

Volatility and Institutional Investor Holdings in a Declining Market: A Study of Nasdaq during the Year 2000

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We investigate the differences in the holdings of institutional investors relative to individual investors during an eight-month period between March and November 2000, where the Nasdaq Composite index fell 46.23% in value. We find evidence that during that market decline, institutional investors held stocks with less return volatility than individual investors. Our evidence of institutional investor preference for holding lower volatility stocks in a declining market may indicate their relatively greater sensitivity to downside risk. As a consequence, institutional investors are found to perform better than individual investors during that specific time period. [G12, G23]

■ There is mixed empirical evidence on the hypothesis that institutional investors are attracted to less risky stocks. Badrinath, Gay, and Kale (1989) and Aggarwal and Rao (1990) find evidence that links the level of institutional holdings with lower risk stocks. On the other hand, Kothare and Laux (1995) find evidence to suggest that institutional investors are associated with more volatile stocks.

Using a comprehensive data set covering the period 1980-1996, Gompers and Metrick (2001) find that institutional investors compared to individual investors prefer stocks in larger market capitalization companies that are more liquid and have higher book-to-market ratios. They do not, however, detect any significant relation between institutional holdings and stock return volatility. In a study that documents the preferences of US open-end mutual funds, Falkenstein (1996) considers only the years 1991 and 1992, and finds that mutual funds display a preference for high-volatility stocks.

Sias (1996) argues that institutional investors are likely to choose less volatile stocks for several reasons: 1) many institutions are governed by the prudent man

rule; 2) greater institutional interest may imply more and better information; and 3) institutional investor behavior is less susceptible to fads or noise trading influences. Contrary to this intuition, Sias (1996) finds that higher levels of institutional ownership for NYSE listed securities, over the period 1977-1991 are associated with higher contemporaneous stock return volatility. He concludes that the evidence is against an interpretation that institutional investors tend to select riskier stocks, but that an increase in institutional ownership may itself be the cause of increased volatility.

While the results of Gompers and Metrick (2001) and Sias (1996) are inconclusive with respect to whether institutional investors prefer less risky or more risky stocks over long periods of time, we might observe different results in rising and declining markets. In fact, Falkenstein's (1996) result showing that mutual funds managers prefer high-volatility stocks might in part be due to a rising stock market during his sample period.

We posit that institutional holdings during a market downturn will be inversely related to stock return volatility. That is, institutional investors tend to hold less-volatile stocks than individual investors in a declining market. A possible reason for this behavior could be the fiduciary responsibilities that are specific to institutional investment management.

This hypothesis is tested by investigating the

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differences in the holdings of institutional investors and individual investors during a period the Nasdaq experienced a pronounced decline. For an eight-month period during March–November 2000, the Nasdaq Composite index fell 46.23 % in value. For the same period, the NYSE index remained relatively flat (-2.43%). As a control sample, we conduct the same tests on NYSE listed stocks where the market did not experience a significant downward movement.

The evidence for this period indicates that for Nasdaq there is a strong and consistent cross-sectional relation between the level of institutional ownership and contemporaneous means and standard deviations of individual security daily returns. A higher percentage of institutional ownership is associated with higher mean daily returns and lower risk as measured by the standard deviation of daily returns. For the control sample of NYSE-listed securities, we neither find any significant relation between the level of institutional ownership and nor returns or standard deviations. Our evidence of institutional investor preference for lower-volatility stocks in a declining market may be the result of a higher sensitivity to downside risk by institutional investors.¹

The rest of this paper is organized as follows. Section I presents the data and descriptive statistics and reviews the extant literature regarding the differences between NYSE and Nasdaq markets with respect to trading costs, institutional trading, and other unique characteristics. Section II presents tests for our main hypothesis regarding the relationship between institutional ownership and the risk and return for individual securities. Section III provides a summary of our findings and concluding remarks.

I. The Data

We first describe the data, and then discuss sample characteristics in the context of relevant literature. The data come from Research Insight previously known as Compustat. The sample includes securities traded on Nasdaq with at least \$50 million of market value as of July 31, 2000. The control sample includes all securities traded on the NYSE with market values greater than \$50 million as of July 31, 2000. There are a maximum of 2,383 securities for Nasdaq and 1,341 securities for NYSE at any given time. We exclude ADRs, duplicate listings, and any other

¹Fiduciary responsibilities as described in Section 404 of ERISA might be good reason to suspect such behavior. Eakins, Stansell, and Wertheim (1998) investigate the prudent investment hypothesis, which suggests that institutional investors consider whether their stock selection would appear to be prudent to possibly avoid lawsuits and charges of imprudence. They investigate the relationship between the level of institutional ownership and various firm-specific characteristics such as risk, return, and size. Their results are generally consistent with the prudent investment hypothesis.

security that did not have complete data available for the variables used in the study.

Research Insight sorts securities into 11 economic sectors. Examination of these economic sectors separately helps us isolate the relative impact of the market downturn on individual sectors. Four sectors were eliminated from study for reasons of number of listed securities (fewer than 100 companies) on either one or both exchanges (Energy, Communication Services, Utilities, and Transportation). The remaining seven economic sectors constitute the sample. These sectors (and codes) are: Basic Materials (1000), Consumer Cyclical (2000), Consumer Staples (3000), Health Care (3500), Financials (5000), Capital Goods (6000), and Technology (8000). We excluded mutual funds and other diversified investors from the Financial sector (economic sector code 5110). The total number of securities in our sample represents 82 % of all securities listed on Nasdaq and 88 % of securities listed on the NYSE.

Daily stock returns (including dividends) and trading volume for all securities are also obtained from Research Insight for the period March 29, 2000, through November 30, 2000. Turnover ratios are computed using daily trading volume divided by the average shares outstanding for two four-month subperiods. The percentage share of institutional ownership for each security is reported on a quarterly basis. This variable is the percentage of a company's total shares outstanding that is owned by institutions as of the end of the previous quarter.²

We divide the eight-month sample period into two equal subperiods. The first period is from March 29 through July 31, 2000, and the second period is from August 1 through November 30, 2000. Two observations for the percentage of institutional ownership are obtained for each security to coincide with these two subperiods. The first observation is for March 2000 and the second observation is for June 2000. Each observation represents institutional ownership immediately prior to the beginning of each subperiod. This sample design is motivated by our objective to examine stock returns for the period that immediately followed the observation of the institutional ownership. Finally, individual security total market values are obtained from Research Insight for the two months March and July 2000, to match the beginning of each subperiod.

B. Control Sample: Differences Between NYSE and Nasdaq

Many authors have examined the differences between

²Research Insight began compiling and reporting quarterly data on institutional ownership for individual securities as of March 2000.

auction and dealer markets. Chan and Lakonishok (1997) and Keim and Madhavan (1997) compare the total execution costs for large institutional traders on the NYSE and Nasdaq. Chan and Lakonishok (1997) find the costs of trading are lower on Nasdaq for smaller firms, while costs for trading larger stocks are lower on the NYSE. They did not find cost to be uniformly higher on one exchange or the other. Keim and Madhavan (1997), however, indicate that trading costs are higher on Nasdaq than on the NYSE for all but the largest stocks.

Huang and Stoll (1996) compare execution costs on several dimensions, and find that costs for Nasdaq stocks are almost twice as high as for a comparable sample of NYSE stocks. They attribute this difference to institutional features of the Nasdaq market, particularly arrangements to direct portions of the order flow to certain market makers. Lee (1993) also suggests that retail investors face higher execution costs on Nasdaq than on NYSE.

Weston (2000) examines the effect of the recent SEC market reforms on the competitive structure of the Nasdaq. The new rules allow limit orders that come to a dealer inside the quoted spread to take precedence over orders outside the spread or to become a new quote for the dealer. Weston finds that differences between NYSE and Nasdaq spreads have greatly diminished with the new rules, and that the reforms have significantly improved dealer competition on Nasdaq.³

The bulk of the evidence on transactions costs in Nasdaq and NYSE indicates a difference between the two trading systems, as evidenced in Keim and Madhavan (1997), although according to Weston (2000) the differences are declining over time. Thus, it appears reasonable to use NYSE-listed stocks as a control sample.⁴

C. Descriptive Statistics

Exhibit 1 provides summary statistics for the sample of securities listed on the Nasdaq and NYSE for the two subperiods. For each market we report the individual security means, medians and standard deviations for percentage of institutional ownership,

³While not specifically comparing differences between NYSE and Nasdaq, Conrad, Johnson, and Wahal (2002) examine execution costs using a large transactions database from the Plexus Group for the year 2000. They conclude that: "average execution costs in calendar year 2000 are approximately the same as average execution costs reported for the 1996-1998 period, despite dramatically different market conditions and ongoing changes in the structure of financial markets."

⁴To take into account any microstructure effects on returns, we control for liquidity differences between the two markets in our tests.

market values, mean and standard deviation of daily returns, and the mean turnover ratio.

There is approximately twice the number of stocks listed on Nasdaq as on the NYSE. The mean percentage of institutional ownership for Nasdaq-listed securities is approximately 31% while for NYSE-listed stocks the mean is 51%. The average market capitalization of firms listed on the NYSE is roughly three times as large as firms listed on Nasdaq. While the data show that mean turnover ratios for Nasdaq are about twice that of NYSE, it is well documented that the volume of trade is not comparable across markets because of the double-counting that occurs on Nasdaq due to inter-dealer trading.

The data in Exhibit 1 clearly show that securities listed on Nasdaq had on average, negative returns in both periods, with a more severe drop in the second period. For NYSE, the returns were positive for the first subperiod and turned slightly negative in the second period. As expected, the standard deviation of daily returns for Nasdaq listed stocks is about twice the standard deviation for NYSE listed securities.

Exhibit 2 divides the sample into economic sectors. Note the high number of health care and technology stocks listed on Nasdaq compared to the NYSE. In terms of market value, the average size of firms listed on NYSE is between four (Technology) and thirteen times (Health Care) the size of Nasdaq firms.⁵ The percentage of institutional ownership across economic sectors for NYSE-listed securities is stable around the 50% mean. For Nasdaq-listed stocks, the highest institutional ownership is 38.6% in the case of Consumer Staples. The lowest institutional ownership of 19.92% is in the Financials sector.

The only sector to experience positive mean returns during this period is the Financials. The sector with the lowest mean returns during that period is Technology. These two observations are consistent during both subperiods and both markets. The Financials sector also has the lowest standard deviation and the Technology sector has the highest standard deviation for both subperiods and both markets.

While mean trading volume (measured by mean turnover ratios) is not comparable across markets, ratios are comparable within markets and across economic sectors. The mean turnover ratio exhibits similar behavior to the means and standard deviations

⁵It should be noted that the apparent discrepancy between the mean market value figure for the entire sample and the mean market values for the individual economic sectors is due to the concentration of relatively few, but very large market capitalization stocks on the NYSE as opposed to a very large number of small capitalization stocks listed on Nasdaq. This is particularly pronounced in the case of the Technology and Health Care sectors.

Exhibit 1. Summary Statistics for Nasdaq and NYSE Listed Stocks

The two subperiods are March 29 through July 31, 2000 and August 1 through November 30, 2000. The number of stocks in the sample for Nasdaq is 2374 in period 1 and 2383 in period 2. For NYSE the sample size is 1303 stocks in period 1 and 1341 stocks in period 2.

Subperiods	Market	Mean		Median		Standard Deviation	
		1st	2nd	1st	2nd	1st	2nd
Market Value	Nasdaq	2353	1990	308	247	19927	17003
(\$Millions)	NYSE	6697	6683	944	927	24609	25242
% Institutional	Nasdaq	32.34	30.40	27.40	25.72	23.61	22.21
Ownership	NYSE	50.28	48.94	52.63	51.44	22.49	23.02
% Mean Daily	Nasdaq	-0.12	-0.31	-0.04	-0.16	0.93	0.71
Returns	NYSE	0.05	-0.02	0.06	0.02	0.36	0.41
% Std. Dev. of Daily	Nasdaq	6.02	5.34	5.87	5.21	2.64	2.52
Returns	NYSE	3.35	3.20	3.02	2.78	1.58	1.86
% Mean Turnover	Nasdaq	0.95	1.07	0.64	0.55	1.03	2.63
Ratio	NYSE	0.40	0.40	0.33	0.31	0.36	0.43

of daily returns. The lowest turnover values occur in Financials and the highest values in Technology. These extreme differences between turnover ratios reflect increases in trading activity in the Technology and Health Care sectors during this period.

II. Hypothesis Testing

Next, we investigate whether increases in the percentage of institutional ownership results in statistically different mean and standard deviation of daily returns.

A. Individual Securities Tests

To examine the effects of increases in the percentage of institutional ownership on the means and standard deviations of daily returns, we use two control variables. The first is each security's market capitalization, and the second is the exchange on which it trades. These effects are examined separately for Nasdaq, and then for the control group of NYSE-listed securities.

The first step is to form capitalization-sorted deciles for each subperiod. We rebalance the composition of the sample at the beginning of the second subperiod according to July 2000 market values. The second step is to sort each decile according to the percentage of institutional ownership. Deciles are then divided into three equal-sized groups from the lowest to the highest institutional ownership percentage. Finally, the last step is to obtain total period averages.

The test results in Exhibits 3 and 4 show the differences between the highest and the lowest percentage of institutional ownership categories.⁶ For

each variable, we provide the mean for the low and high institutional ownership categories. We report in boldface the t-test (with unequal variances) of the null hypothesis that the means do not differ within capitalization deciles across firms with high and low percentages of institutional ownership.

Exhibit 3 reports the results for securities listed on Nasdaq. We test the null hypothesis that, within capitalization deciles, the mean daily returns do not differ across firms with high and low percentages of institutional ownership. For eight of the ten deciles reported, a higher percentage of institutional ownership is associated with higher mean daily returns. The t-statistics for equality of the means for the high and low groups are all significant at the 95% level.⁷ The two deciles that do not show significant difference between the high and low groups are the two lowest-capitalization deciles suggesting that the level of institutional ownership for firms with market value less than \$100 million does not appear to produce any measurable impact.

Exhibit 4 reports the same test statistics for the control group of NYSE securities. We cannot reject the null hypothesis that the percentage of institutional ownership has no relationship to mean daily returns. This result is consistent for nine of the ten deciles examined. Moreover, with the exception of the tenth decile, it is evident from the t-statistics on the market value variable that we have eliminated any possible size effect within each decile.

Exhibit 3 shows that, for Nasdaq, the t-statistics for testing the differences in the standard deviation of

⁶Like Sias and Starks (1997), we remove the middle category to accentuate the contrast between low and high levels of institutional ownership.

⁷These results are also consistent across both subperiods. For both periods, eight out of ten deciles show the same pattern for Nasdaq. Similarly, the results are again consistent for the NYSE. In period 1, nine of the ten deciles are not significantly different. In period 2, eight of the deciles are not significantly different.

Exhibit 2. Summary Statistics by Economic Sector

The two subperiods are March 29 through July 31, 2000 (1st period) and August 1 through November 30, 2000 (2nd period). Each period is labeled in a column underneath each variable. Economic sector codes are in parentheses. The variable Market Value is measured in \$ Millions.

Economic Sector	Market	Market Value		Inst. Own.		Daily Return		SD of Daily Ret.		Mean T/O		# of Stocks	
		1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd
Basic Materials (1000)	Nasdaq	389	340	31.00%	32.01%	-0.01%	-0.13%	4.41%	4.46%	0.47%	0.45%	54	52
	NYSE	2222	1989	48.69%	48.98%	0.01%	-0.11%	3.25%	3.16%	0.34%	0.34%	160	163
Consumer	Nasdaq	831	627	35.74%	33.87%	-0.01%	-0.28%	5.52%	5.09%	0.71%	0.82%	358	355
	NYSE	3273	2894	48.64%	47.79%	0.02%	-0.08%	3.34%	3.23%	0.37%	0.37%	378	387
Cyclical (2000)	Nasdaq	1232	1011	38.60%	36.95%	0.01%	-0.15%	4.59%	4.50%	0.57%	0.52%	149	153
	NYSE	8382	8670	48.96%	46.98%	0.10%	0.03%	3.18%	2.84%	0.34%	0.31%	169	183
Staples (3000)	Nasdaq	930	944	34.18%	31.17%	0.01%	-0.10%	6.61%	5.36%	1.07%	1.12%	346	355
	NYSE	12589	16466	55.58%	53.49%	0.26%	0.24%	3.82%	3.50%	0.54%	0.56%	82	83
Financials (5000)	Nasdaq	553	524	19.92%	19.67%	0.06%	0.06%	3.12%	2.62%	0.22%	0.24%	369	372
	NYSE	8110	8480	46.35%	45.15%	0.12%	0.13%	2.90%	2.60%	0.33%	0.33%	191	194
Capital Goods (6000)	Nasdaq	709	688	35.37%	34.34%	0.03%	-0.29%	5.25%	4.92%	0.69%	0.72%	169	164
	NYSE	5125	4959	54.48%	53.35%	0.07%	-0.02%	3.14%	3.11%	0.38%	0.41%	216	222
Technology (8000)	Nasdaq	4776	3974	33.79%	31.20%	-0.35%	-0.60%	7.62%	6.77%	1.43%	1.67%	929	932
	NYSE	18953	16680	54.89%	50.55%	-0.16%	-0.20%	4.75%	4.74%	0.75%	0.71%	107	109

Exhibit 3. Capitalization-Sorted Nasdaq Securities by Percentage Institutional Ownership

Capitalization-sorted Nasdaq securities are further sorted into three equal-size groups by the percentage of institutional ownership. Mean values for institutional ownership, market values, daily returns, standard deviations and turnover ratios are reported for securities with high and low institutional ownership within each capitalization decile for the period March 29 – November 30, 2000. The significant t-statistics for the hypothesis that securities with high and low institutional ownership have equal returns, standard deviations and turnover ratios are all in boldface. Numbers in parentheses represent the number of firms listed in each sub-decile.

Decile	Ownership Level	% Inst. Own.	Market Value	Mn Daily Ret.	SD Daily Ret.	Mean T/O
Small (79)	Low	3.69	58.64	-0.05%	4.96%	0.74%
	t-test, Low = High	24.27	-1.00	1.04	-1.00	-0.09
	High	38.80	57.19	0.03%	4.57%	0.70%
D2 (79)	Low	4.40	86.13	-0.17%	5.33%	0.47%
	t-test, Low = High	23.01	-0.06	0.93	-1.81*	-0.22
	High	41.14	86.05	-0.10%	4.56%	0.43%
D3 (79)	Low	5.66	118.53	-0.26%	5.69%	0.54%
	t-test, Low = High	28.61	1.05	2.10	-2.27	1.55
	High	47.09	120.40	-0.08%	4.81%	1.46%
D4 (79)	Low	5.85	166.02	-0.39%	6.36%	0.68%
	t-test, Low = High	31.03	0.10	4.00	-3.81	0.37
	High	50.27	166.26	-0.03%	4.79%	0.73%
D5 (79)	Low	6.97	234.40	-0.55%	5.96%	0.64%
	t-test, Low = High	28.40	0.40	2.16	-2.42	2.44
	High	53.58	235.95	0.05%	5.02%	0.95%
D6 (79)	Low	7.98	333.19	-0.34%	6.05%	0.79%
	t-test, Low = High	32.37	0.73	2.59	-2.24	1.29
	High	57.29	337.34	-0.11%	5.12%	1.03%
D7 (79)	Low	10.51	500.23	-0.47%	6.93%	1.00%
	t-test, Low = High	33.55	0.20	4.55	-4.54	1.36
	High	61.33	502.18	-0.02%	5.30%	1.22%
D8 (79)	Low	14.36	806.83	-0.49%	6.76%	0.85%
	t-test, Low = High	35.32	0.55	3.54	-3.11	3.62
	High	68.33	817.58	-0.14%	5.58%	1.39%
D9 (79)	Low	14.71	1574.29	-0.40%	6.71%	0.99%
	t-test, Low = High	43.49	-0.29	2.40	-1.60	3.40
	High	71.66	1558.11	-0.16%	6.13%	1.99%
Large (81)	Low	21.72	15956.21	-0.43%	7.06%	1.67%
	t-test, Low = High	32.53	-0.85	1.94	-3.36	1.72
	High	69.85	10689.37	-0.24	6.03%	2.10%

*Indicates the t-statistics is significant at the 95% level.

daily returns between securities with high and low percentages of institutional ownership are consistently negative in each decile. This indicates that higher institutional ownership is associated with lower values of standard deviations. Moreover, seven of the deciles exhibit significant t-statistics at the 95% confidence level, and one other decile has a value significant at the 90% level. Once again, the two smallest capitalization deciles appear to be less impacted by the level of institutional ownership.⁸

Exhibit 4 reports the same test statistics for NYSE securities. In nine of the ten deciles the t-statistics are

not statistically significant at the 95% confidence level. This indicates that within capitalization deciles, the degree of institutional ownership is not associated with higher or lower levels of individual security standard deviations.

Our empirical results suggest that institutional investors appear to have an advantage over individual investors during this significant market decline. Stocks largely owned by institutional investors achieved higher mean daily returns with lower standard deviations during the 2000 sharp decline on Nasdaq. This phenomenon is not observed for stocks listed on the NYSE, where the market did not experience a particularly sharp downward movement. One possible explanation might be that institutional investors are able to manage downside risk more effectively than individual investors in a declining market. This

⁸These results are also consistent across each subperiod. In period 1 and 2, seven of ten deciles show the same pattern for Nasdaq (at the 95% level, and two at the 85% level), and nine of ten deciles for NYSE. (These results are available from the authors upon request.)

Exhibit 4. Capitalization-Sorted NYSE Securities by Percentage Institutional Ownership

Capitalization-sorted NYSE securities are further sorted into three equal-size groups by the percentage of institutional ownership. Mean values for institutional ownership, market values, daily returns, standard deviations and turnover ratios are reported for securities with high and low institutional ownership within each capitalization decile for the period March 29 – November 30, 2000. The significant t-statistics (at the 95% level) for the hypothesis that securities with high and low institutional ownership have equal returns, standard deviations and turnover ratios are all in boldface. Numbers in parentheses represent the number of firms listed in each sub-decile.

Decile	Ownership Level	% Inst. Own.	Market Value	Mn Daily Ret.	SD Daily Ret.	Mean T/O
Small (79)	Low	15.00	82.75	0.00%	4.28%	0.20%
	t-test, Low = High	19.76	1.84*	0.18	0.43	2.42
	High	55.58	91.76	0.02%	4.55%	0.35%
D2 (79)	Low	16.29	181.72	-0.11%	3.71%	0.18%
	t-test, Low = High	27.51	0.71	1.00	-0.68	1.91
	High	65.10	186.75	-0.02%	3.45%	0.40%
D3 (79)	Low	20.14	314.08	-0.08%	3.76%	0.22%
	t-test, Low = High	22.79	-0.19	1.09	-1.37	2.13
	High	70.25	312.32	0.03%	3.25%	0.43%
D4 (79)	Low	17.49	487.03	-0.04%	3.18%	0.22%
	t-test, Low = High	29.68	-0.23	0.82	-0.55	2.64
	High	72.03	484.22	0.02%	3.01%	0.39%
D5 (79)	Low	28.98	759.31	0.01%	2.76%	0.30%
	t-test, Low = High	19.20	-0.36	0.68	2.22	2.92
	High	75.12	751.77	0.06%	3.34%	0.61%
D6 (79)	Low	26.00	1159.68	0.04%	3.14%	0.30%
	t-test, Low = High	22.47	-0.11	0.41	0.25	4.41
	High	76.40	1156.18	0.07%	3.20%	0.56%
D7 (79)	Low	25.55	1775.50	0.06%	3.09%	0.34%
	t-test, Low = High	25.24	1.62	0.06	0.31	3.79
	High	77.93	1854.06	0.07%	3.17%	0.59%
D8 (79)	Low	28.62	2999.75	-0.01%	2.98%	0.35%
	t-test, Low = High	22.59	0.71	0.67	-0.46	3.63
	High	77.80	3087.66	0.04%	2.88%	0.59%
D9 (79)	Low	34.31	7487.20	0.03%	3.12%	0.37%
	t-test, Low = High	18.43	-0.38	0.68	0.35	2.91
	High	78.78	7322.46	0.08%	3.21%	0.59%
Large (81)	Low	36.01	77696.37	-0.09%	3.34%	0.36%
	t-test, Low = High	18.02	-3.57	2.19	-0.90	3.14
	High	73.67	26058.60	0.04%	3.12%	0.53%

*Indicates the t-statistics is significant at the 90% level.

behavior might explain why we observe that institutional investors realized higher returns than individual investors during that period.

The t-tests for the null hypothesis that the mean turnover ratios do not differ between high and low percentages of institutional ownership indicate a strong and statistically significant positive relationship between institutional holdings and mean turnover ratios. Given that the turnover ratio is an accepted proxy for liquidity, our results are consistent with Gompers and Metrick (2001), who find that institutional investors prefer more liquid stocks.

Exhibit 3, on the other hand, shows a very different result for a declining market as represented by Nasdaq. There is no significant relationship seen between institutional ownership and the turnover ratio. In seven of the ten deciles, the t-statistics for the turnover ratio

between high and low percentages of institutional holdings are not statistically significant.

While this may appear to be a counter-intuitive result, the severity of the market decline during the period might have caused either the relationship between institutional holdings and liquidity to break down, or the turnover ratio failed to capture the liquidity characteristics of individual securities. As an example of the latter possibility, a security that the majority of institutions have sold for reasons of depressed value during the market decline (such as an Internet stock) might reflect a high level of turnover exposure, although that security might not be characterized as liquid under normal market conditions.

B. Regression Results

In an alternative to the capitalization sorting

procedure, we use ordinary least squares regressions of institutional ownership percentages and mean turnover ratios against mean returns and standard deviations of returns as independent variables. To account for any potential size effect and any possible multicollinearity between market capitalization and the other independent variables, we divide all variables by the log of market capitalization at the beginning of each period. We provide regression estimates for each subperiod and the total period. For the total period, we calculate the mean return by averaging the mean daily returns for both periods. A similar procedure is used for the standard deviation. The estimates are obtained separately for securities listed on Nasdaq and on NYSE. The cross-sectional regressions are:

$$\text{Mean Return}_i = \alpha_0 + \alpha_1 \text{Inst. Own.}_i + \alpha_2 \text{Turnover Ratio}_i + \varepsilon_i \quad (1)$$

$$\text{Std. Dev.}_i = \beta_0 + \beta_1 \text{Inst. Own.}_i + \beta_2 \text{Turnover Ratio}_i + u_i \quad (2)$$

where the subscript i stands for individual securities, and ε and u are the respective error terms.

Exhibit 5 presents the estimated coefficients and t -statistics for the regressions for Nasdaq and the control sample of NYSE securities. The regression results are generally consistent with the results obtained in Exhibits 3 and 4. The mean return regressions show a highly positive relation between institutional ownership and mean returns. The standard deviation regressions show that for both subperiods, there is a highly significant negative relation between institutional ownership and the standard deviation of individual security returns. This is consistent with our hypothesis that institutional investors appear to perform better than individual investors in a down market because they are better able to manage downside risk.

In the control sample represented by the NYSE, we do not observe a very significant or consistent relationship between institutional ownership and either mean returns or standard deviation. For the standard deviation regressions, none of the institutional ownership coefficients are statistically significant. For the mean return regressions, the institutional ownership coefficient is significant only in the first period, and it appears to be very low compared to the coefficient observed for Nasdaq.⁹

Note that in all the regressions we have controlled for the liquidity of individual securities by

incorporating the mean turnover ratio variable. As Exhibit 5 shows, in all but one case, the coefficient of the turnover variable is significant. As expected, these regressions show that holding the level of institutional ownership constant, a higher turnover ratio is related to higher standard deviation and lower mean returns.

Once again, these regression estimates indicate for Nasdaq-listed securities, whose market experienced a marked decline, a strong negative relation between stock return volatility and the level of institutional ownership, even after controlling for liquidity. There is also a significant positive relation between mean daily returns and the level of institutional ownership. Neither relationship is seen for the NYSE securities.

C. Further Evidence: Changes in Institutional Ownership

To further examine the hypothesis that institutional investors are more likely to avoid downside risk, we take a closer look at changes in institutional ownership and their relation with mean daily returns. We sort the entire sample of listed securities on both exchanges by whether institutional ownership over the first subperiod increased, declined, or remained unchanged.

For each category, Exhibit 6 reports the percentage change in institutional ownership and the mean daily returns in the first and second subperiods. The number and percentage of stocks in each category is also reported. It is worth noting that over the first subperiod, institutional investors reduced their holdings in 71% of stocks traded on Nasdaq when the market experienced a severe decline, while on the NYSE, they reduced their stock holdings in only 48% of stocks.

For Nasdaq securities, changes in institutional ownership are positively associated with ex-post market returns. Specifically, the reduction in holdings is associated with large negative returns, while an increase in holdings is associated with positive returns. The no-change in ownership category is associated with mean returns that are not statistically different from zero. This behavior is again consistent with the idea that institutional investors are more apt to manage downside risk.

For the control sample of NYSE-traded securities, there does not seem to be any association between changes in institutional ownership and ex-post mean returns. Specifically, for both positive and negative changes in institutional ownership categories, mean daily returns are identical.¹⁰

⁹The referee points out that mean daily returns could be affected by the bid-ask bounce, which could bias the Nasdaq mean daily returns upward. When we re-estimated Equation (1) using geometric average daily returns instead, we found results not materially different from the findings in Exhibit 5.

¹⁰Note that for the NYSE, the percentage of securities for which institutional ownership declined (48%) is closer to the percentage of securities for which institutional ownership increased (39%), than is the case for Nasdaq.

Exhibit 5. OLS Regressions of Institutional Ownership Against Other Variables

OLS regressions of institutional ownership percentage and mean turnover ratio against mean returns and standard deviation of returns as dependent variables. All variables are divided by the log of market value at the beginning of each period to account for any potential size effect and any likely multicollinearity between market value and the other independent variables. Estimates are obtained separately for securities listed on Nasdaq and on NYSE and for each subperiod. Number of firms used appears in parentheses below each market. The t-statistics are shown in italics under the coefficients.

Market	Period	Dep. Variable	Constant	Inst. Own.	Mn. T/O	Adj. R-Sq.
Nasdaq (2288)	1 st Period	Mean Return	-0.0003* (-4.50)	0.0055* (5.99)	-0.1107* (-4.61)	2.06%
		Std. Deviation	0.0101* (62.74)	-0.0312* (-13.95)	1.20* (20.61)	19.21%
	2 nd Period	Mean Return	-0.0008* (-16.17)	0.0058* (7.69)	-2.28* (-4.54)	3.18%
		Std. Deviation	0.0102* (54.11)	-0.0166* (-5.75)	15.41* (7.99)	3.84%
	Both Periods	Mean Return	-0.0004* (-8.29)	0.0058* (8.85)	-0.3535* (-10.95)	7.10%
		Std. Deviation	0.0097* (59.71)	-0.0274* (-12.03)	2.09* (18.66)	16.20%
NYSE (1292)	1 st Period	Mean Return	0.0000 (-0.71)	0.0016* (3.35)	-0.0328 (-1.04)	0.71%
		Std. Deviation	0.0041* (20.18)	-0.0020 (-0.79)	2.03* (12.35)	10.85%
	2 nd Period	Mean Return	-0.0001 (-1.45)	0.0009 (1.54)	-0.0869* (-2.96)	0.58%
		Std. Deviation	0.0038* (14.64)	0.0017 (0.50)	1.88* (11.44)	9.82%
	Both Periods	Mean Return	0.0000 (-0.34)	0.0009* (2.10)	-0.0806* (-3.15)	0.73%
		Std. Deviation	0.0040* (19.25)	-0.0014 (-0.52)	1.95* (11.79)	10.16%

*Significant at the 95% level.

The last column in Exhibit 6 shows the mean daily returns for period 2, the period following the change in institutional ownership. The results in this last column show that institutional investors adjusted their holdings in Nasdaq securities in a manner more consistent with ex-ante returns than they did with NYSE listed securities. Specifically, when there is a negative change in institutional ownership for Nasdaq, mean returns are significantly lower than in the no-change in ownership case. For NYSE-listed securities, this consistency is not observed, and in fact the reverse is true.¹¹

In a further robustness test, we run a regression for

¹¹These results do not necessarily contradict the findings of Nofsinger and Sias (1999), who focus their investigation on NYSE-traded securities. They find a strong positive correlation between changes in institutional ownership and returns. The difference between their results and ours regarding NYSE might be because they consider yearly data for institutional ownership and monthly stock returns, while we use quarterly data for institutional ownership and average daily stock returns. A longer time interval is likely to permit more strategic portfolio adjustments by institutional investors.

each market while controlling for liquidity effects due to market size and/or volume:

$$\text{Inst.Own}_{i,2} = \gamma_0 + \gamma_1 \text{Mean Return}_{i,1} + \gamma_2 \text{Std.Dev.}_{i,1} + \gamma_3 \text{Turnover Ratio}_{i,1} + \mu_i \quad (3)$$

For each security i , we regress the corresponding level of institutional ownership in period 2 on lagged values of mean returns, standard deviations and turnover ratios, after controlling for size.¹² The estimated coefficients for the regression in Equation (3) for Nasdaq are:

$$\text{Inst. Own} = 0.07 + 1.82 \text{ Mean. Ret.} - 2.38 \text{ Std. Dev.} + 5.03 \text{ Turn. Ratio}$$

(37.05) (4.09) (-13.38) (9.30)

With an adjusted R-squared of 9%. And for NYSE the estimates are:

¹²This is done by dividing all variables by the log of market value measured in period 1.

Exhibit 6. Changes in Institutional Ownership

Changes are for a four-month period ending July 31, 2000. Period 1 is from March 29-July 31, 2000 and Period 2 is August 1-November 30, 2000. Number of stocks, mean daily returns for Nasdaq and NYSE-listed stocks with t-test statistics in parentheses.

Direction of Institutional Trading	Market	No. of Stocks	% of Stocks	% Change Inst. Own.	% Mn. Return 1 st Period	% Mn. Return 2 nd Period
Negative Change in Inst. Ownership	NASDAQ	1616	71	-3.02	-0.16 (-6.10)	-0.40 (-21.60)
	NYSE	625	48	-3.18	0.05 (3.20)	-0.04 (-2.64)
No Change in Inst. Ownership	NASDAQ	265	12	0.00	-0.03 (-1.03)	-0.17 (-4.28)
	NYSE	172	13	0.00	0.02 (0.67)	-0.09 (-2.11)
Positive Change in Inst. Ownership	NASDAQ	402	18	1.78	0.00 (0.25)	-0.02 (-0.96)
	NYSE	495	38	1.75	0.05 (4.05)	0.03 (2.03)

Inst. Own = 0.06 + 3.86 Mean. Ret. - 0.23 Std. Dev. + 16.28 Turn. Ratio
(34.28)(2.39) (-0.72) (8.64)

With an adjusted R-square of 6%. (Numbers in parentheses are t-statistics).

In both markets, we note that the mean return and turnover coefficients are statistically significant, and positively related to institutional ownership in period 2. More important, the standard deviation variable is significant at the 95% level for Nasdaq, but not significant for the NYSE. The sign on the coefficient of the standard deviation variable confirms our hypothesis that institutional investors manage their holdings to minimize downside risk to a greater extent than individual investors. This effect is reinforced by the fact that over the first period, from March through July 2000, institutional investors responded to the decline in the Nasdaq by taking a less risky stance as manifested by their holdings as of July 2000.

III. Summary and Conclusions

Our examination of the relation between the level of institutional ownership and the means and standard deviations of stock returns during a sharp market decline focuses on short-term effects during an eight-month period. The means and standard deviations of daily returns are examined for securities listed on Nasdaq during the March-November 2000 period when the Nasdaq composite index dropped by more than 46%. We compare

these results to a control sample of NYSE-listed securities, where the index for the period stayed relatively flat. We control for possible liquidity effects and correct for multicollinearity in our regressions.

Our main findings indicate that institutional investors owned less volatile stocks during this market decline. For securities listed on Nasdaq, where the market declined sharply, we document a strong and consistent cross-sectional relationship between the level of institutional ownership and the contemporaneous means and standard deviations of individual security daily returns. A higher percentage of institutional ownership is associated with higher mean daily returns and lower standard deviations. For securities listed on the NYSE, however, where no such market decline occurred, we find no significant relation between the level of institutional ownership and either returns or risk as measured by the standard deviations of daily returns.

A possible explanation for our findings is that institutional investors are more attuned to downside risk, and are able to manage it more effectively than individual investors. The prudent man rule and fiduciary responsibilities of institutional managers might be good reasons to suspect such behavior. Given their ability to manage downside risk in the event of a sharply depressed market, it is also not surprising that institutional investors fared better than individual investors in terms of overall mean returns during the 2000 market decline on Nasdaq. ■

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