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Short Selling and Trading Abuses on Nasdaq

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We examine the potential for short-selling trading abuses unique to Nasdaq during a period when there was no up-tick rule and no effective prohibitions against "naked" short selling. We find that (a) short sellers earned significant abnormal returns on Nasdaq securities, but these were smaller than on NYSE/AMEX securities; (b) they did not destabilize markets by selling into falling markets and exacerbating price drops; and (c) Nasdaq short sellers may be more susceptible than NYSE/AMEX shorts to "short squeezes." Our results cast doubt on the appropriateness of recent regulatory reforms established for Nasdaq and public concern over Nasdaq short-selling abuses.

I. INTRODUCTION

Short sellers attempt to profit from expected declines in stock prices by borrowing and selling shares they do not own, then buying and replacing the borrowed shares when the price drops. While it is a time-honored method of exploiting bad news about stock prices, the practice has come under increasing regulatory scrutiny as other market participants have accused short sellers of manipulating prices, increasing volatility and exacerbating price drops in declining markets.

Descriptions of short sellers' trading activities have been decidedly one-sided, portraying shorts as stock-bashing rumor mongers. Weiss (1996), in a recent *Business Week* report, reveals common misperceptions of short sellers held by other investors. He identifies an executive who blames his company's recent stock slide of 60% over three months on "mudslinging" short sellers. According to Weiss, many market participants view short sellers as the "assassins of Corporate America." They believe small-cap stocks are espe-

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cially vulnerable to the trading abuses of short sellers because negative rumors can have a more significant impact on share prices of thinly capitalized firms.

It is generally acknowledged by market participants that short selling fraud schemes have been more prevalent in Nasdaq securities due to the previously more lax short-selling requirements for Nasdaq securities. In a recent *Wall Street Journal* article, Power (1995), identifies an Atlanta trader who was charged with a short-selling fraud scheme which cost Wall Street brokerage firms $13.5 million. The trader allegedly sold stock in six firms (five of which were traded on Nasdaq) he did not own. He then planned to settle the trades by purchasing the stock from another firm when prices fell. When prices did not fall, the trader allegedly walked away from his obligation, leaving the brokerage houses liable for his losses.

The primary motivation for this paper is to examine the potential for short-selling trading abuses unique to Nasdaq stocks before recent restrictive regulatory changes were enacted. In order to determine the potential for trading abuses uniquely attributable to the previously more lax Nasdaq short selling regulations, we also examine short-selling practices on the organized exchanges. Of particular interest is whether short sellers earn abnormal returns on Nasdaq securities, and whether they exacerbate price drops by selling in falling markets. Previous research, with one exception, has focused on the profitability of short selling on the NYSE/AMEX organized exchanges.

Until 1994, Nasdaq, unlike the organized exchanges, lacked an uptick rule and effective prohibitions against naked short selling. An uptick rule is intended to prevent short sellers from exacerbating price declines by requiring them to sell at a price greater than that of the last recorded trade. Naked short selling occurs when a trader sells securities short without first borrowing the shares in the open market. If the short is then forced to purchase shares to deliver when the buyer requests a buy-in, there may be a short squeeze in illiquid issues.

In the mid-1980's, the National Association of Securities Dealers (NASD) commissioned a report by Pollack (1986) and began to develop proposals on changes in short selling of Nasdaq securities. In 1986, NASD received approval from the Securities and Exchange Commission (SEC) to require affirmative determination of the deliverability of shorted shares to buyers of those shares. This affirmative determination requirement, however, was often met simply by identifying borrowable stocks listed on daily fax sheets, making it possible to short sell securities without first identifying the specific location and ownership of the shares to be borrowed (despite NASD's policy disallowing this practice). Discussions with NASD's general counsel's office reveal that the lack of an annotation requirement often led to problems in enforcement of the affirmative determination requirement. On July 28, 1994, the NASD filed a proposed rule change with the SEC that would require members or persons associated with members to annotate the affirmative determination made prior to effecting a short sale. The SEC approved this recommendation on September 12, 1994.

The lack of an uptick rule also contributed to the chance of abusive trading practices by aggressive short sellers, according to a January 1992 report by the House committee on Government Operations entitled "Short-Selling Activity in the Stock Market: Market Effects and the Need for Regulation (Part I)." On July 29, 1994, the SEC granted temporary 18-month approval of the NASD-requested "bid test" rule for short selling of NASD securities. The rule prohibits members from effecting short sales when the bid price is at or below the previous bid, but provides an exemption for qualified market makers. This rule became effective in September 1994.

Individual investors closely follow the activities of short sellers by monitoring large increases in open short-interest positions of NYSE/AMEX and Nasdaq stocks reported monthly in *The Wall Street Journal*. If large increases in short interest are bearish signals, individual investors can earn abnormal returns by shorting those shares following the release of the information in *The Wall Street Journal*. If large increases are bullish signals, investors can profit by buying shares.

We define two related empirical questions. First, can short sellers earn abnormal returns? Second, can individual investors earn abnormal returns by reacting to published reports of short-selling activity? Previous studies confuse the empirical implications of these questions by misidentifying the appropriate event date. A secondary contribution of this paper is to correctly identify the appropriate event dates for these empirical questions and disentangle the two effects.

The paper is organized as follows. We review the literature on the profitability of short selling and the relationship between stock returns and short interest levels in Section II. We describe our data and methods in Section III, including the estimation of size-adjusted abnormal returns and the definition of the proper event dates. We present our results in Section IV, and offer some conclusions and directions for future research in Section V.

II. LITERATURE REVIEW

There are two strands to the empirical literature on short selling. The early literature examined the temporal relationship between stock market returns and aggregate short interest levels. Figlewski (1981) reports a significant negative relationship between levels of short interest and abnormal returns using monthly returns data from January 1973 through June 1979, which is consistent with a bearish interpretation of high levels of short interest. Seneca (1967) and Kerrigan (1974) also report a significant negative relationship between the short interest ratio and S&P 500 returns.

Aksu and Gunay (1995), however, test for the presence of unit roots and co-integration among stock prices, short interest, and average trading volume, and find no relationship between levels of short interest and stock prices. Other studies reporting similar results include Mayor (1968), Biggs (1966), and Smith (1968).

More recently, researchers have used event studies to estimate the abnormal returns to individual securities for which large increases in short interest levels have been reported. Choie and Hwang (1994) estimate abnormal returns to heavily-shorted NYSE/AMEX stocks by measuring the change in prices from the midpoint between monthly *Wall Street Journal* publication dates (eleven trading days prior to the publication date and one day before the compilation date—the date on which the exchanges compile short interest data) to the publication date. They report that stocks with large short positions underperform the stock market in this period immediately following the compilation date. They note this is evidence of excess returns to short sellers. They also find evidence that stocks with large short positions underperform the market in the twenty trading days after publication. This suggests large increases in short interest on NYSE/AMEX stocks are interpreted by the market as bearish signals. We refine Choie and Hwang's event date definitions, and extend their results to Nasdaq securities.

Woolridge and Dickinson (1994) examine the coincidental relationship between the level of short sales and monthly holding-period returns for 50 randomly-selected securities from *The Wall Street Journal* monthly short-sale list for both NYSE/AMEX and Nasdaq stocks. They report aggregate short positions increase as market prices increase, and short sellers are unable to earn abnormal profits at the expense of less informed traders.

Woolridge and Dickinson conclude high levels of short interest are neither bullish nor bearish. However, they fail to account for noninformational arbitrage trading that requires short selling but would not be expected a priori to affect prices. Strategies such as going long in a merger target and simultaneously going short in the acquiring firm, or "shorting against the box," are examples of such trading. As a result, it is likely that Woolridge and Dickinson significantly underestimated the returns to information-based short selling.

In addition, because they use the publication date as the event date, they do not accurately estimate the abnormal returns to short sellers. In addition, their use of monthly returns may cause them to miss any intra-month return differences between the NYSE/AMEX and Nasdaq markets. Moreover, statistical tests based on the relatively small Woolridge-Dickinson sample (50 NYSE/AMEX and 50 Nasdaq firms) may lack power.

We use the appropriate event date (the compilation date) and a much larger sample of NYSE/AMEX and Nasdaq firms to estimate returns to short sellers. We also drop from our sample observations that potentially represent noninformational short selling, and we use the bid-ask midpoint to compute returns for Nasdaq stocks rather than closing prices.

Vu and Caster (1987) investigate the market reaction to the release of *The Wall Street Journal* short interest data between 1975 and 1983. They find significantly positive cumulative abnormal returns in the 40-day period before the information publication date. These findings are consistent with the tendency of investors to sell short in periods of rising stock prices. Vu and Caster report negative, but insignificant, cumulative abnormal returns during the 40-day period after the announcement, and conclude that the published level of short interest is neither bullish nor bearish.

Senchack and Starks (1993) examine a sample of NYSE/AMEX stocks listed in *The Wall Street Journal*'s monthly short interest column for which short interest positions had at least doubled from the prior month. They find a small, but statistically significant, negative reaction around the publication date. They conclude their results provide weak support for the hypothesis that the market reaction to unusual increases in unexpected short interest is negative.

III. DATA AND METHODS

A) Data

The initial sample includes firms with the largest percentage increase in short interest from the prior month as reported in *The Wall Street Journal* between January 1987 and December 1991. We discard from the sample any observation that potentially represents noninformational trading: a firm identified as a new listing, as having undergone a recent stock split, or as possibly involved in arbitrage activity. A 2-for-1 stock split, for instance, would double the reported short interest without any increase in speculative short positions. Strategies such as going long in a merger target and simultaneously going short in the

acquiring firm, or "shorting against the box," would be examples of noninformational arbitrage trading. An observation is also deleted if the firm had been listed in the largest percentage increase in short interest category within 180 days of a prior listing. For inclusion a firm must have bid and ask prices (for the Nasdaq sample) or daily returns (for the NYSE/AMEX sample) and a size decile portfolio ranking on the CRSP NYSE/AMEX and Nasdaq daily returns tape. These restrictions result in a final sample of 497 NYSE/AMEX and 531 Nasdaq observations.

B) Abnormal Returns

Returns for the Nasdaq sample are computed using the midpoint of the bid-ask spread rather than closing prices to mitigate the problem of upward-biased returns of stocks with small prices, which is a particular concern for Nasdaq stocks. Returns for the NYSE/AMEX sample are taken from the CRSP tapes. We use a standard market-adjusted event study methodology discussed in Brown and Warner (1980, 1985). Abnormal returns are generated by subtracting the daily return for the market from the return for the individual firm. Negative abnormal returns defined in this manner indicate positive abnormal returns to short sellers since they profit from price declines. Our proxy for the market return is the equally-weighted average return for all firms in the same size decile as the firm in question. Deciles are constructed separately for Nasdaq and NYSE/AMEX firms. We use size-adjusted returns to avoid the benchmarking problems associated with using either a pre-event or post-event estimation period.

Test statistics are reported for the null hypothesis that mean abnormal returns or mean cumulative abnormal returns are zero. Although they are technically *T*-statistics, they are equivalent to *Z*-statistics in large samples such as ours, and are reported as *Z*-statistics in the tables. The test statistics are constructed by normalizing abnormal firm returns by an estimate of the standard deviation and summing these standardized residuals across firms. Due to the method by which the test statistics are constructed, it is possible for the mean abnormal return to be of a different sign than the corresponding test statistic.

C) Defining The Event Date

Large increases in the level of open short interest can mean one of two things to the individual investor. First, the increase can be interpreted as a general bearish sentiment by informed investors (to the extent short sellers are informed investors), suggesting that stock prices will fall farther. Diamond and Verrecchia (1987) develop a rational-expectations model consistent with this interpretation. The key testable empirical implication is that an unexpected increase in short interest is bad news and will cause stock prices to decline. According to this model, because short-selling restrictions eliminate more uninformed than informed short sales, the result is a set of short sales that contains a higher percentage of informed trades than in overall sell orders. Second, the increase may represent latent buying pressure (because the short positions must eventually be covered) suggesting that stock prices will rise.

Whether short interest is interpreted as a bullish or bearish signal depends on the subsequent returns to a short position following public release of information on short interest levels of individual stocks in *The Wall Street Journal*. Whether short sellers on average earn abnormal returns depends on any excess returns to short positions after they are established. The research problem is to estimate the date at which the short positions were taken.

The NYSE/AMEX and Nasdaq markets compile monthly short interest positions on individual stocks as of the fifteenth of each month. Because settlement takes five trading days, the exchanges actually compile short interest data as of the eighth to the tenth of each month (the compilation date). (In June of 1995, after the period of our study, the markets went to three-day settlement.) *The Wall Street Journal* consistently publishes short interest data for NYSE/AMEX and Nasdaq stocks ten and thirteen trading days after compilation dates, respectively.

We use the compilation date as the best estimate of the date on which the short positions were established and define it as day t=0 in event time. Previous studies have used a variety of dates between compilation and publication. The compilation date is the latest date at which large increases in short interest could have taken place and still be reported in the next *Wall Street Journal*, and more closely approximates the date on which short sellers establish their positions. It is a better estimate than the publication date, which is several trading days after significant increases in short interest levels.

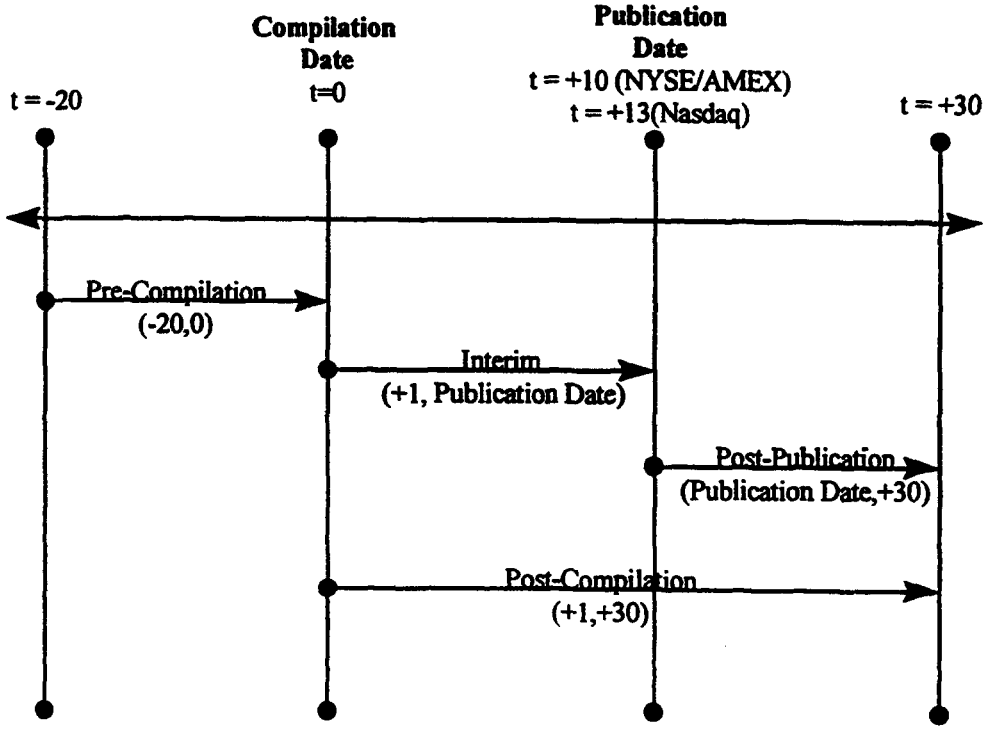

Figure 1. The time-line and relevant event intervals are presented in Figure 1. We define the compilation date as day t = 0 in event time. The NYSE/AMEX and Nasdaq markets compile monthly short interest positions on individual stocks as of the fifteenth of each month. Because settlement takes five trading days, the exchanges actually compile short interest data as of the eighth to the tenth of each month (the compilation date). The WSJ consistently publishes short interest data for NYSE/AMEX and Nasdaq stocks ten and thriteen trading days after compilation dates, respectively. Excess returns in the pre-compilation interval include any run-up in prices prior to large increases in short interest. Excess returns in the post-compilation interval estimate returns to short sellers. Excess returns to investors who respond to the public announcement of large increases in short interest are estimated during the post-publication period. Excess returns to short sellers are the sum of returns in the interim period between compilation and publication, and returns after publication.

The time-line and relevant event intervals are presented in Figure 1. Note that negative abnormal returns represent positive excess returns to short sellers. Excess returns in the pre-compilation interval include any price movements prior to large increases in short interest. Excess returns in the post-compilation interval estimate returns to short sellers. Excess returns to investors who respond to the public announcement of large increases in short interest are estimated during the post-publication period. Excess returns to short sellers are the sum of returns in the interim period between compilation and publication, and returns after publication.

IV. EMPIRICAL RESULTS

A) The Profitability Of Short Selling

Mean Cumulative Abnormal Returns (CARs) of both NYSE/AMEX and Nasdaq stocks over days $t = -20$ to $t = 30$ are plotted in Figure 2. Stocks in both samples experience a price increase prior to the compilation date, suggesting that short sellers tend to sell into rising markets. After the compilation date the MCARs of both samples begin to drift downward, which suggests short sellers earn excess returns.

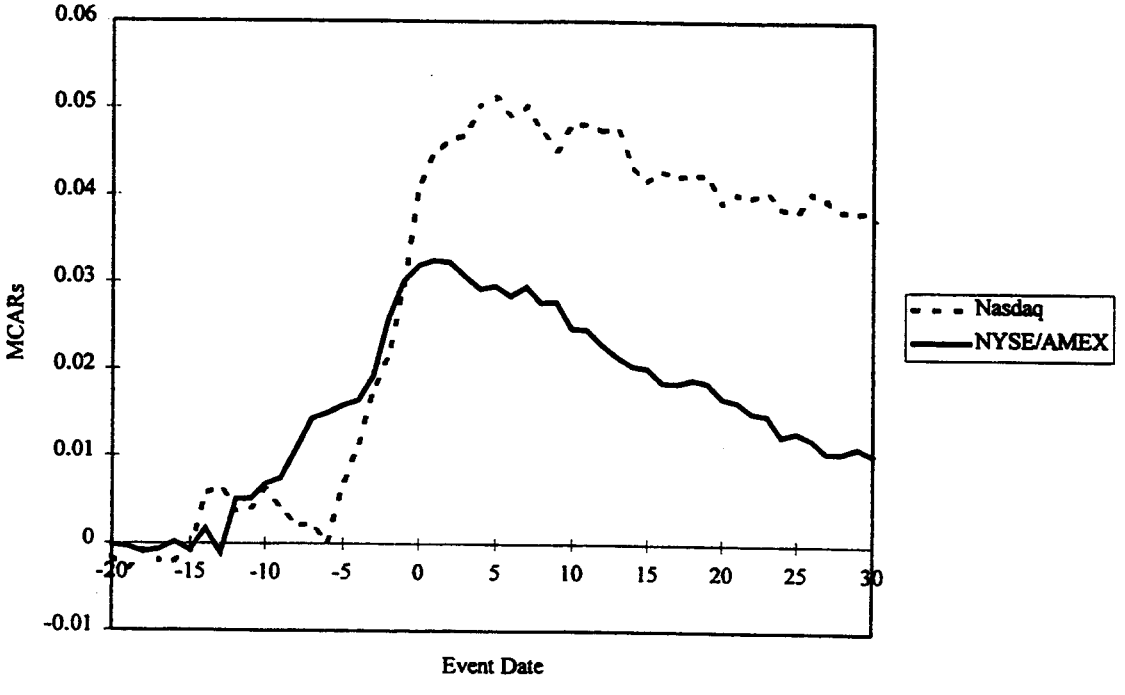

Figure 2. The Mean Cumulative Abnormal Returns (CARs) for both the NYSE/AMEX and Nasdaq samples over days $t = -20$ to $t = +30$ are plotted. The compilation date is defined as $t = 0$ in event time. Abnormal returns are generated by subtracting the daily return for the market from the return for the individual firm. Negative abnormal returns defined in this manner indicate positive abnormal returns to short sellers, since they profit from price declines. Our proxy for the market return is the equally-weghted average return for all firms in the same size decile as the firm in question. Deciles are constructed seperately for Nasdaq and NYSE/AMEX firms.

TABLE 1

Event Day (t)	*Mean Abnormal Returns*	*Z-statistic*
-5	+0.0008	+0.37
-4	+0.0006	+0.09
-3	+0.0029	+4.23***
-2	+0.0064	+3.84***
-1	+0.0044	+3.77***
Compilation Date	+0.0018	+1.30
+1	+0.0006	+1.85*
+2	-0.0002	-0.81
+3	-0.0016	-1.25
+4	-0.0015	-4.37***
+5	+0.0004	+0.73
+6	-0.0012	-0.64
+7	+0.0011	+2.15**
+8	-0.0018	-1.30
+9	+0.0001	+0.70
Publication Date	-0.0031	-2.43**
+11	-0.0001	+0.92
+12	-0.0017	-2.16**
+13	-0.0014	-2.51**
+14	-0.0010	-1.37
+15	-0.0003	-0.74
+16	-0.0016	-1.63
+17	-0.0001	-0.61
+18	+0.0004	+0.11
+19	-0.0003	+0.64
+20	-0.0018	-1.31

Notes: ***Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.
Mean Abnormal Returns(ARs) for 497 NYSE/AMEX firms are reported from event day t = -5 to t = +20. Abnormal returns are generated by subtracting the daily return for the market from the return for the individual firm. Negative abnormal returns defined in this manner indicate positive abnormal returns to short sellers, since they profit from price declines. Our proxy for the market return is the equally-weighted average return for all firms in the same size decile as the firm in question. Deciles are constructed separately for Nasdaq and NYSE/AMEX firms.

Mean abnormal returns (ARs) for days t = -5 to t = +20 for the NYSE/AMEX and Nasdaq samples are listed in Tables 1 and 2, respectively. The NYSE/AMEX stocks generate significant positive excess returns on t = -3, -2 -1, and +1 around the compilation date. There are significant negative excess returns on days t = +10 (the publication date), +12 and +13. The Nasdaq stocks experience significant positive excess returns

TABLE 2

Event Day (t)	*Mean Abnormal Returns*	*Z-statistic*
-5	+0.0066	+5.00***
-4	+0.0047	+3.36***
-3	+0.0063	+6.27***
-2	+0.0037	+3.51***
-1	+0.0084	+4.93***
Compilation Date	+0.0113	+7.41
+1	+0.0039	+2.97***
+2	+0.0014	+0.36
+3	+0.0006	-0.57
+4	+0.0033	+1.72***
+5	+0.0010	+0.54
+6	-0.0019	-1.42
+7	+0.0009	+1.17**
+8	-0.0028	-2.35**
+9	-0.0022	-2.30**
+10	-0.0029	+1.73*
+11	+0.0001	-0.18
+12	-0.0008	-1.98***
Publication Date	+0.0004	-1.74*
+14	-0.0044	-4.65***
+15	-0.0017	-2.25**
+16	+0.0011	+1.87*
+17	-0.0007	-1.07
+18	+0.0003	+1.03
+19	-0.0001	-0.48
+20	-0.0031	-3.64***

Notes: ***Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.
Mean Abnormal Returns(ARs) for 531 Nasdaq firms are reported from event day $t = -5$ to $t = +20$. Abnormal returns are generated by subtracting the daily return for the market from the return for the individual firm. Negative abnormal returns defined in this manner indicate positive abnormal returns to short sellers, since they profit from price declines. Our proxy for the market return is the equally-weighted average return for all firms in the same size decile as the firm in question. Deciles are constructed separately for Nasdaq and NYSE/AMEX firms.

on days $t = -5$ through +1 around the compilation date, and significant negative excess returns on days $t = +12$, +13 (the publication date), +14 and +15.

Excess returns over several intervals are presented in Table 3, Panels A and B, for the NYSE/AMEX and Nasdaq samples, respectively. The intervals are defined in Figure 1. The results confirm the evidence in Figure 2 and Table 2 that short sellers tend to sell into

TABLE 3A
Mean Cumulative Abnormal Returns (CARs) for 497 NYSE/AMEX Firms Are Reported for Selected Intervals.

Interval	*Event Intervals (Inclusive)*	*CAR*	*Z-Statistic*
Pre-Compilation	(-20,0)	+0.0320	+6.92***
Interim	(+1,+9)	-0.0041	-0.10
Post-Publication	(+10,+30)	-0.0174	-3.29***
Post-Compilation	(+1,+30)	-0.0215	-3.29***

Notes: ***Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.
Abnormal returns are generated by subtracting the daily return for the market from the return for the individual firm. Negative abnormal returns defined in this manner indicate positive abnormal returns to short sellers, since they profit from price declines. Our proxy for the market return is the equally-weighted average return for all firms in the same size decile as the firm in question. Deciles are constructed separately for Nasdaq and NYSE/AMEX firms.

TABLE 3B
Mean Cumulative Abnormal Returns (CARs) of 531 Nasdaq Firms Are Reported for Selected Intervals.

Interval	*Event Intervals (Inclusive)*	*CAR*	*Z-Statistic*
Pre-Compilation	(-20,0)	+0.0408	+5.74***
Interim	(+1,+12)	+0.0063	-0.09
Post-Publication	(+13,+30)	-0.0092	-2.91**
Post-Compilation	(+1+30)	-0.0028	-2.31**

Notes: ***Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.
Abnormal returns are generated by subtracting the daily return for the market from the return for the individual firm. Negative abnormal returns defined in this manner indicate positive abnormal returns to short sellers, since they profit from price declines. Our proxy for the market return is the equally-weighted average return for all firms in the same size decile as the firm in question. Deciles are constructed separately for Nasdaq and NYSE/AMEX firms.

rising markets. MCARs in the pre-compilation interval are significantly positive in the NYSE/AMEX market (3.20%) and the Nasdaq market (4.08%). These results, suggesting short sellers in both markets short stocks that have recently experienced significant price increases, are consistent with Vu and Caster (1987) and Woolridge and Dickinson (1994).

Excess returns in the post-publication interval are significantly negative in both markets (-1.74% on NYSE/AMEX and -0.92% on Nasdaq). Our evidence suggests the publication of large increases in short interest is a bearish signal to other investors, which is consistent with Choie and Hwang (1994), Figlewski (1981), Senchack and Starks (1993), Seneca (1967) and Kerrigan (1974). It is inconsistent with Vu and Caster (1987) and Woolridge and Dickinson (1994).

Excess returns in the post-compilation interval are significantly negative in both markets as well, suggesting short sellers earn excess returns of 2.15% on NYSE/AMEX and 0.28% on Nasdaq. Note, however, that short sellers actually earned smaller returns on Nasdaq than NYSE/AMEX securities.

CARs in the interim interval are negative in the NYSE/AMEX sample and positive in the Nasdaq sample, but neither is statistically significant. This suggests that most of the

return to short sellers comes from the public release of their trading activities that reflect their private information, since most of their excess return comes after *The Wall Street Journal* publication date. This evidence is in contrast to Choie and Hwang (1994), who find significant negative returns between the compilation and publication dates.

B) Differences Between NYSE/AMEX And Nasdaq

As discussed previously, a large increase in short interest can be interpreted as a general bearish sentiment by informed investors (to the extent short sellers are informed investors), suggesting stock prices will fall farther. Our initial results support this view. However, the increase may also represent latent buying pressure (because the short positions must eventually be covered) suggesting stock prices will rise.

The lack of effective prohibitions against naked short selling of Nasdaq securities during the period of this study makes the possibility of *rising* prices during the post-compilation period much stronger on the over-the-counter market than on the NYSE or the AMEX. If the short seller does not immediately deliver the shares (known as naked short selling), and the buyer's broker is directed to execute a buy-in, the short seller may be squeezed in acquiring shares for delivery. As the short seller scrambles to acquire the shares to meet delivery requirements, the share price may increase due to the added buying pressure. This benefits buyers at the expense of short sellers and is more likely to be effective for thinly traded securities. Therefore, if trading in a security is thin, buyers may see an incentive to request buy-ins. This may be especially true for small, illiquid stocks traded on the Nasdaq market with no prohibitions against naked short selling. Evidence of short squeezes in small issues has not previously been documented in the literature.

However, any post-compilation price increases for heavily-shorted Nasdaq stocks (relative to exchange-traded stocks) may be due to the already well-documented firm-size effect and not due to a short squeeze, because the smallest Nasdaq stocks are significantly smaller than the smallest NYSE/AMEX stocks. Even when size is controlled, it may be difficult to attribute any differential returns of heavily-shorted Nasdaq stocks and NYSE/AMEX stocks to a short squeeze because of the difficulty in controlling for the many structural differences between the two markets.

To shed some light on the issue, we regress post-compilation CARs of each firm on the log of its market value of equity (LMVEQ) separately for each market. The results of the two regressions are reported in Table 4. The relationship between size and CARs on the NYSE/AMEX exchanges is significantly positive (γ_1 = +0.019) indicating smaller NYSE/AMEX firms experience larger negative (smaller positive) CARs than larger firms. The relationship for Nasdaq firms, however, is not statistically significant (γ_1 = -0.000). The difference between the slope coefficients in the two markets is statistically significant.

These results are consistent with a different pattern of abnormal returns for heavily-shorted small Nasdaq stocks relative to NYSE/AMEX stocks. Small Nasdaq stocks may be more susceptible to buy-ins and short squeezes which drive up prices after large increases in short interest. This calls into question the criticisms many market participants have levied against the activities of short sellers. In contrast, naked short sellers may be more susceptible to the trading abuses of the buyers who create the short squeezes (See Weiss, 1996). Because naked short selling is not permitted on the NYSE/AMEX, heavily-shorted shares there are not as susceptible to buy-ins and short squeezes, and therefore continue to experience price declines after the compilation date.

TABLE 4
Regression Estimates for the Sample of 497 NYSE/AMEX Firms and 531 Nasdaq Firms

Coefficient	*NYSE*	*Nasdaq*	*Difference*
γ_1	-0.264	+0.001	-0.263
	(-3.97***)	(+0.01)	(-2.67***)
γ_2	+0.019	-0.000	+0.019
	(+3.66***)	(-0.05)	(2.35**)

Notes: ***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.
We estimate the following regression separately for each market:

$$CAR_j = \gamma_1 + \gamma_2 LMVEQ_j + e_j$$

where:

CAR_j = cumulative abnormal return for firm j from day $t = +1$ to $t = +30$;
$LMVEQ_j$ = log(market value of equity of firm j);

T-statistics in parentheses test the null hypothesis that the parameter estimate is not significantly different than zero. The significance of the differences between the two markets of the intercept and slope estimates are estimated from a dummy variable regression model. Significance levels are for two-tailed tests.

It is possible that the inverse relationship between size and return for NYSE/AMEX stocks is a result of the bid-ask bias in those stocks for which we did not adjust. Recall that returns were computed from the bid-ask midpoint for Nasdaq stocks only. However, we also analyzed the date using closing prices for the return series for both Nasdaq and NYSE/AMEX. Those results (which are not reported) are not significantly different from the results we report in this paper, suggesting our results are robust to the method of estimating abnormal returns.

V. SUMMARY AND CONCLUSIONS

We do not find compelling evidence that short sellers on Nasdaq are the "assassins of Corporate America" portrayed in the financial press. During a period in which there was no uptick rule and no effective prohibitions against naked short selling, short sellers did on average earn statistically significant abnormal returns on Nasdaq securities. However, these abnormal returns were actually smaller than those on NYSE/AMEX securities, and most of the return occurred after publication of short sellers' trading positions in *The Wall Street Journal*. Therefore, even though short sellers in both markets earned excess returns, those returns were also available to individual investors. Furthermore, it appears that short sellers did not destabilize markets by selling into falling markets and exacerbating price drops. Instead, they added liquidity, selling into rising markets by shorting stocks that had experienced large price increases in the thirty days prior to the establishment of their positions.

We do, however, document some evidence that Nasdaq short sellers, unlike those who trade in NSYE/AMEX securities, may be more susceptible to "short squeezes" which drive up stock prices and result in substantial short-selling losses. Our results cast some doubt on the appropriateness of the regulatory reforms recently established for Nasdaq and the prevalent public concern over short-selling abuses in the Nasdaq market. However, too many

other structural differences exist between the two markets for us to draw a definitive conclusion. We intend in future research to examine the effect of recent regulatory changes on Nasdaq by comparing our results in this paper on Nasdaq short-selling activity before the changes to recent activity after those changes.

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