Institutional Investors and Crash Risk: Monitoring or Expropriation?

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ABSTRACT

This study tests two opposing views of institutional investors—monitoring versus expropriation--by investigating whether institutional ownership is positively or negatively related to future firm-specific stock price crash risk. We present robust evidence that institutional ownership is positively associated with future stock price crash risk. After further classifying institutional investors into transient, dedicated, and quasi-indexer types, we show that the overall positive relation between institutional ownership and future stock price crash risk is driven primarily by transient institutions, with dedicated institutions serving a monitoring role in reducing future stock price crash risk. We also find that institutional ownership by public pension funds (bank trusts, investment companies, and independent investment advisors) is significantly negatively (positively) associated with future crash risk. We also find that opaque financial reporting exacerbates the impact of institutional investors on future stock price crash risk. The findings in this study are shown inter alia to be robust to endogeneity concerns and alternative institutional investment metrics.

JEL Classification: G20; G32; G34

Keywords: institutional investors; crash risk; monitoring; expropriation

1. INTRODUCTION

Recent studies maintain that managers withhold bad news from investors because of career and short-term compensation concerns and that when a sufficiently long-run of bad news accumulates and reaches a critical threshold level, managers tend to give up. At that point, all of the negative firm-specific shocks become public at once leading to a crash—a large negative outlier in the distribution of returns (Jin and Myers, 2006; Kothari, Shu, and Wysocki, 2009; Hutton, Marcus, and Tehranian, 2009). The empirical evidence not only supports this hypothesis but also shows that financial reporting opaqueness, corporate tax avoidance, and CFO's equity incentives facilitate/encourage bad news hoarding activities and act to increase future firm-specific crash risk (Hutton et al., 2009; Kim, Li, and Zhang, 2010a; Kim, Li, and Zhang, 2010b).

In this paper, we comprehensively examine the relation between institutional investors and future stock price crash risk. Our study sheds light on how the presence of institutional investors affects bad news hoarding activities by management. Our interest in this issue is motivated by the rapid and ongoing increase in U.S. institutional investment and the role, if any, that institutional investors play in corporate governance.[1]

Shleifer and Vishny (1986, 1997) argue that institutional shareholders, by virtue of their large shareholdings, have the incentive to collect information and monitor management because they reap greater benefits than smaller investors from monitoring the organization. Similarly, Dobrzynski (1993) and Monks and Minow (1995) argue that sophisticated institutions with large shareholdings tend to monitor and discipline managers to ensure that the firm's investment strategy is consistent with the objective of maximizing long-term value, rather than meeting

[1] Institutional investors have substantially and consistently increased their ownership of U.S. equities in the past three decades. According to the Institutional Investment Report of the Conference Board, institutional ownership in the largest 1,000 U.S. corporations increased between 1987 and 2000 from an average of 46.6 percent of total stock to an average of 61.4 percent and by 2007 reached an unprecedented 76.4 percent of total stock. More current data indicates that institutional investors owned 73 percent of the top 1,000 U.S corporations in 2009 as compared to 69 percent in 2008.

short-term earnings goals. Consistent with this "monitoring view" of institutional investors, empirical studies provide evidence on a variety of benefits of institutional ownership as it affects antitakeover amendments, Tobin's *q*, R & D investment, executive compensation, and management earnings forecasts (Jarrell and Poulsen, 1987; Brickley, Lease, and Smith, 1988; Agrawal and Mandelker, 1990; McConnell and Servaes, 1990; Bushee, 1998; Hartzell and Starks, 2003; Ajinkya, Bhojraj, and Sengupta, 2005). Based on this monitoring paradigm, we would conjecture that institutional investors help to mitigate managerial bad news hoarding activities and reduce future stock price crash risk by monitoring corporate information disclosure.

However, there are several reasons to expect that institutional investors might behave differently. First, if monitoring is costly and/or time consuming, institutional investors may just sell off their stock in response to unfavourable performance rather than take any corrective action (Coffee, 1991). Second, the strategy of many institutional investors in U.S. equity markets (e.g., the mutual fund "Vanguard 500") is to invest in a large number of different equities in order to diversify risk and maintain sufficient liquidity. These latter institutional investors are likely indifferent regarding the governance of individual corporations. Third, and more crucially, many critics claim that, by acting as "traders", institutional investors themselves place excessive emphasis on short-term performance, causing management to be overly concerned that near-term earnings disappointments will induce heavy stock selling by institutional investors and the undervaluation of stock price (Graves and Waddock, 1990; Jacobs, 1991; Porter, 1992; Bushee, 1998, 2001). Indeed, prior research provides evidence that institutions trade heavily based on current earnings news (Porter, 1992; Lang and McNichols, 1997). The latter "expropriation view" of institutional investors would lead us to conjecture that institutional investors exacerbate the tendency of managers to engage in bad news hoarding activities, increasing future stock price crash risk.

We test these two opposing views of institutional investors—monitoring versus expropriation--by investigating whether institutional ownership is positively or negatively related to future firm-specific stock price crash risk. Using a large sample of U.S. public firms for the years 1980 to 2008, we find robust evidence that institutional ownership is positively associated with one-year-ahead stock price crash risk, consistent with the expropriation view. The effect is economically significant. On average, an increase of one standard deviation in the percentage of institutional ownership is associated with an estimated 5-12% increase in future stock price crash risk.

The overall evidence against the monitoring role of institutional investors potentially masks institutional investor differences. Bushee (1998, 2001) classifies institutions into three groups—dedicated, quasi-indexer, and transient institutions—based on their past investment behaviour. He finds that while firms dominated by transient institutional investors are more likely to cut long-term R&D projects to meet short-term earnings targets, firms with overall higher dedicated institutional ownership are less likely to engage in such myopic investment behaviour. His evidence suggests that dedicated institutional investors serve a monitoring role in effectively curtailing short-term myopic investment behaviour by management. In a similar vein, Chen, Harford, and Li (2007) find that monitoring of acquisitions is facilitated by independent long-term institutions (ILTIs) with concentrated holdings.[2] Hence, we conjecture that the overall positive relation between institutional ownership and future stock price crash risk is driven by transient institutions, that is, institutions with a short investment horizon and high portfolio

[2] Chen, Harford, and Li (2007) intersect the groups of ILTIs that they initially identified, with institutions identified by Bushee (1998) as dedicated and quasi-indexer investors to refine their monitoring measure.

turnover. With respect to dedicated institutions that are more likely to take on a monitoring role, we expect a negative relation between institutional ownership and future stock price crash risk. Consistent with these conjectures, we find that ownership by transient (dedicated) institutions is significantly positively (negatively) associated with future stock price crash risk. Moreover, the magnitudes and significance levels of the expropriation effect associated with transient institutions are much larger than those of the monitoring effect associated with dedicated institutions.

To test whether the predictive ability of institutional ownership on future stock price crash risk spans more than one year and whether institutional trading also has an impact on future stock price crash risk, we decompose current institutional ownership (of transient and dedicated institutions) into lagged institutional ownership and institutional trading. Our results show that lagged institutional ownership and lagged transient ownership (and lagged dedicated ownership) positively (negatively) forecast future crash risk, suggesting that institutional ownership has a long-run impact on crash risk irrespective of institutional-type. Moreover, institutional trading and trading by transient institutions also strongly predict future crash risk. In contrast, the results regarding trading by dedicated institutions are insignificant.

In robustness tests, we control for the potential endogeneity of institutional holdings. We also measure the influence of institutional investors by stock ownership of the five largest institutional investors. Our results remain robust. In additional tests, we find that opaque financial reporting exacerbates the short-term focus by institutional investors and its impact on future stock price crash risk. In a sub-period analysis, we find that the expropriation view of transient institutions holds across each of three decades, and the effects have become much stronger since the 1990s. By contrast, the monitoring effects of dedicated institutions are much weaker in the 2000s compared to earlier periods. These findings are consistent with the overall failure of corporate governance in corporate America that contributed to two U.S. financial crises in the 21st century.

Finally, we further divide our institutional investors into bank trusts, insurance companies, investment companies, independent investment advisors, corporate pension funds, and public pension funds. We examine how these different types of institutional holdings are associated with future stock price crash risk. We find that institutional ownership by public pension funds (bank trusts, investment companies, and independent investment advisors) is significantly negatively (positively) associated with future crash risk. This is consistent with the findings in Brickley, Lease, and Smith (1988) and Bushee (2001) that pension funds tend to invest for the long-term and monitor management actively relative to other types of institutions.

To the best of our knowledge, our paper is the first to systematically document the impact of institutional investors on future stock price crash risk.[3] By focusing on a unique perspective—the extreme moment of the stock return distribution—this study provides new and direct evidence concerning the economic consequences of institutional investing. Our paper is one of the few to provide evidence on the contradictory monitoring and expropriation views of institutional investing at the firm level.[4]

In addition, this study provides new evidence on factors that contribute to or mitigate stock price crash risk. Several empirical studies document how future stock price crash risk is affected by divergence of investor opinion (Chen, Hong, and Stein, 2001); opaqueness of financial

[3] Kim, Li, and Zhang (2010a) examine the association between corporate tax avoidance and future stock price crash risk. They also condition this association on external monitoring mechanisms, as proxied by institutional shareholding and analyst coverage.
[4] Bushee (1998) and Chen, Harford, and Li (2007) study institutional monitoring and trading effects of institutional investors on myopic investment behavior and post-merger performance while simultaneously considering different types of institutions. Bushee (1998) finds a significant (short-term) trading effect for concentrated transient ownership. However, he does not find a monitoring effect for dedicated ownership. Chen, Harford, and Li (2007) find a significant monitoring impact only for independent long-term institutions.

reporting (Jin and Myers, 2006; Hutton, Marcus, and Tehranian, 2009); corporate governance (Bae et al., 2006); accounting conservatism (Kim and Zhang, 2009; Fang, Liu, and Xin, 2009); government regulation (Fang, Liu, and Xin, 2009); corporate tax avoidance (Kim, Li, and Zhang, 2010a); CFO's option incentive (Kim, Li, and Zhang, 2010b); and political incentives (Piotroski, Wong, and Zhang, 2010). This study extends the existing literature by examining the impact of institutional investors on future stock price crash risk.

The paper proceeds as follows: Section 2 describes the sample data and presents descriptive statistics; Section 3 presents the main empirical tests. Section 4 briefly concludes.

2. Sample, Variables, and Descriptive Statistics

2.1. Sample

The sample comprises firm-year observations in the *Thompson-Reuters Institutional Holdings Database,* formerly known as the *CDA/Spectrum* database, with non-missing values for all variables. The overall sample period is from 1980 to 2008. Year-end institutional holdings data are obtained from the *Thompson-Reuters Institutional Holdings Database.* Other data sources include: 1) CRSP daily stock files to estimate firm-specific crash risk; 2) *Compustat* annual files for accounting data; and 3) I/B/E/S for analyst data. Our final sample consists of 66,727 firm-year observations.

2.2. Classification of Institutional Investors

Bushee (1998, 2001) and Bushee and Noe (2000) use factor analysis and cluster analysis to classify institutional investors into three groups based on their past investor behaviour. Transient institutional investors (*TRA*) are characterized by high portfolio turnover and diversified portfolios. Dedicated institutional investors (*DED*) have low turnover and concentrated portfolio holdings, while quasi-indexer institutional investors (*QIX*) have low turnover and diversified portfolio holdings. We initially classify institutional investors in our sample firms into the same three groups and calculate institutional ownership by the percentage of ownership relative to the total shares outstanding for all three groups together and for each group separately.

2.3. Measurement of Firm-Specific Crash Risk

Following the previous literature (Chen, Hong, and Stein, 2001; Jin and Myers, 2006; Hutton, Marcus, and Tehranian, 2009), we compute three firm-specific measures of stock price crash risk for each firm-year observation: 1) the negative coefficient of skewness of firm-specific daily returns (*NCSKEW*); 2) the down-to-up volatility of firm-specific daily returns (*DUVOL*); and 3) the difference between the number of days with negative extreme firm-specific daily returns and those with positive extreme firm-specific daily returns (*COUNT*). [5]

To calculate firm-specific measures of stock price crash risk, we first estimate firm-specific daily returns from an expanded market and industry index model regression for each firm and year (Hutton Marcus, and Tehranian, 2009):

$$r_{j,t} = \alpha_j + \beta_{1,j} r_{m,t-1} + \beta_{2,j} r_{i,t-1} + \beta_{3,j} r_{m,t} + \beta_{4,j} r_{i,t} + \beta_{5,j} r_{m,t+1} + \beta_{6,j} r_{i,t+1} + \varepsilon_{j,t}, \quad (1)$$

where $r_{j,t}$ is the return on stock *j* in day *t*, $r_{m,t}$ is the return on the CRSP value-weighted market index in day *t*, and $r_{i,t}$ is the return on the value-weighted industry index based on two-digit SIC codes. We correct for non-synchronous trading by including the lead and lag terms for the value-weighted market and industry indexes (Dimson, 1979).

[5] We also measure firm-specific crash risk by an indicator variable equal to one for a firm-year if the firm experiences one or more firm-specific daily returns falling 3.09 standard deviations below the mean value for that year, and zero otherwise. Our results (available upon request) remain robust.

We define the firm-specific daily return, $R_{j,t}$, as the natural log of one plus the residual return from Equation (1). Using raw residual returns rather than log transformation makes firm-specific returns more positively skewed (Chen, Hong, and Stein, 2001). The log transformation helps to ensure symmetry in the return distribution. We also estimate the measures of crash risk based on raw residual returns, and obtain robust (untabulated) results.

The *NCSKEW* stock price crash measure is defined as the negative of the third moment of each stock's firm-specific daily returns:

$$NCSKEW_{j,T} = -\left(n(n-1)^{\frac{3}{2}} \sum R_{j,t}^{3} \right) \Big/ \left((n-1)(n-2)(\sum R_{j,t}^{2})^{\frac{3}{2}} \right) \quad (2)$$

where n is the number of observations of firm j-specific daily returns during the fiscal year T. The denominator is a normalization factor (Greene, 1993). This study adopts the convention that an increase in *NCSKEW* corresponds to a stock being more "crash prone," i.e., having a more left-skewed distribution, hence, the first minus sign in Equation (2).

The *DUVOL* stock price crash measure is calculated as:

$$DUVOL_{j,T} = \log \left\{ (n_u - 1) \sum_{DOWN} R_{j,t}^{2} \Big/ (n_d - 1) \sum_{UP} R_{j,t}^{2} \right\} \quad (3)$$

where n_u and n_d are the number of up and down days over the fiscal year T, respectively. More specifically, for each stock *j* over a one-year period, we separate all days with firm-specific daily returns above (below) the mean of the period and call this an "up" ("down") sample. We further calculate the standard deviation for the "up" and "down" samples and then compute the (log) ratio of the standard deviation of the "down" sample to the standard deviation of the "up" sample. A higher value for *DUVOL* corresponds to a stock being more "crash prone." This alternative measure does not involve the third moment and hence is less likely to be excessively affected by a small number of extreme returns.

The third stock price crash measure, *COUNT*, is based on the number of firm-specific daily returns exceeding 3.09 standard deviations above and below the mean firm-specific daily return over the fiscal year, with 3.09 chosen to generate frequencies of 0.1% in the normal distribution (Hutton, Marcus, and Tehranian, 2009). *COUNT* is the downside frequencies minus the upside frequencies. A higher value of *COUNT* corresponds to a higher frequency of crashes. Like Hutton, Marcus, and Tehranian (2009) and Kim, Li, and Zhang (2010a), we use the 0.1% cut-off of the normal distribution as a convenient way of obtaining reasonable benchmarks for extreme firm-specific daily returns to calculate the crash risk measure of *COUNT*.

In Section 3, where we describe our empirical tests, we employ one-year-ahead *NCSKEW* ($NCSKEW_{T+1}$), *DUVOL* ($DUVOL_{T+1}$), and *COUNT* ($COUNT_{T+1}$) as dependent variables.

2.4. Control Variables

Following the prior literature (Chen, Hong, and Stein, 2001; Jin and Myers, 2006), we control for the following variables: $NCSKEW_T$, defined as the negative coefficient of skewness for firm-specific daily returns in fiscal year *T*; KUR_T, defined as the kurtosis of firm-specific daily returns in fiscal year *T*; $SIGMA_T$, defined as the standard deviation of firm-specific daily returns in fiscal year *T*; RET_T, defined as the cumulative firm-specific daily returns in fiscal year *T*; MB_T, defined as the market-to-book ratio at the end of fiscal year *T*; LEV_T, defined as the book value of total liabilities divided by the total assets at the end of fiscal year *T*; ROE_T, defined as income before extraordinary items divided by the book value of equity at the end of fiscal year *T*; $LNSIZE_T$, defined as the log of market value of equity at the end of fiscal year *T*; and $DTURNOVER_T$, defined as the average monthly share turnover over fiscal year *T* minus the average monthly share turnover over the previous year *T-1*, where monthly share turnover is calculated as the monthly share trading volume divided by the number of shares outstanding over the month.

Following Hutton, Marcus, and Tehranian (2009), we incorporate into our regressions $OPAQUE_T$, the three-year moving sum of the absolute value of annual performance-adjusted discretionary accruals from fiscal years *T-2* to *T*. We also control for the number of analysts following the firm (ANA_FOL_T), in order to capture firm-specific environment information (Chen, Hong, and Stein, 2001), and the impact of industry-level litigation risk ($LITIG\_RISK_T$) on stock price crash risk (Fang, Liu, and Xin, 2009). $LITIG\_RISK_T$ is set equal to 1 when the firm *j* is in the biotechnology (4-digit SIC codes 2833-2836 and 8731-8734), computer (4-digit SIC codes 3570-3577 and 7370-7374), electronics (4-digit SIC codes 3600-3674), or retail (4-digit SIC codes 5200-5961) industries, and 0 otherwise (Francis et al., 1994).

Appendix A summarizes the variable definitions used in this study.

2.5. Descriptive Statistics

Table 1 Panel A presents descriptive statistics for the variables used in our main regression models. The mean values of future crash risk measures, $NCSKEW_{T+1}$, $DUVOL_{T+1}$, and $COUNT_{T+1}$, are -0.067, -.0.145, and -0.459, respectively. The mean and standard deviation of $DUVOL_{T+1}$ are very similar to the estimates by Chen et al. (2001) using daily market-adjusted returns. The mean value of $INST_T$, TRA_T, DED_T, and QIX_T are 0.436, 0.111, 0.078, and 0.26, which are roughly comparable to the statistics reported in prior studies (e.g., Bushee, 2001; Dikolli, Kulp, and Sedatole, 2009).

Figure 1 highlights the means of *INST*, *TRA*, *DED*, and *QIX*, and *NCSKEW* across the sample years 1980 to 2008.[6,7] We observe a slow and upward trend for total institutional ownership as well as for ownership by each institutional type during this period. We also see an upward trend of *NCSKEW* for the same period. From 1999 to 2002, mean firm-specific crash risk experienced a steep rise falling dramatically afterwards, consistent with the findings of Fang, Liu, and Xin (2009) and the argument that SOX resulted in less withholding of bad news. Not surprisingly, Figure 1 shows that mean firm-specific crash risk started to increase during the years 2007 and 2008, the period of the financial crisis.

Panel B presents a Pearson correlation matrix for the variables used in our main regression models. Our future crash risk measures, $NCSKEW_{T+1}$, $DUVOL_{T+1}$, and $COUNT_{T+1}$, are highly significantly correlated with each other, suggesting that they pick up much the same information. The correlation coefficient between $NCSKEW_{T+1}$ and $DUVOL_{T+1}$ of 0.90 is comparable to that reported by Chen, Hong, and Stein (2001). In addition, while almost all ownership measures are positively correlated with each of the future crash risk measures at the 1% significance level, $INST_T$, TRA_T, and QIX_T have much higher correlation coefficients (of at least 0.10) with these crash risk measures than does DED_T (of no more than 0.01). These results suggest that there might be a positive relation between institutional ownership and future stock price crash risk, consistent with the expropriation view. Consistent with prior literature, all future crash risk measures are significantly positively correlated with $NCSKEW_T$, RET_T, $LNSIZE_T$, $DTURNOVER_T$, and ANA_FOL_T.

-------Insert Table 1 and Figure 1 about here------

[6] Bushee provides the data classifying institutional investors into transient, dedicated, and quasi-indexer groups, starting from year 1981 at http://acct3.wharton.upenn.edu/faculty/bushee/.

[7] We find similar trends for other measures of firm-specific crash risk, i.e., *DUVOL* and *COUNT*, over this sample period. However, to economize on space, we do not report the trend-lines for *DUVOL* and *COUNT*.

3. Empirical Tests

3.1. The Impact of Institutional Ownership on Crash Risk

To test the relation between institutional ownership and future firm-specific crash risk, we estimate the following regression equation:

$$CrashRisk_{j,T+1} = \alpha_0 + \alpha_1 INST_{j,T} + \alpha_2 NCSKEW_{j,T} + \alpha_3 KUR_{j,T} + \alpha_4 SIGMA_{j,T} + \alpha_5 RET_{j,T} + \alpha_6 MB_{j,T} + \alpha_7 LEV_{j,T} + \alpha_8 ROE_{j,T} + \alpha_9 LNSIZE_{j,T} + \alpha_{10} DTURNOVER_{j,T} + \alpha_{11} OPAQUE_{j,T} + \alpha_{12} ANA\_FOL_{j,T} + \alpha_{13} LITIG\_RISK_{j,T} + \varepsilon_{j,T} \quad (4)$$

where $CrashRisk_{j,T+1}$ is measured by $NCSKEW_{j,T+1}$, $DUVOL_{j,T+1}$, or $COUNT_{j,T+1}$. To help ensure that the impact of institutional ownership on future stock price crash risk is not driven by other factors, we control for a number of firm characteristics as discussed in Section 2.4. All regressions include industry (based on two-digit SIC codes) and year dummies to control for industry and year fixed effects. Regression equations are estimated using pooled ordinary least squares (OLS) with White standard errors corrected for firm clustering. Our focus is on the effect of institutional ownership on future crash risk, that is, the coefficient α_1.[8]

Column (1) of Table 2 presents the regression results. Panels A to C are based on the one-year-ahead *NCSKEW*, *DUVOL*, and *COUNT* dependent variables, respectively. The coefficients on *INST* are significantly positive at less than a 1% significance level across all three panels. On average, an increase of one standard deviation in the percentage of institutional ownership is associated with an estimated 11.45% (5.48%, 12.32%) increase in one-year-ahead *NCSKEW* (*DUVOL*, *COUNT*). These findings are consistent with the expropriation view that the short-term

[8] To control for potential outliers, we replicated all analyses in this study after winsorizing top and bottom 0.5% regressor outliers --but not the dependent variables following Jin and Myers (2006) and Hutton, Marcus, and Tehranian (2009). Since our results remained essentially unchanged, we elected to report the raw regression estimates.

focus by institutional investors pressures managers to engage in bad news hoarding activities, thus increasing future stock price crash risk.

To further examine the economic significance of the results, we followed Hutton et al. (2009) by setting *INST* to their 25th and 75th percentile values, respectively, and comparing $NCSKEW_{T+1}$ at the two percentile values while holding all other variables at their mean values. The $NCSKEW_{T+1}$ of firms at the 75th percentile value of *INST* (0.652) is 0.1858 higher than firms at the 25th percentile value (0.201).[9] Given that the median value of $NCSKEW_{T+1}$ in the sample is -0.164, the considerable difference suggests that the impact of institutional ownership on firm-specific crash risk is highly economically significant as well as a statistically significant.[10]

Turning to the control variables, we find, following Blanchard and Watson (1982) and Chen, Hong, and Stein (2001), that the coefficients on *RET* are significantly positive in Panels A and B, implying that stock-price bubbles increase future crash risk. Also, in consonance with the findings of Chen, Hong, and Stein (2001), the coefficients on *LNSIZE*, *NCSKEW,* and *MB* are significantly positive across all three panels. The positive coefficients on firm size are consistent with their argument that small companies face less scrutiny from equity analysts and have more scope for hiding bad news from the public. This in turn allows bad news to dribble out slowly and imparts a more positive skewness to returns. In addition, we observe the significantly negative coefficients on *LEV* and the significantly positive coefficients on *OPAQUE* across all three panels, which are consistent with the findings in Hutton, Marcus, and Tehranian (2009).

-------Insert Table 2 about here ------

3.2. Transient versus Dedicated Institutions

[9] We also calculated the change in $NCSKEW_{T+1}$ corresponding to a shift from the 25th to the 75 percentile of $OPAQUE_T$, while holding all other variables at their mean values. The economic impact of $OPAQUE_T$ on $NCSKEW_{T+1}$ is 5.22%.

[10] The economic impacts for $DUVOL_{T+1}$ and $COUNT_{T+1}$, when *INST* shifts from the 25th to the 75th percentile values, are 8.88% and 19.98%. These results also suggest a non-trivial impact of institutional ownership on future stock price crash risk.

We conjecture that the overall positive relation between institutional ownership and future stock price crash risk is driven by transient institutions; that is, institutions with a short-term investment horizon and high portfolio turnover. Consistent with the expropriation view of institutional investors, these institutions are expected to pressure managers to engage in bad news hoarding activities to maximize short-term profitability, thereby increasing future stock price crash risk. We further conjecture that dedicated institutions are more likely to monitor managers and pre-empt their bad news hoarding activities yielding a negative relation between institutional ownership and future stock price crash risk.

We make no conjecture about quasi-indexer institutions given the conflicting view in the literature regarding their motives. Porter (1992) claims that the passive and fragmented ownership of quasi-indexers provide them little incentive to collect information to monitor managers. Bushee (1998) further maintains that quasi-indexers in effect give up their influence over managers to other active institutions that push managers to engage in short-term focused behaviour. In contrast, Monks and Minow (1995) argue that because indexing strategies do not encourage selling, quasi-indexers are motivated to monitor management to ensure their long-term interests in the firm.

Based on the classification of institutional investors used in Bushee (1998, 2001) and Bushee and Noe (2000), we estimate the following regression equation for each group separately:

$$\begin{aligned} CrashRisk_{j,T+1} &= \alpha_0 + \alpha_1 TRA_{j,T}\left(or\ DED_{j,T}\ or\ QIX_{j,T}\right) + \alpha_2 NCSKEW_{j,T} + \alpha_3 KUR_{j,T} + \alpha_4 SIGMA_{j,T} \\ &+ \alpha_5 RET_{j,T} + \alpha_6 MB_{j,T} + \alpha_7 LEV_{j,T} + \alpha_8 ROE_{j,T} + \alpha_9 LNSIZE_{j,T} + \alpha_{10} DTURNOVER_{j,T} \\ &+ \alpha_{11} OPAQUE_{j,T} + \alpha_{12} ANA_{FOL\,j,T} + \alpha_{13} LITIG\_RISK_{j,T} \\ &+ \varepsilon_{j,T} \qquad (5) \end{aligned}$$

We also estimate the following regression equation for all groups of institutional investors simultaneously:

$$CrashRisk_{j,T+1} = \alpha_0 + \alpha_1 TRA_{j,T} + \alpha_2 DED_{j,T} + \alpha_3 QIX_{j,T} + \alpha_4 NCSKEW_{j,T} + \alpha_5 KUR_{j,T} + \alpha_6 SIGMA_{j,T} + \alpha_7 RET_{j,T} + \alpha_8 MB_{j,T} + \alpha_9 LEV_{j,T} + \alpha_{10} ROE_{j,T} + \alpha_{11} LNSIZE_{j,T} + \alpha_{12} DTURNOVER_{j,T} + \alpha_{13} OPAQUE_{j,T} + \alpha_{14} ANA\_FOL_{j,T} + \alpha_{15} LITIG\_RISK_{j,T} + \varepsilon_{j,T} \quad (6)$$

Columns (2) to (5) of Table 2, Panels A through C, provide the regression results for equations (5) and (6). The coefficients on *TRA* are highly significantly positive in Columns (2) and (5) across all three panels. In contrast, the coefficients on *DED* are significantly negative in Columns (3) and (5) of each panel. Further, we observe that the magnitudes and significance levels of the expropriation effect of the transient institutions are much larger than those of the monitoring effect of the dedicated institutions (in absolute values). Columns (5) of Panels A through C indicate that an increase of one standard deviation in the percentage of transient (dedicated) ownership is associated with an estimated 5.6-13.2% increase (1-3% decrease) in one-year-ahead crash risk. In addition, the coefficients on *QIX* are significantly positive in Columns (4) and (5) of Panels B and C. The latter result is consistent with the argument by Bushee (1998) that quasi-indexer institutions abandon their influence over managers to transient institutions, which pressure managers to engage in bad news hoarding behaviour.

Thus, the results indicate that the overall positive relation between institutional ownership and future stock price crash risk is driven by primarily by transient institutions. The expropriation strategy of transient investors appears to dominate the monitoring role of dedicated institutions in curtailing bad news hoarding activities by management and reducing future stock price crash risk.

3.3. Lagged Institutional Ownership and Institutional Trading

To test whether the predictive ability of institutional ownership regarding future stock price crash risk spans more than one year and to test whether institutional trading also predicts future stock price crash risk, we decompose current institutional ownership (by transient, dedicated, and quasi-indexer institutions) into lagged institutional ownership ($INST_{j,T-1}$) and institutional trading ($\Delta INST_{j,T}$).

First, we estimate the following regression equation for the entire sample:

$$\begin{aligned} CrashRisk_{j,T+1} &= \alpha_0 + \alpha_1 INST_{j,T-1} + \alpha_2 \Delta INST_{j,T} + \alpha_3 NCSKEW_{j,T} + \alpha_4 KUR_{j,T} + \alpha_5 SIGMA_{j,T} \\ &+ \alpha_6 RET_{j,T} + \alpha_7 MB_{j,T} + \alpha_8 LEV_{j,T} + \alpha_9 ROE_{j,T} + \alpha_{10} LNSIZE_{j,T} \\ &+ \alpha_{11} DTURNOVER_{j,T} + \alpha_{12} OPAQUE_{j,T} + \alpha_{13} ANA\_FOL_{j,T} + \alpha_{14} LITIG\_RISK_{j,T} \\ &+ \varepsilon_{j,T} \qquad (7) \end{aligned}$$

Column (1) of Table 3 provides the regression results. Panels A to C are based on the one-year-ahead *NCSKEW*, *DUVOL*, and *COUNT* dependent variables, respectively. The coefficients on both $INST_{T-1}$ and $\Delta INST_T$ are highly significantly positive across all three panels. The evidence indicates that institutional ownership has a long-run (i.e., more than one-year) predictive power for stock price crash risk. On average, increases (decreases) in institutional buying accelerate (decelerate) bad news hoarding activities by management and, thus, future stock price crash risk. In terms of economic significance, the impact of $\Delta INST_{T-1}$ is at least twice as large on average as that of $INST_{T-1}$.

Second, we re-estimate equation (7) for each type of institution separately:

$$\begin{aligned} CrashRisk_{j,T+1} &= \alpha_0 + \alpha_1 TRA_{j,T-1} \left(or\ DED_{j,T-1}\ or\ QIX_{j,T-1} \right) \\ &+ \alpha_2 \Delta TRA_{j,T} \left(or\ \Delta DED_{j,T}\ or\ \Delta QIX_{j,T} \right) + \alpha_3 NCSKEW_{j,T} + \alpha_4 KUR_{j,T} + \alpha_5 SIGMA_{j,T} \\ &+ \alpha_6 RET_{j,T} + \alpha_7 MB_{j,T} + \alpha_8 LEV_{j,T} + \alpha_9 ROE_{j,T} + \alpha_{10} LNSIZE_{j,T} \\ &+ \alpha_{11} DTURNOVER_{j,T} + \alpha_{12} OPAQUE_{j,T} + \alpha_{13} ANA\_FOL_{j,T} + \alpha_{14} LITIG\_RISK_{j,T} \\ &+ \varepsilon_{j,T} \qquad (8) \end{aligned}$$

Third, we re-estimate equation (7) for all three institutional investor types simultaneously:

$$CrashRisk_{j,T+1} = \alpha_0 + \alpha_1 TRA_{j,T-1} + \alpha_2 \Delta TRA_{j,T} + \alpha_3 DED_{j,T-1} + \alpha_4 \Delta DED_{j,T} + \alpha_5 QIX_{j,T-1} + \alpha_6 \Delta QIX_{j,T} + \alpha_7 NCSKEW_{j,T} + \alpha_8 KUR_{j,T} + \alpha_9 SIGMA_{j,T} + \alpha_{10} RET_{j,T} + \alpha_{11} MB_{j,T} + \alpha_{12} LEV_{j,T} + \alpha_{13} ROE_{j,T} + \alpha_{14} LNSIZE_{j,T} + \alpha_{15} DTURNOVER_{j,T} + \alpha_{16} OPAQUE_{j,T} + \alpha_{17} ANA\_FOL_{j,T} + \alpha_{18} LITIG\_RISK_{j,T} + \varepsilon_{j,T} \quad (9)$$

Columns (2) to (4) of Table 3, Panels A through C, present the regression results for equation (8). The coefficients on both TRA_{T-1} and ΔTRA_T are highly significantly positive, and the coefficients on DED_{T-1} are significantly negative across all panels. Further, we observe that the magnitudes and significance levels of both TRA_{T-1} and ΔTRA_T are much larger than those of DED_{T-1}. Further, the coefficients on both QIX_{T-1} and ΔQIX_T are significantly positive in all three panels, suggesting that quasi-indexer institutions surrender their influence over managers to transient institutions with a short-term profitability orientation. Columns (5) of Table 3, Panels A through C, provide similar regression results for equations (9).

In summary, our findings suggest that the overall positive impacts of both $INST_{T-1}$ and $\Delta INST_T$ on future stock price crash risk are driven primarily by transient institutions. In contrast, ownership by dedicated institutions appears to serve a more muted long-term monitoring role in curtailing bad news hoarding activities by management and reducing future stock price crash risk.

-------Insert Table 3 about here ------

3.4. Concentrated Ownership

Following prior literature (see, e.g., Bushee, 1998; Chen, Harford, and Li, 2007; Hartzell and Starks, 2003), we also measure the influence of institutional investors through their ownership concentration as measured by the ownership controlled by the five largest institutional investors, *TOP5*, and the ownership controlled by the five largest transient (dedicated, quasi-indexer) institutions, *TOP5_TRA* (*TOP5_DED*, *TOP5_QIX*). We re-examine the regression equations (4) through (6) by replacing *INST*, *TRA*, *DED*, and *QIX* with *TOP5*, *TOP5_TRA*, *TOP5_DED*, and *TOP5_QIX*, respectively. Panels A to C of Table 4 provide the regression results, using one-year-ahead *NCSKEW*, *DUVOL*, and *COUNT* as dependent variables, respectively.

Column (1) of each panel indicates that the coefficient on *TOP5* is significantly positive at less than a 1% significance level. Also, the coefficients on *TOP5_TRA* are highly significantly positive, and the coefficients on *TOP5_DED* are significantly negative in columns (2) to (5) of each panel. Further, we observe that the magnitudes and significance levels of the coefficients on *TOP5_TRA* are much larger than those of the coefficients on *TOP5_DED*. Columns (5) of Panels A through C show that, on average, an increase of one standard deviation in *TOP5_TRA* (*TOP5_DED*) is associated with an estimated 4.1-10.2% increase (0.83-2.7% decrease) in one-year-ahead crash risk.[11] In addition, after controlling for *TOP5_TRA* and *TOP5_DED*, the coefficient on *TOP5_QIX* becomes insignificant in Column (5) of each panel. These results are similar to those of Sections 3.1 and 3.2. We also decompose concentrated ownership (of transient and dedicated institutions) into lagged concentrated ownership and the change in concentrated ownership. The results reported in Table 5 are similar to the findings in Section 3.3.

-------Insert Tables 4 and 5 about here------

3.5. Opaque Financial Reporting and Institutional Ownership

Hutton, Marcus, and Tehranian (2009) find that firms with opaque financial reporting opaqueness are more prone to stock price crashes. This suggests that opaque financial reporting facilitates managerial bad news hoarding activities. We conjecture that opacity of financial reporting provides opportunities for managers to engage in bad news hoarding activities in order to cope with the pressure from the short-term focus of institutional investors. In particular, we

[11] The standard deviations of *TOP5_TRA* and *TOP5_DED* are 0.067 and 0.081, respectively.

hypothesize that the more opaque the financial reporting, the greater the impact of institutional investor holdings on crash risk. We further hypothesize that opaque financial reporting intensifies crash risk especially for firms with more transient institutional investment. To test these hypotheses, we re-examine the regression equations (4) to (6) after including the interaction-term regressors *INST*OPAQUE*, *TRA*OPAQUE*, *DED*OPAQUE,* and *QIX*OPAQUE*.

Table 6, Panel A presents the regression results, using one-year-ahead *NCSKEW* as the dependent variable.[12] Column (1) shows that the coefficient of the main effect variable (*INST*) remains significantly positive, consistent with our overall findings, and that the coefficient of the interaction term (*INST*OPAQUE*) is also significantly positive. The latter result is consistent with our conjecture that opaque financial reporting intensifies the impact of the short-term focus by institutional investors on future stock price crash risk. Columns (2) to (5) further show the main effects and the interaction effects for each institutional group of *TRA*, *DED*, and *QIX*. Consistent with the findings in Section 3.2., the coefficients of the main effect variables, *TRA* and *DED*, remain significantly positive and negative, respectively, in columns (2), (3), and (5). The coefficients of the interaction term, *TRA*OPAQUE*, in columns (2) and (5) are significantly positive, suggesting that opaque financial reporting intensifies the impact of the short-term focus of transient institutions on future stock price crash risk.

We also re-examine the regression equations (7) to (9) after including interaction terms of lagged institutional ownership and institutional trading with the opaqueness measure. Panel B of Table 6 presents the regression results using one-year-ahead *NCSKEW* as the dependent variable.[13] The coefficients for the main effects variables, namely, lagged institutional ownership

[12] The regression analyses (untabulated) using one-year-ahead *DUVOL* and *COUNT* show similar results.
[13] The regression analyses (untabulated) using one-year-ahead *DUVOL* and *COUNT* show similar results.

and institutional trading, are consistent with the findings in Table 3. The coefficients of the interaction terms $INST_{T-1}$*OPAQUE, TRA_{T-1}*OPAQUE, $\Delta INST_{T-1}$*OPAQUE and ΔTRA_{T-1}*OPAQUE are significant and positive, consistent with the findings in Panel A of Table 3. After controlling for interaction terms, the coefficients of the main effect variable, *OPAQUE*, are mostly insignificant, implying that the impact of *OPAQUE* on future stock price crash risk is highly dependent on institutional ownership, especially transient ownership.

-------Insert Table 6 about here------

3.6. Endogeneity Issues

Our arguments presuppose that institutional ownership influences stock price crash risk. However, it is possible that the direction of causality is the opposite; that is, institutions tend to hold less (or possibly more) crash prone stocks because of their investment policy or that institutional ownership and stock price crash risk are simultaneously determined by other exogenous variables. To alleviate these concerns, we perform both a lead-lag analysis and an instrumental variable analysis.[14]

If in fact institutional ownership drives stock bad news hoarding and stock price crashes, we should find that prior changes in institutional ownership result in subsequent changes to stock price crash risk. To test this, we regress the change in crash risk from years *T* to *T+1* on the change in *INST* (*TRA* or *DED* or *QIX*) from years *T-1* to *T* taking into account (changes in) the appropriate controls. Table 7 provides the regression results.[15] Panels A to C are based on one-year-ahead changes in the dependent variables *NCSKEW*, *DUVOL,* and *COUNT*, respectively. Consistent with the implications of Table 2, we find a strong positive relation between one-year-

[14] Our use of current *INST*, *TRA*, *DED* and *QIX* to predict future crash risk in the main regression analyses helps to alleviate the concern of reverse causality. Further, the interaction effect of institutional ownership with opaque financial reporting makes it hard to argue for reverse causality. Nevertheless, we conduct more tests in order to make stronger inferences about the direction of causality and to determine whether causality runs in both directions.

[15] To economize on space, we only report the coefficients for the immediate variables of interest suppressing the control variables.

ahead change in crash risk and the current change in *INST* (*TRA*), across all three panels. For dedicated institutions we find a strong negative relation between one-year-ahead change in crash risk and the current change in *DED* across all three panels. In contrast, the coefficients on the current change in *QIX* are mixed across the three panels.

We also estimate a reverse regression (untabulated) allowing the prior year change in crash risk to predict one-year-ahead changes in *INST*, *TRA*, *DED* and *QIX*. We find negative (no) significant relations between current changes in crash risk, and one-year-ahead changes in *INST* and *TRA* (*DED, QIX*). The reverse regression results suggest that there may be some feedback between *INST* and *TRA* and future crash risk.

To further control for the potential endogeneity of institutional ownership, we employ an instrumental variable two-stage least squares (2SLS) approach. Following Bushee (2001), the instruments for institutional holdings are: the (log of) firm size (*LNSIZE)* to control for the fact that some institutions prefer or are constrained to invest in large firms; share turnover *DTURNOVER* to control for liquidity preferences; Dividend yield (*DYLD*) to control for institutional preferences for firms that issue dividends; an indicator variable (*SP500*) for whether the firm is included in the S&P 500 index; and the firm's average sales growth (*SGR*) over the prior three years to control for institutional preferences for growth firms.[16] To capture firm performance, we incorporate market-adjusted returns for the year (*MAR*) and an indicator variable (*DPOS*) equal to 1 if earnings are greater than zero and 0 otherwise. We also include three measures of risk as instrumental variables: a market model beta (*BETA*) estimated for up to 36 prior monthly returns, a measure of unsystematic risk (*IRISK*) proxied by standard deviation

[16] Bushee (2001) also includes Standard & Poor's stock rating, a proxy for the prudence of the investment, and the firm's R&D intensity as instruments. Including these two variables in the first-stage regression reduces our sample size by at least 40 percent and, thus, we elected to omit them from the tabulated regressions in order to keep the sample size as close to the one used in the main regression analyses. Nevertheless, including them does not weaken the significance of the instruments for *INST*, *TRA* and *QIX* and strengthens the significance of the instrument for *DED* in the second-stage regressions (untabulated).

of daily market-model residuals over prior year, and leverage measured as the debt-to-assets ratio (*LEV*).

In the first stage, we separately regress each of the institutional variables of *INST*, *TRA*, *DED* and *QIX* on the above instruments inclusive of industry and year fixed effects controls. In the second stage, we re-estimate the regressions in our main analyses after replacing *INST*, *TRA*, *DED* and *QIX* by their fitted values from the first-stage regression.[17] Table 8 provides the estimates from the second-stage regressions. Consistent with the prior results, the coefficients on the fitted values of *INST*, *TRA* and *QIX* are significantly positive in columns (1) and (5), and the coefficients on the fitted values of *DED* is consistently (significant) negative in column (5), across the three panels.

To further examine the robustness of our results, we also use firm fixed effects to address the concern that omitted time-invariant firm characteristics may be driving the results.[18] The findings (untabulated) show that the impact of *INST*, *TRA*, and *QIX* (*DED*) on future stock crash risk remains highly significantly positive (negative).[19]

-------Insert Tables 7 and 8 about here------

3.7. Sub-period Analysis

Firm-specific stock crashes during the 2000s, especially those of high profile companies (e.g., Enron and Lehman), are related to bad news hoarding activities by management (Powers, Troubh, and Winokur, 2002; Valukas, 2010). What about prior periods? Are the institutional investment factors that affect firm-specific stock crashes homogeneous across time periods or are they specific to certain time periods? To investigate this issue, we separate our sample period

[17] We also apply the Hausman test (Hausman 1978) by regressing future stock price crash risk on *INST (TRA*, *DED* and *QIX)* as well as on the residuals from the first-stage regressions. The results reject the exogeneity of *INST*, *TRA* and *QIX* at the 10% level.
[18] When analyzing the effect of institutional ownership on future stock price crash risk, endogeneity concerns arise because of omitted unobservable firm characteristics. Omitted variables affecting both institutional ownership and future stock price crash risk could lead to spurious correlations between institutional ownership and future stock price crash risk.
[19] To economize on space, we do not report the results here. They are available upon request as are all untabulated results.

into three sub-periods, the 1980s, 1990s, and 2000s. We repeat our analyses for Equations (6) and (9) over each sub-period. Panels A and B of Table 9 present the regression results for Equations (6) and (9), respectively, with one-year-ahead *NCSKEW* as the dependent variable.[20]

Panel A shows that transient institutions have a significant positive impact on future stock price crash risk for each of the three decades, consistent with the expropriation view. Furthermore, such effects have strengthened since the 1990s. In contrast, the monitoring effect of dedicated institutions was much weaker in the 2000s relative to earlier periods consistent with corporate governance failure contributing to the two U.S. financial crises in the 21st century. Additionally, the impact of quasi-indexer institutions on future stock price crash risk was significantly positive only during the 1990s. The Panel B decomposition of ownership by transient and dedicated institutions into lagged ownership and changes in ownership exhibit similar evidence.

-------Insert Table 9 about here ------

3.8. Legal Types of Institutional Investors

Brickley, Lease, and Smith (1988) claim that public pension funds, mutual funds, endowments and foundations are less susceptible to management pressure and, therefore, monitor managers more actively than institutions, such as banks and insurance companies, that have a business relationship with the firm. Their evidence also suggests that the former are more likely to oppose management than the latter. Bushee (2001) argues that banks and pension funds face strict fiduciary responsibilities, which motivate them to be more near-term focused than other institutions (i.e., insurance companies, investment companies, and investment advisors). He finds that banks exhibit a significant preference for near-term earnings over long-term earnings. In contrast, he finds a significant association between the percentage of pension ownership and

[20] The regression analyses using one-year-ahead *DUVOL* and *COUNT* (untabulated) show similar results.

long-term firm future value, possibly due to the long-term investment horizon of pension funds. Almazan, Hartzell, and Starks (2005) argue that the intensity of institutional investor monitoring is attenuated by a variety of factors including the liquidity of portfolio holdings (Bhide, 1994), fiduciary duties (Murphy and Van Nuys, 1994), possible future business relationships (Brickley, Lease, and Smith, 1988), and free-rider problems associated with the private cost of monitoring (Shleifer and Vishny, 1986). Almazan, Hartzell, and Starks (2005) find that relative to passive institutions (bank trusts and insurance companies), active institutions (independent investment advisors and investment companies) influence executive compensation to a greater extent, consistent with the overall low cost of monitoring that they face. Thus, we would expect the cost of monitoring and the short- or long-term focus of the investment horizon to differ across types of institutional investors, with concomitant implications for crash risk.

We replace *INST* in equation (4) with each of the percentage of institutional holdings from bank trusts (*BNK*), insurance companies (*INS*), investment companies (*INV*), independent investment advisors (*IIA*), corporate pension funds (*CPS*), and public pension funds (*PPS*) and examine how each of these different types of institutional investors are associated with future stock price crash risk. We also estimate the same regression equation for all types of institutional investors simultaneously.[21]

Table 10, Panel A presents the regression results with one-year-ahead *NCSKEW* as the dependent variable.[22] Columns (1) to (7) indicate that institutional ownership by public pension funds (bank trusts, investment companies, and independent investment advisors) is (are) significantly negatively (positively) associated with future stock price crash risk. This is consistent with the finding in Brickley, Lease, and Smith (1988) and Bushee (2001) that, relative

[21] We use Bushee's website: http://acct3.wharton.upenn.edu/faculty/bushee/IIvars.html#typ to obtain information about institutional investor types. We do not include university and foundation endowments due to their relatively small sample size.
[22] The regression analyses (untabulated) using one-year-ahead *DUVOL* and *COUNT* show similar results.

to other types of institutions, pension funds tend to invest for the long-term investment and to monitor management actively. The evidence suggests that, on average, the short-term focus of other institutions pressures managers to engage in bad news hoarding activities, leading to increased crash risk.

Table 10, Panel B further decomposes the current ownership of different types of institutions into lagged ownership and change in ownership. We observe similar evidence: lagged institutional ownership of public pension funds (lagged and change in institutional ownership of bank trusts, investment companies, and independent investment advisors) is (are) significantly negatively (positively) associated with future crash risk.

-------Insert Table 10 about here------

4. Conclusions

The findings in this study have important implications for public firms wishing to attract equity investments by "sound" institutional investors. Incidents of stock crashes during the 2000s, especially by high profile companies (e.g., Enron and Lehman) caused severe damage to investor confidence in corporate disclosure and exerted immense pressure on regulators to intervene. One of the important issues emerging from the recent financial crisis is the role institutional investors played in exacerbating the crisis by pressuring financial service entities for short-term profits. The European Union has gone so far as to claim that the recent financial crisis has undermined the assumption of institutional investors as responsible shareholders (Pitt-Watson, 2009; Wheelan, 2010; European Parliament, 2010). Similarly, the Aspen Institute in its 2009 statement concluded that "the trend toward greater shareholder power ... should be accompanied by greater investor and intermediary responsibility" to "empower and encourage business managers and boards of directors to focus on sustainable value creation rather than evanescent short-term objectives."[23]

We present two competing views regarding the impact of institutional investors on managerial short-termism behaviour as reflected in bad news hoarding activities. Our evidence suggests that dedicated institutional groups play a monitoring role in reducing future stock price crash risk through pre-empting bad news hoarding activities by management. In contrast, our results also imply that ownership by transient institutional groups has a severe adverse impact on public firms by pressuring management to hoard bad news for short-term targets, which ultimately increases the risk of future stock price crash. Thus, our results cast strong doubt on any strategy that aims to attract institutional investors without considering the investment focus and preferences of these institutions. This study can also aid investors who focus on predicting stock crash risk, based on information about specific institutional investors.

[23] On September 9, 2009, twenty-eight leaders representing business, government, academia, and labor, including Warren Buffett of Berkshire Hathaway Inc. and James Wolfensohn of the World Bank Group, joined the Aspen Institute Business & Society Program's Corporate Values Strategy Group (CVSG) to endorse a bold call to end the focus on value-destroying short-termism in the financial markets and create public policies that reward long-term value creation for investors and the public good. The statement they signed (the Aspen Statement) identifies three leverage points for encouraging a renewed focus on long-term value creation and for addressing shareholder short-termism: market incentives, alignment, and transparency.

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APPENDIX A
VARIABLE DEFINITIONS

Crash Risk Measures:

NCSKEW is the negative coefficient of skewness of firm-specific daily returns over the fiscal year.

DUVOL is the log of the ratio of the standard deviation of firm-specific daily returns for the "down-day" sample to the standard deviation of firm-specific daily returns for the "up-day" sample over the fiscal year.

COUNT is the number of firm-specific daily returns exceeding 3.09 standard deviations below the mean firm-specific daily return over the fiscal year, minus the number of firm-specific daily returns exceeding 3.09 standard deviations above the mean firm-specific daily return over the fiscal year.

We estimate firm-specific daily returns from an expanded market and industry index model regression for each firm and year (Hutton, Marcus, and Tehranian, 2009):

$$r_{j,t} = \alpha_j + \beta_{1,j} r_{m,t-1} + \beta_{2,j} r_{i,t-1} + \beta_{3,j} r_{m,t} + \beta_{4,j} r_{i,t} + \beta_{5,j} r_{m,t+1} + \beta_{6,j} r_{i,t+1} + \varepsilon_{j,t},$$

where $r_{j,t}$ is the return on stock *j* in day t, $r_{m,t}$ is the return on the CRSP value-weighted market index in day t, and $r_{i,t}$ is the return on the value-weighted industry index based on the two-digit SIC code. The firm-specific daily return is the natural log of one plus the residual return from the regression model.

Institutional Ownership Measures:

INST is the number of shares held by institutional investors divided by the total number of shares outstanding at the end of the year.

TRA is the percentage of shares outstanding held by transient institutions at the end of the year.

DED is the percentage of shares outstanding held by dedicated institutions at the end of the year.

QIX is the percentage of shares outstanding held by quasi-indexer institutions at the end of the year.

TOP5 is the number of shares held by the five largest institutional investors divided by the total number of shares outstanding at the end of the year.

TOP5_TRA is the percentage of shares outstanding held by the five largest transient institutions at the end of the year.

TOP5_DED is the percentage of shares outstanding held by the five largest dedicated institutions at the end of the year.

TOP5_QIX is the percentage of shares outstanding held by the five largest quasi-indexer institutions at the end of the year.

BNK is the percentage of shares outstanding held by bank trusts at the end of the year.

INS is the percentage of shares outstanding held by insurance companies at the end of the year.

INV is the percentage of shares outstanding held by investment companies at the end of the year.

IIA is the percentage of shares outstanding held by independent investment advisors at the end of the year.

CPS is the percentage of shares outstanding held by corporate (private) pension funds at the end of the year.

PPS is the percentage of shares outstanding held by public pension funds at the end of the year.

Other Variables:

KUR is the kurtosis of firm-specific daily returns over the fiscal year.

SIGMA is the standard deviation of firm-specific daily returns over the fiscal year.

RET is the cumulative firm-specific daily returns over the fiscal year.

MB is the ratio of the market value of equity to the book value of equity measured at the end of the fiscal year.

LEV is the book value of all liabilities divided by total assets at the end of the fiscal year.

ROE is the income before extraordinary items divided by the book value of equity at the end of the fiscal year.

LNSIZE is the log value of market capitalization at the end of the fiscal year.

DTURNOVER is the average monthly share turnover over the current fiscal year, minus the average monthly share turnover over the previous year, where monthly share turnover is calculated as the monthly share trading volume divided by the number of shares outstanding over the month.

OPAQUE is the three-year moving sum of the absolute value of annual performance-adjusted discretionary accruals developed by Kothari, Leone, and Wasley (2005).

ANA_FOL is the log value of one plus the number of analysts that issue earnings forecasts for a given firm during the fiscal year.

LITIG_RISK is equal to 1 for all firms in the biotechnology (4-digit SIC codes 2833-2836 and 8731-8734), computer (4-digit SIC codes 3570-3577 and 7370-7374), electronics (4-digit SIC codes 3600-3674), and retail (4-digit SIC codes 5200-5961) industries, and zero otherwise (Francis et al., 1994).

Figure 1: Mean Values of Institutional Holding Measures (*INST*, *TRA*, *DED* and *QIX*) and Crash Risk Measure (*NCSKEW*) across the Sample Years 1980-2008

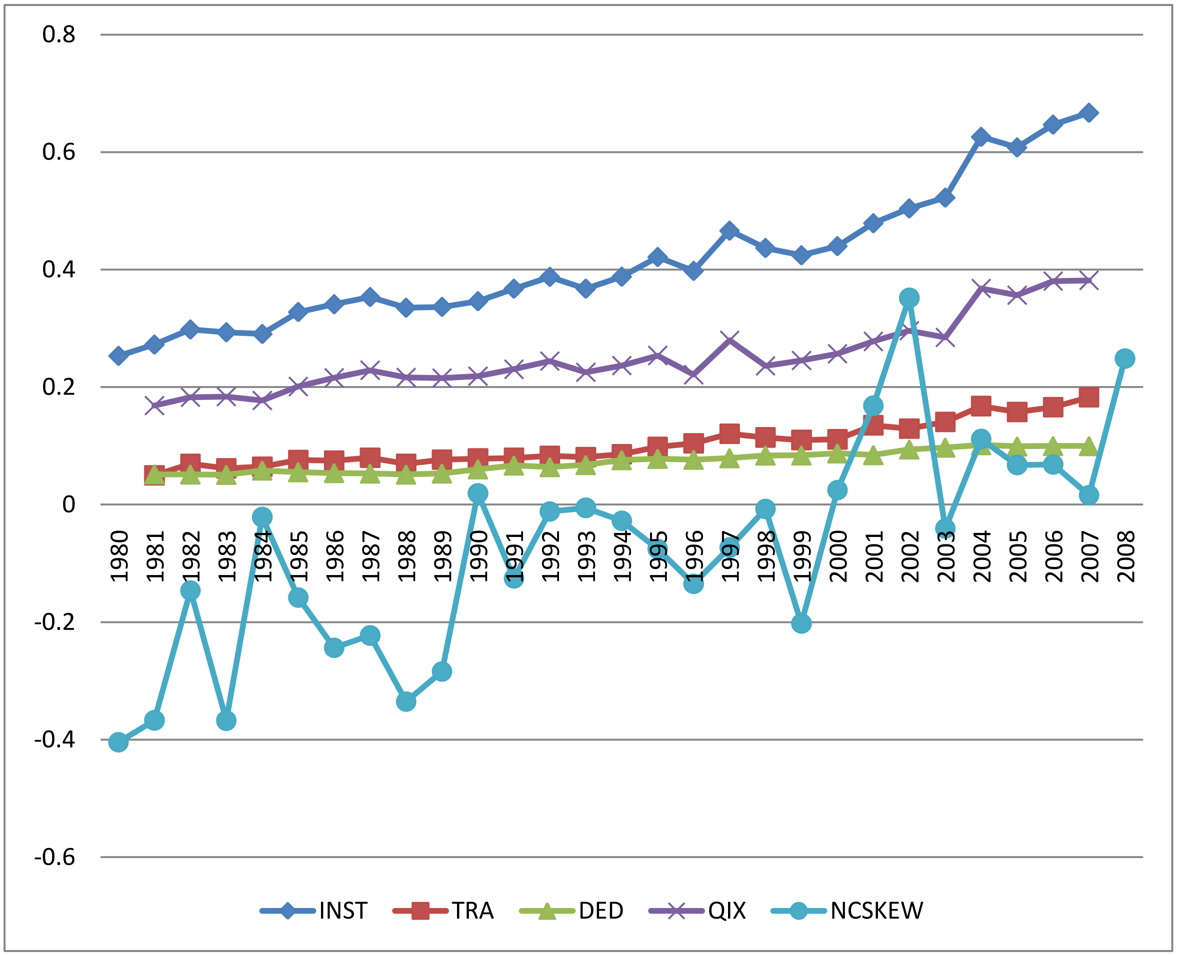

Table 1
Descriptive Statistics and Correlation Matrix

This table presents descriptive statistics and correlation matrix of key variables of interest on the sample of firms included in our study. The sample covers firm-year observations in the *Thompson-Reuters Institutional Holdings Database* with non-missing values for all control variables for the period 1980 to 2008. Panel A presents descriptive statistics. Panel B presents a Pearson correlation matrix. Bold values indicate statistical significance at the 1% level. All variables are defined in Appendix A.

Panel A. Descriptive Statistics

Variables	N	Mean	Std. dev.	5th Pctl.	25th Pctl.	Median	75th Pctl.	95th Pctl.
$NCSKEW_{T+1}$	66727	-0.067	1.240	-1.462	-0.540	-0.164	0.209	1.873
$DUVOL_{T+1}$	66727	-0.145	0.556	-0.973	-0.469	-0.168	0.139	0.803
$COUNT_{T+1}$	66730	-0.459	1.672	-3.000	-2.000	0.000	1.000	2.000
$INST_T$	66727	0.436	0.278	0.029	0.201	0.416	0.652	0.924
TRA_T	61705	0.111	0.106	0.002	0.029	0.081	0.162	0.323
DED_T	55431	0.078	0.082	0.001	0.016	0.054	0.114	0.230
QIX_T	65217	0.260	0.175	0.015	0.113	0.241	0.387	0.564
$NCSKEW_T$	66727	-0.061	1.224	-1.428	-0.540	-0.168	0.206	1.866
KUR_T	66727	5.985	11.171	0.393	1.382	2.702	5.724	22.187
$SIGMA_T$	66727	0.031	0.018	0.011	0.018	0.026	0.038	0.066
RET_T	66727	-0.159	0.270	-0.539	-0.181	-0.083	-0.040	-0.015
MB_T	66727	2.887	3.668	0.418	1.157	1.859	3.139	8.062
LEV_T	66727	0.507	0.261	0.138	0.334	0.508	0.648	0.873
ROE_T	66727	-0.037	0.473	-0.765	0.000	0.098	0.158	0.320
$LNSIZE_T$	66727	19.586	1.914	16.605	18.208	19.511	20.874	22.906
$DTURNOVER_T$	66727	0.022	0.360	-0.628	-0.158	0.015	0.205	0.683
$OPAQUE_T$	66727	0.185	0.156	0.035	0.082	0.141	0.236	0.493
ANA_FOL_T	66727	1.732	0.807	0.693	1.099	1.609	2.398	3.135
$LITIG\_RISK_T$	66727	0.076	0.265	0.000	0.000	0.000	0.000	1.000

Panel B. Correlation Matrix

	$NCSKEW_{T+1}$	$DUVOL_{T+1}$	$COUNT_{T+1}$	$INST_T$	TRA_T	DED_T	QIX_T	$NCSKEW_T$	KUR_T	$SIGMA_T$
$DUVOL_{T+1}$	**0.90**									
$COUNT_{T+1}$	**0.50**	**0.70**								
$INST_T$	**0.14**	**0.16**	**0.13**							
TRA_T	**0.15**	**0.15**	**0.12**	**0.70**						
DED_T	**0.01**	**0.01**	0.00	**0.47**	**0.13**					
QIX_T	**0.10**	**0.13**	**0.11**	**0.88**	**0.42**	**0.19**				
$NCSKEW_T$	**0.05**	**0.05**	**0.04**	**0.10**	**0.04**	**0.04**	**0.11**			
KUR_T	**0.03**	0.01	-0.01	**0.08**	**0.06**	**0.04**	**0.07**	**0.40**		
$SIGMA_T$	**-0.04**	**-0.06**	**-0.07**	**-0.29**	**-0.07**	**-0.02**	**-0.35**	**0.08**	**0.16**	
RET_T	**0.04**	**0.06**	**0.06**	**0.24**	**0.09**	**0.03**	**0.26**	**-0.02**	**-0.12**	**-0.88**
MB_T	**0.01**	**0.01**	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
LEV_T	**-0.03**	**-0.03**	**-0.01**	**-0.04**	**-0.06**	**0.02**	**-0.03**	**-0.02**	**0.01**	**0.02**
ROE_T	0.00	0.00	0.01	0.00	0.00	0.00	0.00	-0.01	0.00	0.00
$LNSIZE_T$	**0.12**	**0.14**	**0.14**	**0.48**	**0.27**	**0.07**	**0.46**	**0.03**	0.00	**-0.55**
$DTURNOVER_T$	**0.01**	**0.02**	**0.01**	**0.04**	**0.06**	0.00	**0.03**	**0.01**	**0.04**	**0.03**
$OPAQUE_T$	**0.01**	0.00	**-0.02**	**-0.16**	0.01	**-0.05**	**-0.21**	0.01	**0.02**	**0.33**
ANA_FOL_T	**0.09**	**0.11**	**0.12**	**0.47**	**0.26**	**0.06**	**0.47**	**0.09**	**-0.01**	**-0.42**
$LITIG\_RISK_T$	**0.02**	0.01	0.00	0.00	**0.07**	0.01	**-0.03**	**0.02**	**0.04**	**0.18**

	RET_T	MB_T	LEV_T	ROE_T	$LNSIZE_T$	$DTURNOVER_T$	$OPAQUE_T$	ANA_FOL_T
MB_T	0.00							
LEV_T	**-0.07**	0.00						
ROE_T	0.00	**-0.56**	0.00					
$LNSIZE_T$	**0.41**	**0.01**	**0.03**	0.00				
$DTURNOVER_T$	**-0.02**	0.00	0.00	0.00	**0.03**			
$OPAQUE_T$	**-0.23**	0.01	**-0.03**	0.00	**-0.28**	0.00		
ANA_FOL_T	**0.30**	0.00	**0.02**	0.00	**0.71**	**0.02**	**-0.21**	
$LITIG\_RISK_T$	**-0.13**	0.01	**-0.11**	0.00	**-0.06**	-0.01	**0.13**	**-0.03**

Table 2
Impact of Institutional Ownership on Crash Risk

This table estimates the cross-sectional relation between institutional ownership and future stock price crash risk. The sample covers firm-year observations in the *Thompson-Reuters Institutional Holdings Database* with non-missing values for all variables for the period 1980 to 2008. *t*-statistics reported in parentheses are based on White standard errors corrected for clustering by firm. Year and industry fixed effects are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Panel A. Dependent Variable (Future Stock Price Crash Risk): $NCSKEW_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
$INST_T$	**0.412***** **(15.72)**				
TRA_T		**1.319***** **(19.86)**			**1.244***** **(17.07)**
DED_T			**-0.152**** **(-2.06)**		**-0.250***** **(-3.34)**
QIX_T				**0.340***** **(8.35)**	**0.057** **(1.21)**
$NCSKEW_T$	0.024***	0.026***	0.015**	0.025***	0.018**
	(3.61)	(3.69)	(2.00)	(3.60)	(2.30)
KUR_T	0.000	0.000	0.001	0.000	0.001
	(-0.43)	(0.38)	(0.97)	(-0.26)	(1.19)
$SIGMA_T$	4.347***	1.396	3.153	3.868***	1.749
	(3.15)	(0.96)	(1.49)	(2.61)	(0.88)
RET_T	0.285***	0.223**	0.340*	0.290***	0.274
	(2.82)	(2.00)	(1.90)	(2.66)	(1.61)
MB_T	0.000**	0.000**	0.001***	0.000**	0.001***
	(2.52)	(2.38)	(3.70)	(2.52)	(3.56)
LEV_T	-0.120***	-0.119***	-0.167***	-0.120***	-0.161***
	(-5.12)	(-4.88)	(-6.36)	(-5.09)	(-6.05)
ROE_T	0.000**	0.000**	0.006***	0.000**	0.005***
	(2.07)	(1.96)	(4.26)	(2.09)	(4.08)
$LNSIZE_T$	0.062***	0.052***	0.047***	0.062***	0.042***
	(12.13)	(9.75)	(7.75)	(11.66)	(6.89)
$DTURNOVER_T$	0.004	0.003	0.004	0.004	0.002
	(1.26)	(1.23)	(1.27)	(1.30)	(1.13)
$OPAQUE_T$	0.339***	0.286***	0.365***	0.339***	0.317***
	(9.30)	(7.42)	(8.32)	(9.09)	(7.05)
ANA_FOL_T	0.006	0.020*	0.076***	0.036***	0.029**
	(0.57)	(1.91)	(6.97)	(3.38)	(2.48)
$LITIG\_RISK_T$	-0.02	-0.045	0.01	-0.021	-0.014
	(-0.47)	(-1.00)	(0.21)	(-0.51)	(-0.29)
Intercept	-1.735***	-1.381***	-1.332***	-1.650***	-1.033***
	(-16.74)	(-12.73)	(-10.32)	(-15.06)	(-8.15)
Adj. R-squared	0.041	0.044	0.035	0.037	0.043
N. of cases	66727	61705	55431	65217	53674

Panel B. Dependent Variable (Future Stock Price Crash Risk): $DUVOL_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
$INST_T$	**0.197*** (16.73)**				
TRA_T		**0.581*** (20.81)**			**0.531*** (17.58)**
DED_T			**-0.060* (-1.83)**		**-0.113*** (-3.41)**
QIX_T				**0.187*** (10.49)**	**0.068*** (3.38)**
$NCSKEW_T$	0.022***	0.023***	0.018***	0.022***	0.019***
	(8.09)	(8.22)	(6.03)	(8.02)	(6.32)
KUR_T	-0.002***	-0.001***	-0.001***	-0.002***	-0.001***
	(-5.32)	(-4.29)	(-3.36)	(-5.18)	(-3.13)
$SIGMA_T$	0.756	-0.751	0.107	0.665	-0.398
	(1.49)	(-1.36)	(0.13)	(1.20)	(-0.48)
RET_T	0.080**	0.056	0.115	0.086**	0.095
	(2.27)	(1.36)	(1.63)	(2.21)	(1.35)
MB_T	0.000***	0.000***	0.000***	0.000***	0.000***
	(2.82)	(2.63)	(3.55)	(2.78)	(3.46)
LEV_T	-0.062***	-0.064***	-0.085***	-0.062***	-0.084***
	(-6.06)	(-5.99)	(-7.40)	(-6.03)	(-7.19)
ROE_T	0.000**	0.000**	0.002***	0.000**	0.002***
	(2.19)	(2.05)	(4.42)	(2.20)	(4.47)
$LNSIZE_T$	0.031***	0.027***	0.025***	0.031***	0.024***
	(13.10)	(11.24)	(9.02)	(12.80)	(8.79)
$DTURNOVER_T$	0.002	0.001	0.002	0.002	0.001
	(1.18)	(1.15)	(1.19)	(1.23)	(1.04)
$OPAQUE_T$	0.155***	0.128***	0.172***	0.155***	0.154***
	(9.42)	(7.53)	(8.91)	(9.26)	(7.85)
ANA_FOL_T	-0.003	0.004	0.028***	0.008*	0.004
	(-0.65)	(0.81)	(5.63)	(1.67)	(0.71)
$LITIG\_RISK_T$	-0.032*	-0.041**	-0.014	-0.031*	-0.021
	(-1.72)	(-2.05)	(-0.69)	(-1.69)	(-0.99)
Intercept	-0.967***	-0.836***	-0.808***	-0.958***	-0.605***
	(-20.70)	(-17.28)	(-14.16)	(-19.61)	(-10.69)
Adj. R-squared	0.068	0.071	0.059	0.063	0.069
N. of cases	66727	61705	55431	65217	53674

Panel C. Dependent Variable (Future Stock Price Crash Risk): *COUNT*$_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
***INST*$_T$**	**0.443********				
	(12.89)				
***TRA*$_T$**		**1.334********			**1.224********
		(17.04)			**(14.68)**
***DED*$_T$**			**-0.251*******		**-0.362********
			(-2.45)		**(-3.53)**
***QIX*$_T$**				**0.434********	**0.157********
				(8.42)	**(2.70)**
NCSKEW$_T$	0.054***	0.056***	0.045***	0.055***	0.046***
	(7.87)	(7.88)	(5.95)	(7.86)	(6.06)
KUR$_T$	-0.006***	-0.005***	-0.004***	-0.006***	-0.004***
	(-7.24)	(-6.18)	(-5.19)	(-7.16)	(-4.76)
SIGMA$_T$	1.936	-1.596	0.382	1.738	-0.9
	(1.38)	(-1.11)	(0.20)	(1.16)	(-0.51)
RET$_T$	0.137	0.053	0.173	0.15	0.108
	(1.44)	(0.51)	(1.14)	(1.45)	(0.77)
MB$_T$	0.000*	0.000*	0.001**	0.000*	0.000**
	(1.87)	(1.74)	(2.40)	(1.87)	(2.31)
LEV$_T$	-0.143***	-0.149***	-0.176***	-0.142***	-0.168***
	(-4.75)	(-4.76)	(-5.16)	(-4.71)	(-4.83)
ROE$_T$	0.000***	0.000***	0.004**	0.000***	0.004**
	(3.71)	(3.55)	(2.28)	(3.74)	(2.32)
LNSIZE$_T$	0.102***	0.095***	0.089***	0.102***	0.087***
	(14.68)	(13.25)	(11.25)	(14.32)	(11.03)
DTURNOVER$_T$	0.005	0.004	0.005	0.006	0.003
	(1.15)	(1.12)	(1.15)	(1.18)	(1.01)
OPAQUE$_T$	0.336***	0.269***	0.375***	0.333***	0.331***
	(6.85)	(5.34)	(6.76)	(6.67)	(5.87)
ANA_FOL$_T$	0.01	0.022	0.076***	0.034**	0.018
	(0.70)	(1.60)	(5.23)	(2.42)	(1.15)
LITIG_RISK$_T$	-0.06	-0.07	-0.025	-0.055	-0.024
	(-1.04)	(-1.16)	(-0.40)	(-0.99)	(-0.36)
Intercept	-3.095***	-2.734***	-2.659***	-2.995***	-2.515***
	(-22.10)	(-18.87)	(-16.53)	(-20.71)	(-15.64)
Adj. R-squared	0.052	0.053	0.044	0.048	0.049
N. of cases	66730	61708	55433	65220	53676

Table 3

Lagged Institutional Ownership, and Institutional Trading (i.e., Change in Institutional Holdings)

This table estimates the cross-sectional relation between lagged institutional ownership, institutional trading and future stock price crash risk. The sample covers firm-year observations in the *Thompson-Reuters Institutional Holdings Database* with non-missing values for all variables for the period 1980 to 2008. *t*-statistics reported in parentheses are based on White standard errors corrected for clustering by firm. Year and industry fixed effects are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Panel A. Dependent Variable (Future Stock Price Crash Risk): $NCSKEW_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
$INST_{T-1}$	**0.323***** **(11.99)**				
$\Delta INST_T$	**0.751***** **(15.35)**				
TRA_{T-1}		**1.304***** **(17.59)**			**1.216***** **(14.20)**
ΔTRA_T		**1.325***** **(15.70)**			**1.204***** **(12.68)**
DED_{T-1}			**-0.180**** **(-2.18)**		**-0.281***** **(-3.29)**
ΔDED_T			**-0.073** **(-0.62)**		**-0.002** **(-0.02)**
QIX_{T-1}				**0.227***** **(5.27)**	**-0.063** **(-1.20)**
ΔQIX_T				**0.832***** **(10.71)**	**0.544***** **(6.17)**
$NCSKEW_T$	0.028*** (4.17)	0.024*** (3.26)	0.014* (1.72)	0.025*** (3.59)	0.014* (1.67)
KUR_T	0.000 (-0.17)	0.001 (0.64)	0.001 (1.01)	0.000 (-0.06)	0.002* (1.68)
$SIGMA_T$	4.187*** (3.07)	1.348 (0.92)	3.753 (1.30)	3.686** (2.52)	1.853 (0.71)
RET_T	0.276*** (2.77)	0.217* (1.91)	0.39 (1.55)	0.278*** (2.60)	0.29 (1.24)
MB_T	0.000** (2.47)	0.000** (2.39)	0.001*** (3.66)	0.000** (2.52)	0.001*** (3.52)
LEV_T	-0.107*** (-4.58)	-0.131*** (-5.18)	-0.179*** (-6.33)	-0.111*** (-4.66)	-0.163*** (-5.61)
ROE_T	0.000** (2.03)	0.000** (1.96)	0.006*** (4.20)	0.000** (2.07)	0.005*** (3.96)
$LNSIZE_T$	0.060*** (11.64)	0.051*** (9.23)	0.046*** (6.93)	0.061*** (11.30)	0.040*** (5.92)
$DTURNOVER_T$	0.003 (1.24)	0.003 (1.19)	0.004 (1.22)	0.004 (1.28)	0.002 (1.09)
$OPAQUE_T$	0.311*** (8.43)	0.291*** (7.22)	0.373*** (7.64)	0.305*** (8.07)	0.293*** (5.78)
ANA_FOL_T	0.021** (1.98)	0.025** (2.28)	0.075*** (6.43)	0.045*** (4.14)	0.042*** (3.25)
$LITIG\_RISK_T$	-0.026 (-0.62)	-0.043 (-0.90)	0.008 (0.15)	-0.029 (-0.67)	-0.03 (-0.56)
Intercept	-1.488*** (-14.28)	-1.365*** (-12.08)	-1.110*** (-7.53)	-1.432*** (-12.87)	-1.132*** (-7.80)
Adj. R-squared	0.042	0.044	0.034	0.038	0.043
N. of cases	65253	58366	50752	63416	48549

Panel B. Dependent Variable (Future Stock Price Crash Risk): $DUVOL_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
$INST_{T-1}$	**0.154*** (12.91)**				
$\Delta INST_{T}$	**0.349*** (16.57)**				
TRA_{T-1}		**0.555*** (17.86)**			**0.486*** (13.85)**
ΔTRA_{T}		**0.635*** (17.74)**			**0.577*** (14.51)**
DED_{T-1}			**-0.062* (-1.69)**		**-0.113*** (-3.03)**
ΔDED_{T}			**-0.054 (-1.07)**		**-0.015 (-0.30)**
QIX_{T-1}				**0.140*** (7.43)**	**0.022 (0.97)**
ΔQIX_{T}				**0.381*** (11.56)**	**0.272*** (7.31)**
$NCSKEW_{T}$	0.024*** (8.86)	0.023*** (7.91)	0.018*** (5.75)	0.022*** (8.08)	0.019*** (5.79)
KUR_{T}	-0.002*** (-5.12)	-0.001*** (-3.81)	-0.001*** (-3.27)	-0.002*** (-5.00)	-0.001** (-2.36)
$SIGMA_{T}$	0.692 (1.37)	-0.806 (-1.39)	0.239 (0.21)	0.605 (1.10)	-0.419 (-0.39)
RET_{T}	0.077** (2.20)	0.057 (1.30)	0.128 (1.31)	0.083** (2.14)	0.097 (1.01)
MB_{T}	0.000*** (2.76)	0.000*** (2.64)	0.000*** (3.53)	0.000*** (2.77)	0.000*** (3.43)
LEV_{T}	-0.057*** (-5.53)	-0.069*** (-6.33)	-0.092*** (-7.49)	-0.058*** (-5.61)	-0.087*** (-6.92)
ROE_{T}	0.000** (2.14)	0.000** (2.05)	0.002*** (4.39)	0.000** (2.18)	0.002*** (4.42)
$LNSIZE_{T}$	0.030*** (12.65)	0.027*** (10.74)	0.025*** (8.41)	0.031*** (12.39)	0.023*** (7.82)
$DTURNOVER_{T}$	0.002 (1.16)	0.001 (1.11)	0.002 (1.14)	0.002 (1.20)	0.001 (0.98)
$OPAQUE_{T}$	0.141*** (8.48)	0.131*** (7.37)	0.178*** (8.38)	0.139*** (8.21)	0.147*** (6.72)
ANA_FOL_{T}	0.003 (0.71)	0.007 (1.37)	0.026*** (4.86)	0.011** (2.28)	0.010* (1.79)
$LITIG\_RISK_{T}$	-0.035* (-1.86)	-0.040* (-1.92)	-0.011 (-0.53)	-0.036* (-1.91)	-0.025 (-1.11)
Intercept	-0.795*** (-16.96)	-0.823*** (-16.34)	-0.557*** (-8.87)	-0.704*** (-14.23)	-0.735*** (-11.65)
Adj. R-squared	0.067	0.072	0.060	0.064	0.070
N. of cases	65253	58366	50752	63416	48549

Panel C. Dependent Variable (Future Stock Price Crash Risk): *$COUNT_{T+1}$*.

	(1)	(2)	(3)	(4)	(5)
$INST_{T-1}$	**0.346*** (9.91)**				
$\Delta INST_T$	**0.779*** (13.11)**				
TRA_{T-1}		**1.279*** (14.77)**			**1.098*** (11.61)**
ΔTRA_T		**1.527*** (14.93)**			**1.419*** (12.66)**
DED_{T-1}			**-0.240** (-2.13)**		**-0.360*** (-3.17)**
ΔDED_T			**-0.288** (-2.00)**		**-0.2 (-1.36)**
QIX_{T-1}				**0.331*** (6.09)**	**0.049 (0.77)**
ΔQIX_T				**0.822*** (9.26)**	**0.584*** (5.89)**
$NCSKEW_T$	0.060*** (8.54)	0.057*** (7.83)	0.045*** (5.76)	0.056*** (7.87)	0.048*** (5.98)
KUR_T	-0.005*** (-7.03)	-0.004*** (-5.53)	-0.004*** (-4.94)	-0.005*** (-6.92)	-0.003*** (-3.95)
$SIGMA_T$	1.767 (1.27)	-2.097 (-1.41)	0.681 (0.28)	1.437 (0.96)	-1.078 (-0.51)
RET_T	0.13 (1.37)	0.046 (0.42)	0.218 (1.08)	0.141 (1.37)	0.118 (0.67)
MB_T	0.000* (1.85)	0.000* (1.72)	0.001** (2.38)	0.000* (1.89)	0.000** (2.29)
LEV_T	-0.133*** (-4.42)	-0.157*** (-4.96)	-0.195*** (-5.44)	-0.133*** (-4.38)	-0.183*** (-4.97)
ROE_T	0.000*** (3.72)	0.000*** (3.51)	0.004** (2.25)	0.000*** (3.77)	0.004** (2.35)
$LNSIZE_T$	0.100*** (14.27)	0.093*** (12.65)	0.088*** (10.51)	0.100*** (13.92)	0.084*** (10.00)
$DTURNOVER_T$	0.005 (1.13)	0.004 (1.07)	0.005 (1.10)	0.006 (1.16)	0.003 (0.95)
$OPAQUE_T$	0.302*** (6.10)	0.274*** (5.23)	0.381*** (6.32)	0.303*** (5.98)	0.313*** (5.05)
ANA_FOL_T	0.025* (1.73)	0.030** (2.09)	0.070*** (4.59)	0.040*** (2.83)	0.034** (2.03)
$LITIG\_RISK_T$	-0.064 (-1.13)	-0.067 (-1.06)	-0.003 (-0.04)	-0.066 (-1.15)	-0.02 (-0.28)
Intercept	-2.640*** (-18.81)	-2.661*** (-17.81)	-2.040*** (-11.90)	-2.947*** (-20.16)	-2.426*** (-14.00)
Adj. R-squared	0.051	0.054	0.044	0.049	0.050
N. of cases	65256	58369	50754	63419	48551

Table 4
Impact of Concentrated Ownership on Crash Risk

This table estimates the cross-sectional relation between concentrated institutional ownership and future stock price crash risk. The sample covers firm-year observations in the *Thompson-Reuters Institutional Holdings Database* with non-missing values for all variables for the period 1980 to 2008. *t*-statistics reported in parentheses are based on White standard errors corrected for clustering by firm. Year and industry fixed effects are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Panel A. Dependent Variable (Future Stock Price Crash Risk): $NCSKEW_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
$TOP5_T$	**0.282***** **(6.14)**				
$TOP5\_TRA_T$		**1.527***** **(16.62)**			**1.477***** **(14.64)**
$TOP5\_DED_T$			**-0.148**** **(-2.01)**		**-0.229***** **(-3.03)**
$TOP5\_QIX_T$				**0.321***** **(5.18)**	**-0.009** **(-0.12)**
$NCSKEW_T$	0.025***	0.023***	0.015**	0.026***	0.015*
	(3.76)	(3.24)	(2.00)	(3.77)	(1.89)
KUR_T	0.000	0.000	0.001	0.000	0.001
	(-0.12)	(0.38)	(0.97)	(-0.16)	(1.23)
$SIGMA_T$	3.002**	1.965	3.156	3.065**	2.124
	(2.23)	(1.29)	(1.49)	(2.19)	(1.04)
RET_T	0.253**	0.246**	0.340*	0.260**	0.293
	(2.57)	(2.07)	(1.90)	(2.53)	(1.64)
MB_T	0.000***	0.000**	0.001***	0.000**	0.001***
	(2.58)	(2.44)	(3.70)	(2.55)	(3.59)
LEV_T	-0.122***	-0.124***	-0.167***	-0.120***	-0.168***
	(-5.21)	(-5.09)	(-6.36)	(-5.07)	(-6.28)
ROE_T	0.000**	0.000**	0.006***	0.000**	0.005***
	(2.11)	(2.00)	(4.26)	(2.10)	(4.13)
$LNSIZE_T$	0.065***	0.062***	0.047***	0.065***	0.051***
	(12.23)	(11.40)	(7.74)	(11.89)	(8.13)
$DTURNOVER_T$	0.004	0.003	0.004	0.005	0.003
	(1.33)	(1.29)	(1.27)	(1.32)	(1.21)
$OPAQUE_T$	0.328***	0.302***	0.366***	0.328***	0.333***
	(8.94)	(7.82)	(8.32)	(8.80)	(7.37)
ANA_FOL_T	0.056***	0.036***	0.076***	0.056***	0.048***
	(5.67)	(3.50)	(6.96)	(5.59)	(4.23)
$LITIG\_RISK_T$	-0.025	-0.038	0.01	-0.025	-0.006
	(-0.60)	(-0.83)	(-0.21)	(-0.60)	(-0.13)
Intercept	-1.795***	-1.613***	-1.332***	-1.705***	-1.406***
	(-16.62)	(-14.59)	(-10.31)	(-15.14)	(-10.51)
Adj. R-squared	0.037	0.041	0.035	0.036	0.039
N. of cases	66727	61705	55431	65217	53674

Panel B. Dependent Variable (Future Stock Price Crash Risk): *DUVOL*$_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
***TOP5*$_T$**	**0.127*****				
	(6.01)				
***TOP5_TRA*$_T$**		**0.633*****			**0.600*****
		(15.79)			**(13.76)**
***TOP5_DED*$_T$**			**-0.061***		**-0.102*****
			(-1.85)		**(-3.06)**
***TOP5_QIX*$_T$**				**0.171*****	**0.042**
				(6.14)	**(1.35)**
NCSKEW$_T$	0.022***	0.021***	0.018***	0.023***	0.018***
	(8.27)	(7.70)	(6.03)	(8.26)	(5.91)
KUR$_T$	-0.002***	-0.001***	-0.001***	-0.002***	-0.001***
	(-4.91)	(-4.26)	(-3.36)	(-5.02)	(-3.02)
SIGMA$_T$	0.099	-0.494	0.107	0.208	-0.34
	(0.20)	(-0.84)	(0.13)	(0.40)	(-0.40)
RET$_T$	0.065*	0.067	0.115	0.070*	0.1
	(1.88)	(1.50)	(1.63)	(1.94)	(1.36)
MB$_T$	0.000***	0.000***	0.000***	0.000***	0.000***
	(2.88)	(2.71)	(3.55)	(2.82)	(3.46)
LEV$_T$	-0.063***	-0.066***	-0.085***	-0.062***	-0.087***
	(-6.16)	(-6.22)	(-7.40)	(-6.00)	(-7.44)
ROE$_T$	0.000**	0.000**	0.002***	0.000**	0.002***
	(2.23)	(2.10)	(4.42)	(2.21)	(4.49)
LNSIZE$_T$	0.032***	0.031***	0.025***	0.033***	0.028***
	(13.16)	(12.78)	(9.01)	(13.10)	(10.07)
DTURNOVER$_T$	0.002	0.002	0.002	0.002	0.001
	(1.26)	(1.21)	(1.19)	(1.25)	(1.13)
OPAQUE$_T$	0.149***	0.136***	0.172***	0.149***	0.160***
	(9.03)	(7.98)	(8.91)	(8.90)	(8.13)
ANA_FOL$_T$	0.021***	0.012**	0.028***	0.019***	0.015***
	(4.62)	(2.52)	(5.63)	(4.21)	(2.87)
LITIG_RISK$_T$	-0.035*	-0.037*	-0.014	-0.034*	-0.018
	(-1.87)	(-1.87)	(-0.69)	(-1.81)	(-0.83)
Intercept	-0.992***	-0.935***	-0.808***	-0.986***	-0.865***
	(-20.39)	(-19.00)	(-14.14)	(-19.62)	(-14.62)
Adj. R-squared	0.063	0.067	0.059	0.061	0.065
N. of cases	66727	61705	55431	65217	53674

Panel C. Dependent Variable (Future Stock Price Crash Risk): $COUNT_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
$TOP5_T$	**0.238*** (3.73)**				
$TOP5\_TRA_T$		**1.448*** (12.58)**			**1.377*** (11.15)**
$TOP5\_DED_T$			**-0.258** (-2.49)**		**-0.338*** (-3.27)**
$TOP5\_QIX_T$				**0.377*** (4.57)**	**0.053 (0.57)**
$NCSKEW_T$	0.056***	0.053***	0.045***	0.057***	0.043***
	(8.04)	(7.42)	(5.95)	(8.09)	(5.70)
KUR_T	-0.005***	-0.005***	-0.004***	-0.005***	-0.004***
	(-6.83)	(-6.15)	(-5.19)	(-6.99)	(-4.63)
$SIGMA_T$	0.356	-1.004	0.378	0.64	-0.851
	(0.26)	(-0.67)	(0.20)	(0.45)	(-0.47)
RET_T	0.102	0.078	0.173	0.111	0.121
	(1.09)	(0.71)	(1.14)	(1.15)	(0.81)
MB_T	0.000*	0.000*	0.001**	0.000*	0.000**
	(1.92)	(1.80)	(2.40)	(1.89)	(2.34)
LEV_T	-0.145***	-0.154***	-0.176***	-0.141***	-0.175***
	(-4.81)	(-4.95)	(-5.15)	(-4.68)	(-5.02)
ROE_T	0.000***	0.000***	0.004**	0.000***	0.004**
	(3.76)	(3.60)	(2.28)	(3.76)	(2.33)
$LNSIZE_T$	0.104***	0.104***	0.088***	0.105***	0.096***
	(14.50)	(14.44)	(11.23)	(14.46)	(11.78)
$DTURNOVER_T$	0.006	0.005	0.005	0.006	0.004
	(1.22)	(1.17)	(1.15)	(1.21)	(1.09)
$OPAQUE_T$	0.321***	0.288***	0.374***	0.317***	0.343***
	(6.53)	(5.69)	(6.76)	(6.38)	(6.08)
ANA_FOL_T	0.066***	0.041***	0.076***	0.061***	0.044***
	(4.88)	(2.94)	(5.23)	(4.48)	(2.96)
$LITIG\_RISK_T$	-0.067	-0.062	-0.025	-0.061	-0.016
	(-1.16)	(-1.03)	(-0.40)	(-1.08)	(-0.25)
Intercept	-3.124***	-2.959***	-2.656***	-3.051***	-2.722***
	(-21.51)	(-20.22)	(-16.50)	(-20.57)	(-16.24)
Adj. R-squared	0.049	0.050	0.044	0.047	0.046
N. of cases	66730	61708	55433	65220	53676

Table 5

Lagged Concentrated Ownership, and Concentrated Trading (i.e., Change in Concentrated Holdings)

This table estimates the cross-sectional relation between lagged concentrated ownership, concentrated trading and future stock price crash risk. The sample covers firm-year observations in the *Thompson-Reuters Institutional Holdings Database* with non-missing values for all variables for the period 1980 to 2008. *t*-statistics reported in parentheses are based on White standard errors corrected for clustering by firm. Year and industry fixed effects are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Panel A. Dependent Variable (Future Stock Price Crash Risk): $NCSKEW_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
$TOP5_{T-1}$	**0.283***** **(5.76)**				
$\Delta TOP5_T$	**0.323***** **(4.48)**				
$TOP5\_TRA_{T-1}$		**1.543***** **(15.24)**			**1.516***** **(12.82)**
$\Delta TOP5\_TRA_T$		**1.508***** **(13.07)**			**1.407***** **(10.52)**
$TOP5\_DED_{T-1}$			**-0.173**** **(-2.08)**		**-0.269***** **(-3.14)**
$\Delta TOP5\_DED_T$			**-0.082** **(-0.69)**		**-0.086** **(-0.71)**
$TOP5\_QIX_{T-1}$				**0.268***** **(4.02)**	**-0.154*** **(-1.87)**
$\Delta TOP5\_QIX_T$				**0.470***** **(4.75)**	**0.191*** **(1.67)**
$NCSKEW_T$	0.026*** (3.82)	0.020*** (2.77)	0.014* (1.72)	0.026*** (3.74)	0.01 (1.26)
KUR_T	0.000 (-0.23)	0.001 (0.64)	0.001 (1.01)	0.000 (-0.21)	0.001 (1.50)
$SIGMA_T$	3.062** (2.24)	1.921 (1.24)	3.758 (1.30)	3.079** (2.17)	2.416 (0.86)
RET_T	0.257** (2.56)	0.239** (1.98)	0.391 (1.55)	0.261** (2.51)	0.329 (1.28)
MB_T	0.000** (2.57)	0.000** (2.45)	0.001*** (3.66)	0.000** (2.55)	0.001*** (3.57)
LEV_T	-0.121*** (-5.10)	-0.136*** (-5.38)	-0.179*** (-6.34)	-0.122*** (-5.09)	-0.180*** (-6.18)
ROE_T	0.000** (2.10)	0.000** (2.00)	0.006*** (4.20)	0.000** (2.09)	0.005*** (4.09)
$LNSIZE_T$	0.066*** (12.20)	0.062*** (10.93)	0.046*** (6.92)	0.065*** (11.59)	0.049*** (6.94)
$DTURNOVER_T$	0.005 (1.32)	0.004 (1.25)	0.004 (1.22)	0.005 (1.29)	0.003 (1.17)
$OPAQUE_T$	0.322*** (8.65)	0.308*** (7.61)	0.373*** (7.65)	0.315*** (8.31)	0.327*** (6.43)
ANA_FOL_T	0.054*** (5.42)	0.040*** (3.72)	0.075*** (6.41)	0.057*** (5.54)	0.053*** (4.26)
$LITIG\_RISK_T$	-0.03 (-0.69)	-0.035 (-0.74)	0.008 (0.15)	-0.031 (-0.72)	-0.021 (-0.39)
Intercept	-1.583*** (-14.45)	-1.611*** (-14.00)	-1.110*** (-7.52)	-1.482*** (-12.88)	-1.326*** (-8.67)
Adj. R-squared	0.036	0.040	0.034	0.036	0.039
N. of cases	65253	58366	50752	63416	48549

Panel B. Dependent Variable (Future Stock Price Crash Risk): $DUVOL_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
$TOP5_{T-1}$	**0.134*** (5.93)**				
$\Delta TOP5_{T}$	**0.116*** (3.68)**				
$TOP5\_TRA_{T-1}$		**0.629*** (14.12)**			**0.587*** (11.58)**
$\Delta TOP5\_TRA_{T}$		**0.673*** (13.41)**			**0.617*** (10.77)**
$TOP5\_DED_{T-1}$			**-0.06 (-1.63)**		**-0.107*** (-2.84)**
$\Delta TOP5\_DED_{T}$			**-0.061 (-1.20)**		**-0.064 (-1.26)**
$TOP5\_QIX_{T-1}$				**0.163*** (5.45)**	**-0.004 (-0.10)**
$\Delta TOP5\_QIX_{T}$				**0.180*** (4.27)**	**0.074 (1.54)**
$NCSKEW_{T}$	0.023*** (8.50)	0.021*** (7.23)	0.018*** (5.75)	0.023*** (8.34)	0.017*** (5.25)
KUR_{T}	-0.002*** (-5.15)	-0.001*** (-3.82)	-0.001*** (-3.27)	-0.002*** (-5.13)	-0.001** (-2.54)
$SIGMA_{T}$	0.146 (0.29)	-0.551 (-0.89)	0.24 (0.21)	0.254 (0.48)	-0.295 (-0.25)
RET_{T}	0.068* (1.92)	0.067 (1.42)	0.128 (1.31)	0.073** (1.96)	0.112 (1.05)
MB_{T}	0.000*** (2.85)	0.000*** (2.73)	0.000*** (3.53)	0.000*** (2.81)	0.000*** (3.46)
LEV_{T}	-0.063*** (-6.11)	-0.072*** (-6.56)	-0.092*** (-7.50)	-0.063*** (-6.04)	-0.095*** (-7.51)
ROE_{T}	0.000** (2.21)	0.000** (2.09)	0.002*** (4.39)	0.000** (2.21)	0.002*** (4.46)
$LNSIZE_{T}$	0.033*** (13.20)	0.031*** (12.36)	0.025*** (8.40)	0.033*** (12.81)	0.027*** (8.97)
$DTURNOVER_{T}$	0.002 (1.25)	0.002 (1.18)	0.002 (1.14)	0.002 (1.22)	0.001 (1.08)
$OPAQUE_{T}$	0.146*** (8.75)	0.139*** (7.80)	0.178*** (8.38)	0.143*** (8.41)	0.162*** (7.34)
ANA_FOL_{T}	0.019*** (4.20)	0.013*** (2.74)	0.026*** (4.85)	0.019*** (3.97)	0.017*** (2.99)
$LITIG\_RISK_{T}$	-0.036* (-1.94)	-0.036* (-1.75)	-0.011 (-0.53)	-0.037** (-1.98)	-0.022 (-0.93)
Intercept	-0.838*** (-17.00)	-0.928*** (-18.10)	-0.557*** (-8.86)	-0.733*** (-14.35)	-0.604*** (-9.23)
Adj. R-squared	0.062	0.068	0.060	0.061	0.065
N. of cases	65253	58366	50752	63416	48549

Panel C. Dependent Variable (Future Stock Price Crash Risk): *$COUNT_{T+1}$*.

	(1)	(2)	(3)	(4)	(5)
$TOP5_{T-1}$	**0.282***** **(4.11)**				
$\Delta TOP5_{T}$	**0.124** **(1.33)**				
$TOP5\_TRA_{T-1}$		**1.509***** **(11.68)**			**1.361***** **(9.50)**
$\Delta TOP5\_TRA_{T}$		**1.542***** **(10.65)**			**1.442***** **(8.90)**
$TOP5\_DED_{T-1}$			**-0.241**** **(-2.12)**		**-0.350***** **(-3.06)**
$\Delta TOP5\_DED_{T}$			**-0.301**** **(-2.07)**		**-0.324**** **(-2.19)**
$TOP5\_QIX_{T-1}$				**0.373***** **(4.16)**	**-0.06** **(-0.56)**
$\Delta TOP5\_QIX_{T}$				**0.304**** **(2.51)**	**0.041** **(0.29)**
$NCSKEW_{T}$	0.058*** (8.28)	0.052*** (7.11)	0.045*** (5.77)	0.057*** (8.14)	0.043*** (5.40)
KUR_{T}	-0.005*** (-7.06)	-0.004*** (-5.57)	-0.004*** (-4.94)	-0.005*** (-7.01)	-0.004*** (-4.10)
$SIGMA_{T}$	0.474 (0.34)	-1.525 (-0.98)	0.681 (0.28)	0.585 (0.41)	-0.916 (-0.40)
RET_{T}	0.109 (1.14)	0.069 (0.60)	0.219 (1.08)	0.115 (1.16)	0.15 (0.75)
MB_{T}	0.000* (1.88)	0.000* (1.79)	0.001** (2.38)	0.000* (1.88)	0.000** (2.32)
LEV_{T}	-0.148*** (-4.91)	-0.163*** (-5.14)	-0.195*** (-5.45)	-0.143*** (-4.70)	-0.200*** (-5.44)
ROE_{T}	0.000*** (3.74)	0.000*** (3.55)	0.004** (2.25)	0.000*** (3.77)	0.004** (2.33)
$LNSIZE_{T}$	0.106*** (14.51)	0.105*** (14.00)	0.088*** (10.49)	0.105*** (14.15)	0.093*** (10.69)
$DTURNOVER_{T}$	0.006 (1.20)	0.005 (1.13)	0.005 (1.10)	0.007 (1.18)	0.004 (1.04)
$OPAQUE_{T}$	0.315*** (6.34)	0.293*** (5.58)	0.381*** (6.33)	0.309*** (6.12)	0.343*** (5.52)
ANA_FOL_{T}	0.061*** (4.48)	0.043*** (3.00)	0.070*** (4.58)	0.058*** (4.25)	0.048*** (2.94)
$LITIG\_RISK_{T}$	-0.069 (-1.20)	-0.059 (-0.95)	-0.003 (-0.04)	-0.069 (-1.21)	-0.011 (-0.16)
Intercept	-2.720*** (-18.58)	-2.915*** (-19.26)	-2.038*** (-11.89)	-3.013*** (-20.00)	-2.610*** (-14.30)
Adj. R-squared	0.048	0.051	0.044	0.047	0.047
N. of cases	65256	58369	50754	63419	48551

Table 6
Opaque Financial Reporting and Institutional Ownership

This table estimates the cross-sectional relation between institutional ownership, opaque financial reporting, and future stock price crash risk. The sample covers firm-year observations in the *Thompson-Reuters Institutional Holdings Database* with non-missing values for all variables for the period 1980 to 2008. To economize on space, all the control variables (as in Table 2) are suppressed. *t*-statistics reported in parentheses are based on White standard errors corrected for clustering by firm. Year and industry fixed effects are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Panel A. Dependent Variable (Future Stock Price Crash Risk): $NCSKEW_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
$INST_T$	**0.215***** **(5.87)**				
$INST_T$*$OPAQUE_T$	**1.069***** **(7.43)**				
TRA_T		**0.927***** **(9.34)**			**0.920***** **(8.39)**
TRA_T*$OPAQUE_T$		**1.939***** **(5.24)**			**1.572***** **(3.77)**
DED_T			**-0.255**** **(-2.14)**		**-0.253**** **(-2.12)**
DED_T*$OPAQUE_T$			**0.614** **(1.05)**		**0.036** **(0.06)**
QIX_T				**0.08** **(1.39)**	**-0.025** **(-0.36)**
QIX_T*$OPAQUE_T$				**1.575***** **(6.54)**	**0.573*** **(1.90)**
$OPAQUE_T$	**-0.04** **(-0.75)**	**0.072** **(1.49)**	**0.324***** **(5.77)**	**0.036** **(0.68)**	**-0.016** **(-0.20)**
Controls	Included	Included	Included	Included	Included
Adj. R-squared	0.042	0.045	0.035	0.038	0.043
N. of cases	66727	61705	55431	65217	53674

Panel B. Dependent Variable (Future Stock Price Crash Risk): $NCSKEW_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
$INST_{T-1}$	**0.147*** (3.88)**				
$INST_{T-1}*OPAQUE_T$	**1.002*** (6.59)**				
$\Delta INST_T$	**0.520*** (6.84)**				
$\Delta INST_T*OPAQUE_T$	**1.154*** (4.20)**				
TRA_{T-1}		**0.936*** (8.46)**			**0.871*** (6.85)**
$TRA_{T-1}*OPAQUE_T$		**1.864*** (4.50)**			**1.773*** (3.59)**
ΔTRA_T		**0.946*** (7.33)**			**0.917*** (6.40)**
$\Delta TRA_T*OPAQUE_T$		**1.834*** (4.02)**			**1.463*** (2.89)**
DED_{T-1}			**-0.315** (-2.35)**		**-0.295** (-2.12)**
$DED_{T-1}*OPAQUE_T$			**0.833 (1.23)**		**0.11 (0.15)**
ΔDED_T			**-0.121 (-0.66)**		**0.005 (0.03)**
$\Delta DED_T*OPAQUE_T$			**0.294 (0.35)**		**-0.034 (-0.04)**
QIX_{T-1}				**-0.009 (-0.14)**	**-0.107 (-1.40)**
$QIX_{T-1}*OPAQUE_T$				**1.459*** (5.70)**	**0.359 (1.03)**
ΔQIX_T				**0.521*** (4.32)**	**0.564*** (4.06)**
$\Delta QIX_T*OPAQUE_T$				**1.681*** (3.49)**	**-0.113 (-0.20)**
$OPAQUE_T$	**-0.05 (-0.91)**	**0.076 (1.42)**	**0.315*** (4.85)**	**0.017 (0.32)**	**-0.027 (-0.29)**
Controls	Included	Included	Included	Included	Included
Adj. R-squared	0.043	0.044	0.034	0.039	0.043
N. of cases	65253	58366	50752	63416	48549

Table 7
Lead-lag Test: Change in Institutional Ownership and Subsequent Change in Crash Risk

This table estimates the cross-sectional regression of the change in crash risk from years *T* to *T+1* on changes in *INST* (*TRA* or *DED* or *QIX*) from years *T-1* to *T*, controlling for changes from years *T-1* to *T* in *KUR*, *SIGMA*, *RET*, *MB*, *LEV*, *ROE*, *LNSIZE*, *DTURNOVER*, *OPAQUE* and *ANA_FOL*, litigation risk dummy variable, and industry and year indicator variables. To economize on space, all control variables are suppressed. The sample covers firm-year observations in the *Thompson-Reuters Institutional Holdings Database* with non-missing values for all variables for the period 1980 to 2008. *t*-statistics reported in parentheses are based on White standard errors corrected for clustering by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Panel A. Dependent Variable: $\Delta NCSKEW_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
$\Delta INST_T$	**0.320*** (4.32)**				
ΔTRA_T		**0.998*** (8.24)**			**0.847*** (6.39)**
ΔDED_T			**-0.531*** (-3.26)**		**-0.397** (-2.39)**
ΔQIX_T				**0.072 (0.63)**	**0.062 (0.51)**
Controls	Included	Included	Included	Included	Included
Adj. R-squared	0.119	0.125	0.126	0.120	0.129
N. of cases	57940	52524	46345	56407	44598

Panel B. Dependent Variable: $\Delta DUVOL_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
$\Delta INST_T$	**0.126*** (4.03)**				
ΔTRA_T		**0.556*** (10.68)**			**0.486*** (8.58)**
ΔDED_T			**-0.298*** (-4.34)**		**-0.236*** (-3.38)**
ΔQIX_T				**-0.067 (-1.47)**	**-0.061 (-1.21)**
Controls	Included	Included	Included	Included	Included
Adj. R-squared	0.142	0.148	0.148	0.142	0.151
N. of cases	57940	52524	46345	56407	44598

Panel C. Dependent Variable: $\Delta COUNT_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
$\Delta INST_T$	**0.172* (1.88)**				
ΔTRA_T		**1.341*** (8.68)**			**1.227*** (7.32)**
ΔDED_T			**-0.758*** (-3.61)**		**-0.658*** (-3.04)**
ΔQIX_T				**-0.382*** (-2.89)**	**-0.331** (-2.27)**
Controls	Included	Included	Included	Included	Included
Adj. R-squared	0.070	0.072	0.072	0.070	0.074
N. of cases	57943	52527	46347	56410	44600

Table 8

Impact of Institutional Ownership on Crash Risk Using an Instrumental Variables Approach

This table estimates the cross-sectional regression of future stock price crash risk on fitted values of *INST* (*TRA* or *DED* or *QIX*) estimated from a first-stage regression of *INST* (*TRA* or *DED* or *QIX*) on instrumental variables based on Bushee (2001). To economize on space, all the control variables (as in Table 2) are suppressed. The sample covers firm-year observations in the *Thompson-Reuters Institutional Holdings Database* with non-missing values for all variables for the period 1980 to 2008. *t*-statistics reported in parentheses are based on White standard errors corrected for clustering by firm. Year and industry fixed effects are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Panel A. Dependent Variable: $NCSKEW_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
Instrument for $INST_T$	**1.653*** (4.12)**				
Instrument for TRA_T		**3.722*** (10.23)**			**4.087*** (5.16)**
Instrument for DED_T			**-9.693*** (-5.56)**		**-1.841 (-0.71)**
Instrument for QIX_T				**-2.195*** (-5.05)**	**1.435** (2.15)**
Controls	Included	Included	Included	Included	Included
Adj. R-squared	0.038	0.037	0.036	0.037	0.036
N. of cases	66043	61057	54929	64540	53188

Panel B. Dependent Variable: $DUVOL_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
Instrument for $INST_T$	**0.975*** (4.45)**				
Instrument for TRA_T		**1.646*** (9.92)**			**2.235*** (4.50)**
Instrument for DED_T			**-4.419*** (-5.46)**		**-1.503 (-0.99)**
Instrument for QIX_T				**-0.555*** (-3.04)**	**1.380*** (4.05)**
Controls	Included	Included	Included	Included	Included
Adj. R-squared	0.064	0.064	0.061	0.061	0.063
N. of cases	66043	61057	54929	64540	53188

Panel C. Dependent Variable: $COUNT_{T+1}$.

	(1)	(2)	(3)	(4)	(5)
Instrument for $INST_T$	**2.792*** (4.42)**				
Instrument for TRA_T		**4.075*** (8.58)**			**5.574*** (4.67)**
Instrument for DED_T			**-11.775*** (-5.30)**		**-6.229* (-1.66)**
Instrument for QIX_T				**-1.036** (-2.01)**	**4.252*** (4.71)**
Controls	Included	Included	Included	Included	Included
Adj. R-squared	0.049	0.048	0.045	0.047	0.045
N. of cases	66046	61060	54931	64543	53190

Table 9
Sub-period Analysis

This table estimates the cross-sectional relation between institutional ownership and future stock price crash risk in the 1980s, 1990s and 2000s. The sample covers firm-year observations in the *Thompson-Reuters Institutional Holdings Database* with non-missing values for all variables for the period 1980 to 2008. To economize on space, all the control variables (as in Table 2) are suppressed. *t*-statistics reported in parentheses are based on White standard errors corrected for clustering by firm. Year and industry fixed effects are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Panel A. Dependent Variable (Future Stock Price Crash Risk): $NCSKEW_{T+1}$.

	1980s	1990s	2000s
	(1)	(2)	(3)
TRA_T	**0.555*** **	**1.361*** **	**1.133*** **
	(3.50)	**(13.07)**	**(9.79)**
DED_T	**-0.289** **	**-0.342*** **	**-0.156**
	(-2.29)	**(-3.12)**	**(-1.19)**
QIX_T	**0.044**	**0.118* **	**0.049**
	(0.51)	**(1.81)**	**(0.62)**
Controls	Included	Included	Included
Adj. R-squared	0.047	0.045	0.032
N. of cases	12150	22004	19520

Panel B. Dependent Variable (Future Stock Price Crash Risk): $NCSKEW_{T+1}$.

	80s	90s	00s
	(1)	(2)	(3)
TRA_{T-1}	**0.31**	**1.446*** **	**1.060*** **
	(1.61)	**(11.77)**	**(7.96)**
ΔTRA_T	**0.760*** **	**1.202*** **	**1.143*** **
	(3.50)	**(9.33)**	**(7.40)**
DED_{T-1}	**-0.2**	**-0.426*** **	**-0.185**
	(-1.24)	**(-3.27)**	**(-1.33)**
ΔDED_T	**-0.577** **	**-0.117**	**0.212**
	(-2.40)	**(-0.73)**	**(1.00)**
QIX_{T-1}	**-0.091**	**-0.027**	**-0.039**
	(-0.90)	**(-0.39)**	**(-0.46)**
ΔQIX_T	**0.278* **	**0.571*** **	**0.575*** **
	(1.71)	**(4.66)**	**(3.75)**
Controls	Included	Included	Included
Adj. R-squared	0.049	0.046	0.031
N. of cases	9948	20179	18422

Table 10 Legal Types of Institutional Investors

This table estimates the cross-sectional relation between institutional ownership and future stock price crash risk for each of legal types of institutional investors. The sample covers firm-year observations in the *Thompson-Reuters Institutional Holdings Database* with non-missing values for all variables for the period 1980 to 2008. To economize on space, al the control variables (as in Table 2) are suppressed. *t*-statistics reported in parentheses are based on White standard errors corrected for clustering by firm. Year and industry fixed effects are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Panel A. Dependent Variable (Future Stock Price Crash Risk): $NCSKEW_{T+1}$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
BNK_T	**0.439***** **(4.50)**						**0.395***** **(2.87)**
INS_T		**0.324**** **(2.22)**					**0.095** **(0.47)**
INV_T			**0.820***** **(7.88)**				**0.271**** **(2.04)**
IIA_T				**0.654***** **(15.77)**			**0.497***** **(7.20)**
CPS_T					**-0.251** **(-0.97)**		**-0.147** **(-0.43)**
PPS_T						**-0.729***** **(-3.12)**	**-1.269***** **(-4.12)**
Controls	Included	Included	Included	Included	Included	Included	Included
Adj. R-squared	0.036	0.037	0.034	0.040	0.038	0.034	0.040
N. of cases	64282	55089	54175	64905	36893	47576	31809

Panel B. Dependent Variable (Future Stock Price Crash Risk): $NCSKEW_{T+1}$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
BNK_{T-1}	**0.195*** **(1.88)**						**0.322**** **(2.17)**
ΔBNK_T	**1.088***** **(6.37)**						**0.872***** **(3.72)**
INS_{T-1}		**0.094** **(0.57)**					**-0.067** **(-0.29)**
ΔINS_T		**0.801***** **(3.60)**					**0.406** **(1.23)**
INV_{T-1}			**0.636***** **(5.37)**				**0.274*** **(1.65)**
ΔINV_T			**1.015***** **(6.69)**				**0.679***** **(3.10)**
IIA_{T-1}				**0.612***** **(13.86)**			**0.446***** **(5.18)**
ΔIIA_T				**0.768***** **(11.98)**			**0.425***** **(3.66)**
CPS_{T-1}					**-0.318** **(-1.02)**		**-0.123** **(-0.33)**
ΔCPS_T					**0.203** **(0.32)**		**-0.178** **(-0.24)**
PPS_{T-1}						**-0.970***** **(-3.54)**	**-1.078***** **(-2.65)**
ΔPPS_T						**-0.136** **(-0.39)**	**0.01** **(0.02)**
Controls	Included	Included	Included	Included	Included	Included	Included
Adj. R-squared	0.036	0.038	0.034	0.042	0.040	0.033	0.041
N. of cases	61882	50326	49295	62943	30597	41904	25812