-0.002
	(0.80)	(0.01)	(1.03)	(-1.88)	(-1.52)	(-0.91)
RET_{t-5}	-0.001	0.001	-0.005	-0.000	-0.000	0.001
	(-0.28)	(0.31)	(-1.26)	(-0.05)	(-0.23)	(0.27)
RET_{t-6}	-0.001	-0.002	0.002	0.003	0.001	0.006
	(-0.26)	(-0.71)	(0.52)	(2.72)	(0.93)	(3.03)
RET_{t-7}	-0.003	-0.006	-0.000	-0.000	-0.001	0.001
	(-1.41)	(-2.06)	(-0.04)	(-0.35)	(-0.96)	(0.28)
RET_{t-8}	-0.003	-0.004	-0.003	0.002	0.002	0.001
	(-1.34)	(-1.15)	(-0.76)	(1.20)	(1.24)	(0.26)
RET_{t-9}	-0.003	-0.005	-0.001	0.002	0.004	-0.001
	(-1.47)	(-1.45)	(-0.22)	(1.69)	(2.54)	(-0.24)
Constant	-0.070	-0.082	-0.099	0.001	0.025	0.007
	(-2.08)	(-2.24)	(-2.76)	(0.23)	(3.65)	(0.93)
Observations	14,276	8,769	5,507	14,276	8,769	5,507
Adj-R-squared	0.143	0.131	0.172	0.159	0.164	0.162

Table 9. Corporate Risk-taking and Investor Horizon

This table presents the results of regressions of corporate risk-taking measured as $StdROA1_t$, $StdROA2_t$, LTD_t, and $GROWTH_t$ on investor horizon. The sample period is from the first quarter of 1981 to the fourth quarter of 2008. Corporate risk-taking variables are from COMPUSTAT while institutional ownership is obtained from Thomson Financial 13 File. The dependent variables are as follows. $StdROA1_t$ ($StdROA2_t$) is the standard deviation of quarterly ROA1 (ROA2) from quarter *t* to *t+5*, where ROA1 is the log of the ratio of net income (COMPUSTAT Fundamentals Quarterly: Item IBQ) to total assets (Item ATQ) lagged by one quarter and ROA2 is the log of the ratio of operating income before depreciation (Item OIBDPQ) to total assets (Item ATQ) lagged by one quarter. LTD_t is the log of the ratio of long-term debt (Item DLTTQ) to total assets Item ATQ) lagged by one quarter. $GROWTH_t$ is the log of the ratio of market capitalization to book value of equity (Item SEQQ). The independent ROE_{t-1} is quarterly return on equity defined as the log of the ratio of net income (Item IBQ) to the value of equity (Item SEQQ) lagged by one quarter. All the other independent variables are as defined in Table I. All ratio variables are winsorized at the 1st and 99th percentile. Time dummies are included but not reported in the table. The robust *t*-statistics in parentheses are based on standard errors that are heteroskedasticity-consistent and allow clustering at the firm level.

VARIABLES	$StdROA1_t$		$StdROA2_t$		LTD_t		$GROWTH_t$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IO_{t-1}	0.033		0.009		0.111		0.018	
	(2.90)		(1.22)		(2.20)		(0.89)	
SIO_{t-1}		0.069		0.041		0.217		0.320
		(4.14)		(3.66)		(2.79)		(11.49)
LIO_{t-1}		0.001		-0.029		-0.187		-0.655
		(0.04)		(-1.09)		(-0.92)		(-9.50)
$SIZE_{t-1}$	-0.059	-0.059	-0.041	-0.041	0.039	0.042	0.098	0.096
	(-37.12)	(-37.63)	(-37.38)	(-38.06)	(5.20)	(5.59)	(29.03)	(28.91)
$LEVERAGE_{t-1}$	0.307	0.306	-0.032	-0.033			-0.348	-0.355
	(19.98)	(19.94)	(-3.01)	(-3.06)			(-11.60)	(-11.94)
$DTURNOVER_{t-1}$	0.036	0.034	0.069	0.067	-0.120	-0.128	0.321	0.300
	(3.00)	(2.85)	(5.11)	(5.03)	(-2.56)	(-2.69)	(8.29)	(8.32)
$BKMKT_{t-1}$	0.030	0.031	-0.019	-0.018	0.129	0.132		
	(7.14)	(7.29)	(-5.82)	(-5.60)	(6.63)	(6.83)		
ROE_{t-1}			-0.018	-0.018	0.066	0.066	0.279	0.278
			(-12.89)	(-12.84)	(9.87)	(9.81)	(74.15)	(73.50)
Constant	1.499	1.505	1.086	1.094	-2.585	-2.625	-0.670	-0.636
	(46.09)	(46.61)	(46.28)	(46.81)	(-18.10)	(-18.64)	(-10.79)	(-10.42)
Observations	360,311	360,311	282,271	282,271	281,231	281,231	322,601	322,601
Adj-R-squared	0.075	0.076	0.079	0.079	0.012	0.013	0.313	0.318