Naked Short Selling and Market Returns[☆]

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Initial Draft: March, 2009

Current Draft: April, 2009

Running Head: Naked short selling and market returns

JEL classification: D02; G14; G28

Keywords: Failures to deliver; naked short selling; stock returns

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[☆] The authors thank Terry Nixon, Sarah Peck, and Steve Wyatt for valuable comments. Any remaining errors or omissions remain the responsibility of the authors.

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Abstract

The recent financial crisis has focused a great deal of attention on naked short sellers. However, little is known about the relation between naked short sellers and market returns. We examine market returns around naked short sale transactions to address three questions. First, are naked short sellers momentum traders who exacerbate price declines, as some claim? Second, do naked short sellers possess superior information that allows them to profit from subsequent price declines? Third, how do market participants react to information indicating increased naked short selling activity? We find that naked short sellers are contrarian investors who trade following recent positive abnormal returns. Our results provide no evidence that naked short sellers are informed traders who can accurately forecast negative returns. Instead, abnormal returns are positive in the days following increased naked short sale activity. Market participants do not view announcements that indicate increased naked short sale activity negatively, as abnormal returns are generally positive following such announcements. Overall, our results are not consistent with the recent portrayal of naked short sellers as abusive and manipulative but instead suggest that naked short sellers promote efficient markets by providing liquidity, risk-bearing, and selling stocks they view as overpriced.

Naked Short Selling and Market Returns

1. Introduction

Critics described naked short selling (i.e., selling a stock short without first borrowing or arranging to borrow it) as abusive and manipulative, suggesting that naked short selling has negative consequences for the security being sold short. Consistent with this notion, the U.S. Securities and Exchange Commission (SEC) has targeted naked short selling in recent regulatory actions described as "in the public interest and for the protection of investors to maintain fair and orderly securities markets, and to prevent substantial disruption in the securities markets."[1] However, academic research suggests that short sale constraints can negatively impact market efficiency by inflating prices, leading to low subsequent returns (e.g., Miller, 1977).

Despite the growing criticism of naked short sellers by regulators, the media, and other market participants, academic studies of naked short selling are relatively uncommon. A recent exception is Boulton and Braga-Alves (2009) who leverage the SEC's 2008 Emergency Order restricting naked short selling of 19 financial firms' stocks to test Miller's (1977) overpricing hypothesis. They find that the restrictions temporarily inflated the stock prices of the targeted firms, particularly those subject to a high degree of naked short sale activity prior to the announcement of the Emergency Order. They also find evidence that the restrictions damaged liquidity in the stocks they were designed to protect, reflected in higher trading costs and lower trading volume.

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[1] Securities and Exchange Commission, Release No. 34-58572/ September 17, 2008, p. 3.

One reason for the lack of empirical studies in this area might be that market participants are not required to uniquely identify naked short sales, making them difficult to study. One proxy for naked short sale intensity is failures to deliver (FTDs), which occur when a seller does not deliver securities to the buyer within the standard three-day settlement period. FTDs occur for a number of reasons, including processing errors, delays in delivering securities held in certificate form, and naked short selling. Boni (2006) documents the pervasiveness of FTDs prior to Regulation SHO and posits that persistent failures are more likely the result of expensive to borrow shares than inadvertent delivery delays. She shows that "strategic fails" account for a high percentage of outstanding short interest and argues that the inability to strategically fail leads to increased short sale constraints and reduced liquidity, resulting in a greater likelihood of short squeezes and increased price volatility. Other studies of FTDs include Evans et al. (2006), who find that the opportunity to fail to deliver stocks could result in a profitable trading opportunity for options market makers when the stock and option markets are misaligned, and Fleming and Garbade (2002), who examine fails in Treasury securities following the September 11, 2001 attacks and find that low specials rates made fails an attractive alternative to borrowing and delivering.

We use persistent FTDs to proxy for naked short selling to study the trading strategies of naked short sellers and the market's reaction to information about naked short sellers' activities. Our objectives are threefold. First, we provide the first detailed empirical description of FTDs since the adoption of Regulation SHO, which mandated U.S. exchanges to disseminate daily lists of securities experiencing high levels of FTDs. In a naked short sale transaction, a failure to deliver results if the seller does not obtain the shares necessary to make delivery within the three-day settlement period, making FTDs highly correlated with naked short sales. We include a descriptive look at the number of stocks reaching threshold levels of FTDs, the duration spent on the threshold lists, and the incidence of reappearing on the threshold lists from 2005 through 2008. We find that nearly 1,900 common stocks appear on the threshold lists at least once from 2005 through 2008. This includes more than 300 AMEX-listed, 1,200 Nasdaq-listed, and 300 NYSE-listed securities. Common stocks remain on the threshold lists for 17 days, on average, before being removed. Stocks that reach threshold levels at least once appear a total of 2.75 times, on average, with NVE Corporation appearing 19 times.

Second, we conduct an event study around threshold events to examine the trading of naked short sellers. Regulators have justified recent naked short sale restrictions by suggesting that naked short sellers are momentum traders who intensify downward price movements. If naked short sellers are momentum traders, we should expect them to target stocks that have recently experienced negative returns. We find the opposite. Consistent with Angel et al. (2003) and Diether et al. (2008), we find that naked short sellers are contrarian investors who tend to target stocks that have recently experienced positive abnormal returns. Depending on the criteria used to define a threshold event, cumulative abnormal returns (CARs) are 2.1–2.5% over the two trading days ending with the date of the naked short sale transaction(s) that leads to a security appearing on an exchange's threshold list. In contrast to Diamond and Verrechia's (1987) model that predicts that short sellers are informed, we find no evidence that naked short sellers successfully target stocks that are overpriced, as the stocks they sell short exhibit positive CARs in the period immediately following the transaction(s) that leads to a threshold appearance.[2] For example, CARs average 1.5–1.9% over the 7 trading days from the naked short sale to a stock's appearance on the threshold list. This result is consistent with Woolridge and Dickinson (1994) who suggest that short sellers provide liquidity by short selling into up markets.

Third, we examine the stock market's reaction to the announcement that firms have been added to the threshold lists, which is indicative of increased naked short selling activity. We find no evidence to suggest that the market views naked short selling as abusive or manipulative. Instead, we report positive abnormal returns following the announcement that a security has reached threshold levels of FTDs (i.e., a threshold event). CARs are 1.3–1.7% over the 5 trading days following a threshold event, depending on the criteria used to define a threshold event. This result is stronger in more recent years, as 5-day, post-announcement CARs are generally twice as large in 2008 as compared with 2006. This suggests that the SEC's efforts to stem the financial crisis by preventing naked short selling may have been misguided, as there is no evidence that, during our sample period, announcements indicating increased naked short selling have an immediate, negative impact on stock prices.

The remainder of this paper is structured as follows. Section 2 details naked short sales, FTDs, and the threshold lists. Section 3 describes our event study sample and methodology. Section 4 reports our results on the impact of naked short sales on stock prices. Section 5 summarizes and concludes.

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[2] Several papers, including Arnold et al. (2005), Asquith and Meulbroek (1995), Asquith et al. (2005), and Desai et al. (2002), study short selling in general and find results consistent with the predictions of Diamond and Verrechia's (1987) model.

2. Failures to deliver

A failure to deliver occurs when a seller does not deliver securities to the buyer within the standard three-day settlement period. FTDs occur for a number of reasons, including processing errors, delays in delivering securities held in certificate form, and naked short selling. In a naked short sale transaction, a fail results if the seller does not obtain the shares necessary to make delivery within the three-day settlement period. Regulation SHO requires U.S. exchanges to disseminate daily lists of securities reaching threshold levels of FTDs. A security appears on its primary exchange's threshold list if the aggregate level of open FTDs is equal to, or greater than, 10,000 shares and 0.5% of the total shares outstanding for 5 consecutive settlement days. A security remains on the threshold list until the aggregate level of open FTDs drops below the threshold criteria for 5 consecutive days. Regulation SHO requires broker-dealers to close-out open fail positions that persist for 13 consecutive trading days during which a security appears on a threshold list.

In Figure 1, we provide a timeline that details the sequence of events leading to a failure to deliver, threshold status, and removal from the threshold lists. Considering a firm's appearance on a threshold list as the benchmark date (day t), the naked short sale transaction(s) that pushes a firm above the threshold level of FTDs occurs on day t-7 (i.e., the threshold trades). Threshold trades on day t-7 are expected to settle on day t-4, otherwise a fail occurs. Securities that meet or exceed threshold levels of FTDs for 5 consecutive trading days appear on the threshold lists. Fails that initially occur on day t-4 that result in a security reaching threshold levels lead to a threshold list appearance on day t if threshold levels of FTDs persist for 5 consecutive trading days. Securities are removed from the threshold lists when the aggregate level of open FTDs drops below threshold levels for 5 consecutive trading days. Therefore, day t+5 is the first day that a security can be removed from the threshold lists. Broker-dealers are required to close-out fail positions that persist for 13 consecutive trading days during which a security is on the threshold lists.

<<FIGURE 1 ABOUT HERE>>

In Figure 2, we report the daily number of securities appearing on the AMEX, Nasdaq, and NYSE threshold lists from 2005 through 2008. The average daily number of threshold securities reported by the AMEX, Nasdaq, and NYSE are 60, 228, and 66, respectively. The broad trend over the sample period was a gradual increase in the number of threshold securities until the third quarter of 2008. A pause in the upward trend occurred in August 2007, when the SEC announced the elimination of a “grandfather” exception that exempted failure to deliver positions established before a security reached threshold levels from the mandatory close-out requirement. This change led to a temporary decline in the number of threshold securities. On September 17, 2008 the SEC issued an Emergency Order prohibiting naked short sales for all securities under their jurisdiction.[3] This regulation resulted in a sudden and significant decline in the number of securities on the threshold lists during the final months of our sample period.

<<FIGURE 2 ABOUT HERE>>

[3] Securities and Exchange Commission, Release No. 34-58572/ September 17, 2008.

In Figure 3, we report a frequency distribution of the total number of threshold events for firms that appear on the threshold lists at least once. In this figure, a threshold event is defined as an appearance on the threshold lists after an absence of at least 5 days. The average threshold security appears on the threshold lists 2.75 times between 2005 and 2008. Over 40% of the securities make only one appearance on the threshold lists and 74% of the securities make 3 or fewer total appearances during our sample period. At the other end of the spectrum, NVE Corporation makes 19 unique appearances on the threshold lists.

<<FIGURE 3 ABOUT HERE>>

While the typical stay on the threshold lists is about 17 days, some firms remain for an extended period. In Figure 4, we illustrate how long firms remain on the threshold lists once they appear. Over 68% of threshold events last for 15 or fewer days, with a median of 11 days. Extended stays are less common, with about 6% of threshold events lasting longer than 30 days. Medis Technologies, which ended a streak of 759 consecutive trading days on the Nasdaq's threshold list on August 13, 2008, is the sample stock with the longest streak on the threshold lists. The most common duration is 5 days, which corresponds to the minimum duration based on the SEC's criteria for being removed from the threshold lists.

<<FIGURE 4 ABOUT HERE>>

3. Sample and methodology

3.1. Sample selection and event identification

We use the threshold lists provided by the AMEX, Nasdaq, and NYSE to identify our sample events.[4] One complication is that many firms move on and off the threshold lists with some regularity, making it difficult to define an event. To capture events that are informative to market participants, we calculate the time between appearances on the threshold lists and define an event as (a) a first-time appearance or (b) a reappearance after a sustained absence. In our tests, we report results using first time listings and reappearances after 30-, 90-, and 180-day absences from the threshold lists to define events.[5] We use 2005 as the base year for identifying events, resulting in a sample that spans 2006 through 2008. Because we require CRSP data for our event study, only events that correspond to ordinary common stocks covered by CRSP are retained.

In Table 1, we report summary statistics for our event sample. The first row reports results for first-time appearances and reappearances after a minimum 30-day absence. This definition results in 3,170 unique threshold events. Of these, 1,198 (1,972) events are first time (repeat) appearances on the threshold lists. There are 1,604 unique firms in the sample. The typical repeat firm last appeared on a threshold list 198 days prior. The typical event is about the

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[4] Threshold lists are available on the following websites:

Amex (http://www.amex.com/amextrader/tradingData/RegSHO/TrDa_RegSHO.jsp),

Nasdaq (ftp://ftp.nasdaqtrader.com/symboldirectory/regsho), and

NYSE (http://www.nyse.com/regulation/nyse/Threshold_Securities.shtml).

[5] Unreported tests indicate that the results are robust to alternative definitions of a sustained absence from the threshold lists.

3rd appearance on the threshold list for any given firm. We report similar information for our 90- and 180-day samples in the second and third rows, respectively.

<<TABLE 1 ABOUT HERE>>

3.2. Methodology

To measure the market's reaction to threshold events, we follow Brown and Warner (1985) and measure abnormal returns using the market model as our benchmark. The model is

$$R_{jt} = \alpha + \beta_j R_{mt} + \varepsilon_{jt}, \quad (1)$$

where R_{jt} is the return on the j^{th} stock on day t and R_{mt} is the return on the market index on day t. β_j measures a stock's sensitivity to the market risk factor.

Daily abnormal returns are measured for common stock j on day t as

$$AR_{jt} = R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j R_{mt}), \quad (2)$$

where $\hat{\alpha}_j$ and $\hat{\beta}_j$ are the ordinary least squares estimates from equation (2). We estimate equation (1) over the 255 trading days ending at least 46 days before the event and calculate abnormal returns for each stock with equation (2). We use the CRSP equally weighted portfolio to proxy for the market index. The CRSP data requirement for measuring abnormal returns using the market model reduces our final 30-day sample from 3,170 to 2,945 observations. There are similar reductions in the functional sample size for the 90- and 180-day samples.

4. Empirical results

The focus of our event study analysis is threefold. First, we are interested in evaluating the claim that naked short sellers are momentum traders who intensify downward price movements. If naked short sellers are momentum traders, we would expect threshold events to occur following negative returns because short sellers profit from price declines. Second, we test the claim that naked short sellers are informed traders. If naked short sellers possess superior information, we would expect them to profit from subsequent negative stock returns. Third, we are interested in the market's reaction to the announcement that a firm has reached threshold levels of FTDs, which is indicative of increased naked short selling. A negative market reaction to threshold events is consistent with the notion that naked short selling provides negative information to market participants.

4.1. Threshold event abnormal returns

In Table 2, we report abnormal returns around threshold events. In Table 2, Panel A we report daily abnormal returns over the [–12, +13] window, where day zero is the day a stock appears on an exchange's threshold list. Our window begins 5 trading days before the threshold trades, which allows us to study the stock market performance of the firms targeted by naked short sellers, and ends with the mandatory close-out date, which enables us to examine stock market performance subsequent to the threshold trades and around the announcement that a stock has been added to the threshold lists. We report results for three threshold event definitions. In the first column of results, threshold events are either (a) the first-time a security appears on the threshold lists or (b) a reappearance after an absence of at least 30 days. In subsequent results columns we amend criteria (b) and require absences of 90 and 180 days, respectively.

<<TABLE 2 ABOUT HERE>>

In Table 2, Panel A, we find that mean daily abnormal returns tend to be positive, and in many cases are statistically significant, around threshold events. Using the 30-day event criteria as the benchmark for discussion (results column 1), we find that abnormal returns are significant at the 5%-level or better for 8 out of the 26 days, including 5 days preceding the event (days t-12, t-8, t-7, t-4, and t-1) and 3 days subsequent to the event (days t+1, t+2, and t+4). Interestingly, the two days with the largest positive abnormal return are the day before (t-8) and the day of (t-7) the threshold trades, with average abnormal returns of 0.59% and 1.53%, respectively. While not consistent with the notion that naked short sellers are momentum traders, this result is consistent with Angel et al. (2003) and Diether et al. (2008), who find evidence that short sellers are contrarian investors who target stocks that recently experienced positive abnormal returns.

It is important to note that the daily threshold lists are released after the close of trading on day t, which suggests that the market cannot act on the new information contained in the threshold lists until the following trading day. Perhaps our most interesting finding is that abnormal returns are positive and both statistically and economically significant over the 4 days following a threshold event. Our results clearly indicate that naked short selling does not convey negative information to market participants. The 90- and 180-day samples lead to similar inferences.

In Table 2, Panel B, we report CARs over various event windows around threshold events. Return windows ending on the day of the threshold trades (day t-7) continue to support the notion that naked short sellers are contrarian investors who tend to target stocks that have recently experienced positive returns. Two-day CARs ending on the day of the threshold trades average 2.12–2.46%. We find that CARs tend to be positive over the [–6, 0] window, which corresponds to the period between the threshold trades and the day the firm appears on a threshold list. This indicates that naked short sellers are generally not able to profitably close out their threshold trades before a stock appears on the publicly available threshold lists and is contrary to the notion that naked short sellers are informed traders. Finally, CARs are positive over the five days following a security's appearance on the threshold lists, suggesting that market participants do not view the news that a security has reached threshold levels negatively.

Our Table 2 results for naked short sellers complement Angel et al. (2003) and Diether et al. (2008) who find that short sellers tend to transact following positive returns. This is consistent with the notion that short sellers promote efficient markets by providing liquidity in up markets, risk-bearing, and selling stocks they view as overpriced and contrary to the claim that naked short sellers are momentum investors who exacerbate downward price momentum. Our results for naked short sellers are not consistent with prior studies, including Arnold et al. (2005), Asquith and Meulbroek (1995), Asquith et al. (2005), and Desai et al. (2002), that conclude that short sellers are informed. Instead, we find that stock prices continue to rise in the days following threshold trades and the days following the public dissemination of threshold information.

What drives these positive abnormal returns following intense naked short selling? We offer two possible explanations. First, it is possible that FTDs are positively correlated with returns because naked short sellers strategically fail instead of covering their position when prices are rising, increasing the probability of threshold events following price increases. This could explain the positive CARs reported for the [–6, 0] window. Second, short squeezes could explain the positive CARs reported for the period [+1, +5]. A short squeeze refers to a sharp increase in the price of a stock that results from a temporary increase in demand as a large number of short sellers attempt to cover their positions at once. If a number of naked short sellers move to cover their positions due to rising prices, a short squeeze could occur.

4.2. Cumulative abnormal returns by year

Naked short sellers have been blamed, in part, for the crisis that gripped financial markets in 2008. To explore the possibility that naked short sellers' trading strategies and the market's reaction to threshold events is not consistent across our sample period, we report CARs around threshold events on a year-by-year basis in Table 3.

<<TABLE 3 ABOUT HERE>>

In Table 3, we find that the positive CARs in the period before the threshold trades are larger in the earlier years of our sample. Focusing on the 30-day definition of threshold events, the average CAR over the interval [–8, –7] is 4.62% (2.14%) for events taking place in 2006 (2007). This compares to a two-day CAR of 0.21% in 2008. This suggests that naked short sellers' contrarian tendencies diminished over our sample period. However, the results do not offer any strong evidence that naked short sellers were momentum traders in 2008, as the CARs are statistically indistinguishable from zero. The results are similar for alternative definitions of threshold events and CAR windows.

The positive CARs reported for the period [–6, 0] continue to contradict the notion that naked short sellers are informed traders. We find that the positive CARs over this interval are largest in 2008, a year characterized by declining stock prices. In 2006, the CARs over this period range from 0.47–0.98%, while in 2008 they are 2.72–3.32%. This confirms our earlier evidence suggesting that naked short sellers are typically unable to profitably unwind their positions before a stock appears on the threshold lists. The result is consistent with the conjecture that naked short sellers are more prone to use FTDs strategically following price increases.

We also report CARs following threshold events year-by-year. CARs following threshold appearances increase monotonically from year to year. For example, using the 30-day definition of a threshold event, we report CARs over the interval [+1, +5] of 0.59%, 1.05%, and 2.07% in 2006, 2007, and 2008, respectively. These results support earlier evidence that market participants do not view threshold events as negative information. The results are consistent with naked short sellers getting caught in a short squeeze. Demand temporarily increases as naked short sellers simultaneously rush to cover their positions, resulting in higher prices. This result is particularly evident in 2008, a year when naked short sellers saw their activities constrained by market regulators while many in the media vilified their trades as abusive and manipulative.

4.3. Cumulative abnormal returns by listing exchange

In Table 4, we explore the possibility that threshold events differ by listing exchange. Differences may be due to factors such as market structure and the market maker exemption. As in prior tables, we report the results for three definitions of a threshold event.

<<TABLE 4 ABOUT HERE>>

In Table 4, we find that the positive CARs in the period before the threshold trades are limited to AMEX- and Nasdaq-listed stocks. Using the 30-day threshold event definition, the average CAR over the interval [–8, –7] is 2.36% (2.72%) for stocks trading on the AMEX (Nasdaq). This compares to a two-day CAR of –0.59% for NYSE-listed firms. The 90- and 180-day event definitions yield similar results. While admittedly weak and isolated to stocks listed on the NYSE, this is the first (and ultimately the only) evidence we report that is consistent with the conjecture that naked short sellers are momentum traders.

The CARs reported for the period between the threshold trades and the threshold listing are positive regardless of exchange. The 30-day sample results suggest that the average CAR over the interval [–6, 0] is 1.21%, 1.46%, and 1.63% for AMEX-, Nasdaq-, and NYSE-listed stocks, respectively. This confirms earlier evidence suggesting that naked short sellers are typically not able to profitably unwind their position before a stock appears on the threshold lists.

We also report abnormal returns following threshold events by listing exchange. In contrast to the [–8, –7] results, CARs following threshold appearances are much larger for NYSE-listings than for firms listed on the AMEX and Nasdaq. For example, focusing on the 30-day definition of a threshold event, we report average CARs over the period [+1, +5] of 2.70% for NYSE-listed stocks. This compares to average CARs of 0.75% and 1.08% for AMEX- and Nadaq-listed stocks, respectively.

4.4. Cumulative abnormal returns by threshold absence

In Table 5, we address the possibility that the information content of threshold events is related to the length of time since a firm last appeared on the threshold lists. We consider a firm's first appearance on the threshold lists as a unique group. This group consists of 1,001 threshold events. We divide the remaining threshold events into quartiles based on the number of days elapsed since the firm's last appearance on the threshold lists. The top quartile (quartile 4) consists of firms with an extended absence from the threshold lists before reappearing, while the bottom quartile (quartile 1) consists of firms that reappear on the threshold lists after a relatively short absence. For example, when threshold events are based on a 30-day absence, the quartile cutoffs are 257, 114, and 57 days, respectively.

<<TABLE 5 ABOUT HERE>>

Focusing on the 30-day definition for threshold events, we find that the positive CARs in the period before the threshold trades are larger for stocks reappearing after an extended absence from the threshold lists. Over the interval [–8, –7] stocks absent from the threshold lists for at least 257 days average CARs of 3.46%, while stocks absent for 57 or fewer days average CARs of 1.07% (p-value of difference = 0.10). This pattern is not evident when using the 90- and 180-day definitions of threshold events.

The CARs reported for the period between the threshold trades and the threshold listing are generally larger for stocks with longer absences from the threshold lists. The 30-day and 90-day sample results indicate that the CARs are statistically significant for only the stocks appearing on the threshold lists after an extended absence. While the returns are not statistically significant for the remaining quartiles, their signs are unanimously positive. This is inconsistent with the notion that naked short sellers are informed traders.

We also report abnormal returns following threshold events for each quartile. There are no consistent patterns in CARs over the [+1, +5] period when the sample is divided into quartiles based on stocks' absence from the threshold lists. CARs over this window are always positive and are often significant. This confirms earlier evidence that market participants do not view threshold events as negative information.

5. Conclusions

The purpose of this paper is threefold. First, we provide the first detailed empirical description of securities reaching threshold levels of FTDs since the adoption of Regulation SHO. We find that nearly 1,900 common stocks appear on the threshold lists at least once over the 2005 through 2008 sample period. Common stocks appearing on the threshold lists do so an average of 2.75 times and remain on the lists for 17 days, on average.

Second, we examine the trading of naked short sellers to test the assertion that naked short sales are informed, momentum traders who intensify downward price movements. Our results do not support this characterization of naked short sellers. Instead, consistent with Angel et al. (2003) and Diether et al. (2008), our evidence suggests that naked short sellers are contrarian traders that target stocks that have recently experienced positive abnormal returns. We find no evidence that naked short sellers are informed traders who target stocks that are overpriced, as the stocks they sell short exhibit positive CARs following their trades.

Third, we test the conjecture that naked short selling is abusive and manipulative by examining the market's reaction to the announcement that firms have been added to the threshold lists. In contrast with this notion, we find that CARs are positive around threshold events. This is consistent with the occurrence of short squeezes, as rising prices motivate short sellers to cover their positions. Together, our results suggest that the SEC's recent regulatory actions restricting naked short selling may have been misplaced, as we find no evidence that naked short sellers are informed traders who exacerbate downward price momentum or are negatively viewed by the market. Instead, our results complement studies such as Woolridge and Dickinson (1994) by suggesting that naked short sellers promote efficient markets by providing liquidity in up markets, risk-bearing, and selling stocks they believe to be overpriced.

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Figure 1
Timeline of FTDs
This figure identifies the important dates surrounding naked short sales and failures to deliver. The benchmark date (t=0) is the date of a security's initial appearance on the threshold lists. It is important to note that the threshold lists are released after the close of trading on the base date.

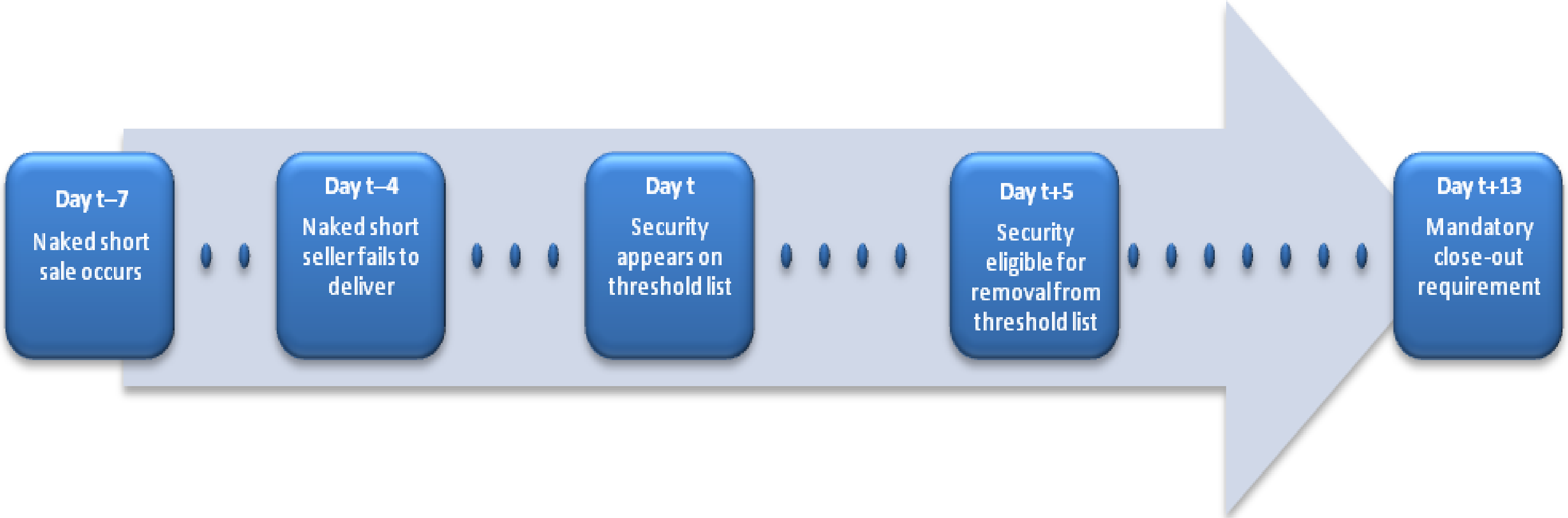

Figure 2
Daily number of threshold securities
This figure details the number of securities appearing on the threshold lists released by the AMEX, Nasdaq, and NYSE on a daily basis over the January 7, 2005 through December 31, 2008 sample period.

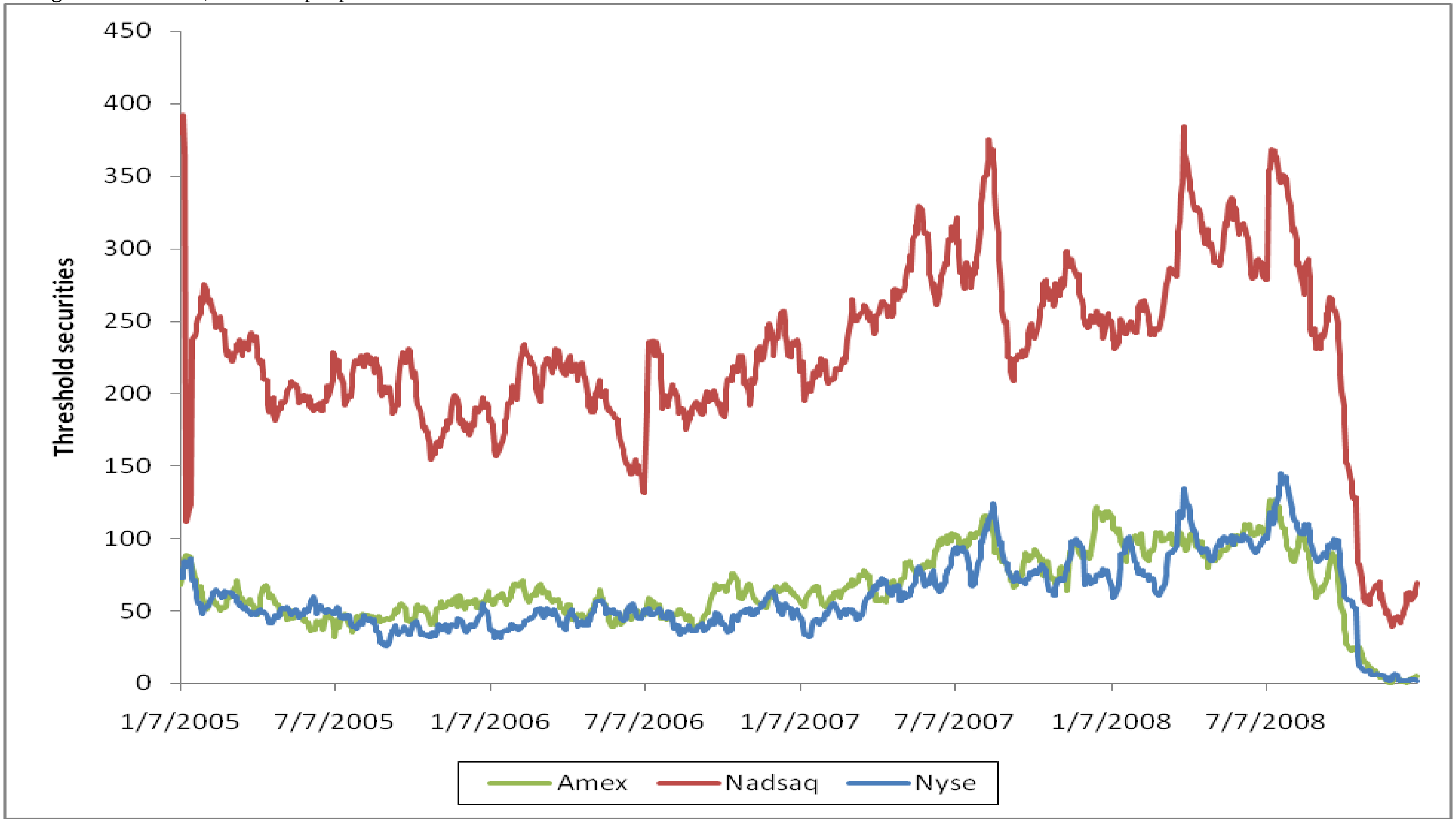

Figure 3
Frequence distribution of threshold events by firm
This figure reports a histogram of the total number of threshold events by firm from 2005 through 2008. Threshold events are defined as the first appearance on the threshold lists and reappearances on the threshold lists following an absence of at least 5 days.

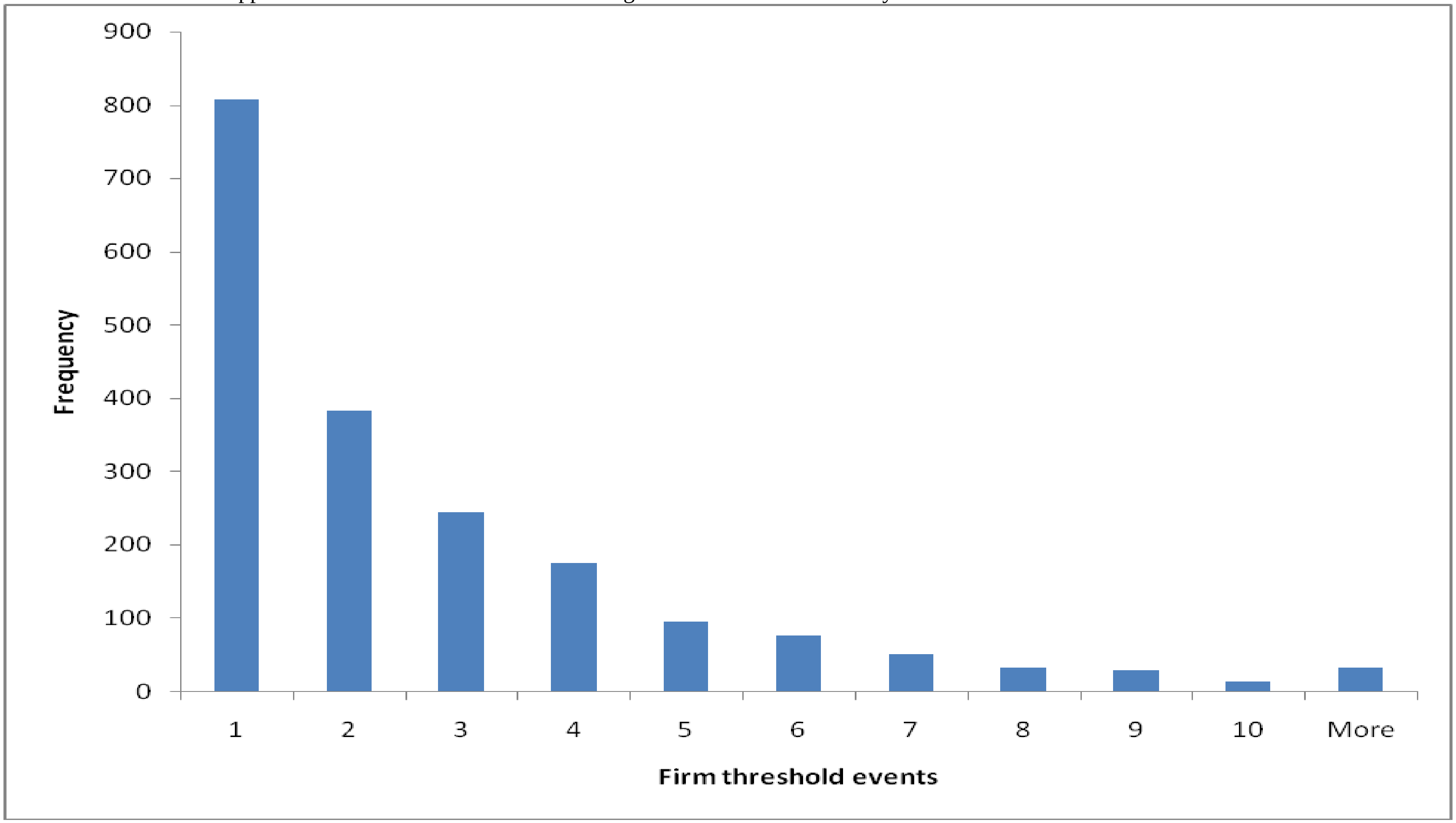

Figure 4

Frequency distribution of threshold list duration

This figure reports a histogram of the duration of threshold events from 2005 through 2008. Threshold events are defined as the first appearance on the threshold lists and reappearances on the threshold lists following an absence of at least 5 days.

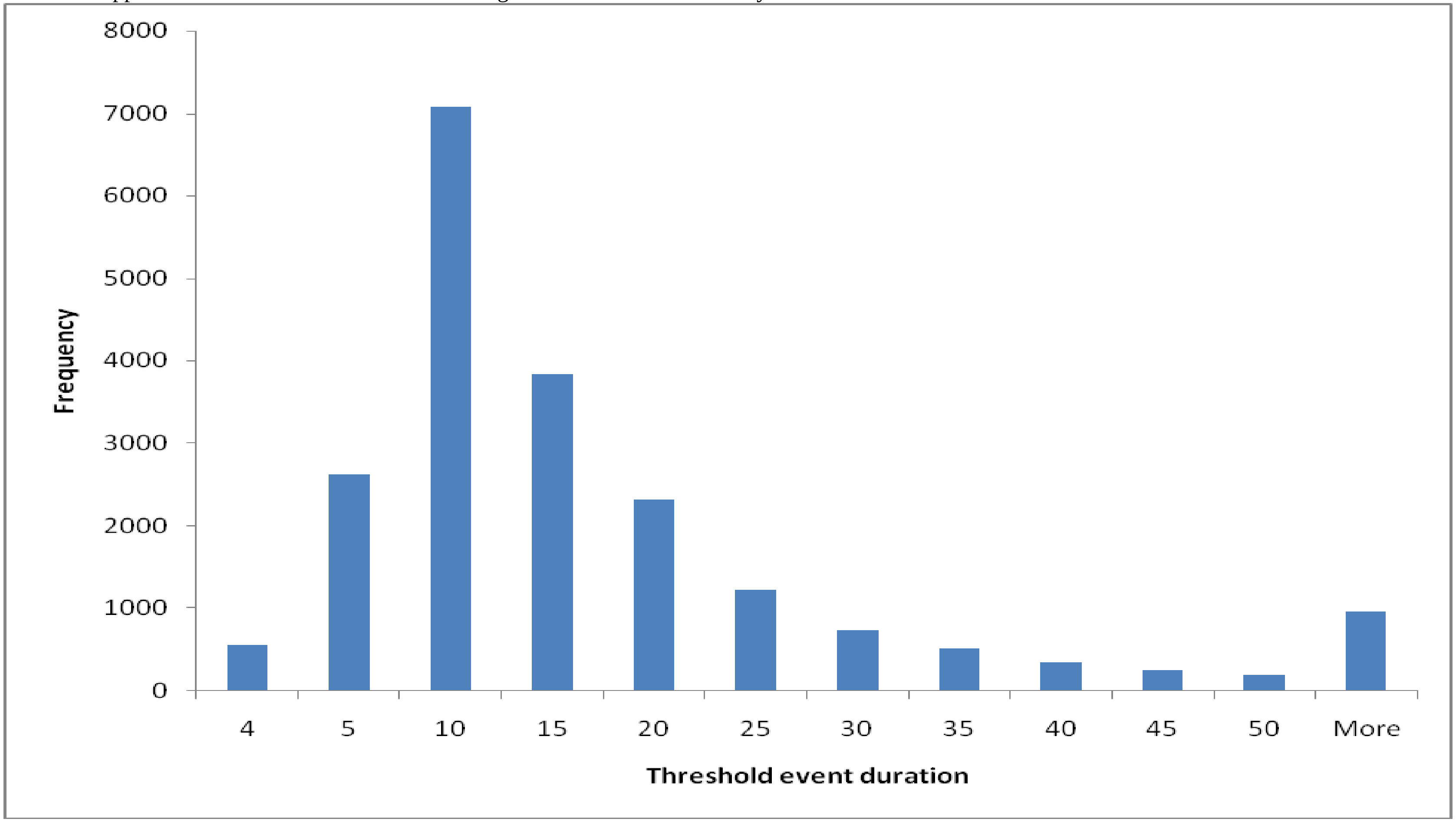

Table 1

Event study sample descriptive statistics

This table reports descriptive statistics for threshold events. Threshold events are defined as (a) first time appearances on the threshold lists and (b) reappearances after absences of at least 30, 90, and 180 days. N respresents the number of events. First time events is the number of firms appearing on the threshold lists for the first time. Repeat events is the number of firms reappearing after a 30-, 90-, or 180-day absence. Unique firms is the number of unique firms in the sample. Absence since last event is the average of the number of days since repeat firms' prior appearance on the threshold lists. Average event/firm is the average appearance for firms experiencing threshold events, where an appearance is defined as a reappearance after an absence of at least 5 days.

	N	First time events	Repeat events	Unique firms	Absence since last event	Average event/firm
30-day absence	3,170	1,198	1,972	1,604	198.23	2.74
90-day absence	2,342	1,198	1,144	1,575	292.77	2.30
180-day absence	1,917	1,198	719	1,522	390.13	1.90

Table 2
Threshold event abnormal returns
This table reports abnormal returns around threshold events. Results are reported for threshold events defined as (a) first time appearances on the threshold lists and (b) reappearances after absences of at least 30, 90, and 180 days. Abnormal returns are calculated using the market model. Panel A reports daily abnormal returns over days [–12, +13] where day 0 corresponds to a threshold event. Panel B reports CARs over various windows, including the period leading up to threshold trades ([–12, –7] and [–8, –7]), the period between threshold trades and the threshold event ([–6, 0]), and the period following the public release of threshold information ([+1, +5]). ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Daily abnormal returns

	Abnormal return		
Event day	30-day absence	90-day absence	180-day absence
-12	–0.0026**	–0.0023*	–0.0026**
-11	0.0017	0.0001	–0.0009
-10	–0.0002	0.0002	–0.0017
-9	–0.0008	–0.0007	–0.0012
-8	0.0059***	0.0068***	0.0053**
-7	0.0153***	0.0176***	0.0193***
-6	0.0018	0.0020	0.0032
-5	0.0026	0.0042**	0.0046*
-4	0.0026**	0.0029**	0.0030**
-3	0.0013	0.0029*	0.0020
-2	0.0011	0.0011	0.0011
-1	0.0040***	0.0027**	0.0042***
0	0.0011	0.0003	0.0008
1	0.0042***	0.0047***	0.0059***
2	0.0030***	0.0047***	0.0048***
3	0.0019*	0.0014	0.0004
4	0.0026**	0.0033**	0.0034**
5	0.0012	0.0018	0.0030**
6	0.0002	–0.0001	–0.0005
7	–0.0003	–0.0015	–0.0014
8	–0.0002	0.0005	0.0016
9	0.0019*	0.0013	0.0014
10	0.0008	–0.0001	0.0001
11	–0.0017*	–0.0019*	–0.0009
12	0.0004	0.0012	0.0015
13	0.0005	0.0014	0.0015

Panel B: Cumulative abnormal returns

	N	[-12, –7]	[-8, –7]	[-6, 0]	[+1, +5]	[+6,+13]	[-6, +13]
30-day absence	2,945	0.0194***	0.0212***	0.0145***	0.0129***	0.0015	0.0290***
90-day absence	2,133	0.0217***	0.0244***	0.0162***	0.0158***	0.0008	0.0328***
180-day absence	1,711	0.0183**	0.0246***	0.0190***	0.0173***	0.0032	0.0394***

Table 3

Threshold event cumulative abnormal returns by event year

This table reports abnormal returns around threshold events by year. Results are reported for threshold events defined as (a) first time appearances on the threshold lists and (b) reappearances after absences of at least 30, 90, and 180 days. Abnormal returns are calculated using the market model. CARs are reported over various windows, including the period leading up to threshold trades ([–12, –7] and [–8, –7]), the period between threshold trades and the threshold event ([–6, 0]), and the period following the public release of threshold information ([+1, +5]). ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Year	N	[–12, –7]	[–8, –7]	[–6, 0]	[+1, +5]	[+6, +13]	[–6, +13]
30-day absence	2006	805	0.0456**	0.0462***	0.0047	0.0059	0.0013	0.0119
	2007	1,074	0.0212**	0.0214***	0.0092**	0.0105***	–0.0019	0.0177***
	2008	1,066	–0.0023	0.0021	0.0273***	0.0207***	0.0052	0.0532***
90-day absence	2006	601	0.0532***	0.0518***	0.0079	0.0119***	–0.0034	0.0164*
	2007	790	0.0228***	0.0236***	0.0122***	0.0133***	–0.0061	0.0195**
	2008	742	–0.0051	0.0031	0.0272***	0.0217***	0.0116*	0.0603***
180-day absence	2006	460	0.0651***	0.0610***	0.0098	0.0107**	0.0011	0.0216**
	2007	629	0.0186*	0.0246***	0.0116**	0.0127***	–0.0076	0.0167*
	2008	622	–0.0168	–0.0023	0.0332***	0.0269***	0.0158**	0.0756***

Table 4
Threshold event cumulative abnormal returns by listing exchange
This table reports abnormal returns around threshold events by listing exchange. Results are reported for threshold events defined as (a) first time appearances on the threshold lists and (b) reappearances after absences of at least 30, 90, and 180 days. Abnormal returns are calculated using the market model. CARs are reported over various windows, including the period leading up to threshold trades ([–12, –7] and [–8, –7]), the period between threshold trades and the threshold event ([–6, 0]), and the period following the public release of threshold information ([+1, +5]). ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Exchange	N	[–12, –7]	[–8, –7]	[–6, 0]	[+1, +5]	[+6, +13]	[–6, +13]
30-day absence	AMEX	454	0.0182*	0.0236***	0.0121	0.0075	–0.0026	0.0170
	Nasdaq	2,007	0.0272***	0.0272***	0.0146***	0.0108***	–0.0001	0.0253***
	NYSE	484	–0.0118	–0.0059	0.0163***	0.0270***	0.0120*	0.0553***
90-day absence	AMEX	336	0.0155	0.0182**	0.0170**	0.0175**	–0.0118	0.0229
	Nasdaq	1,447	0.0321***	0.0339***	0.0174***	0.0116***	0.0033	0.0323***
	NYSE	350	–0.0156*	–0.0089	0.0103	0.0318***	0.0021	0.0442***
180-day absence	AMEX	262	0.0275**	0.0265***	0.0245**	0.0178**	-0.0102	0.0323*
	Nasdaq	1,154	0.0276***	0.0339***	0.0195***	0.0134***	0.0066	0.0375***
	NYSE	295	–0.0263***	-0.0134**	0.0119*	0.0400***	0.0016	0.0535***

Table 5
Threshold event abnormal returns by time since threshold last reached
This table reports abnormal returns around threshold events by the time since the last threshold list appearance. Separate results are reported for first time appearances. Reappearances after absences of at least 30, 90, and 180 days are separated into quartiles based on the time since the last threshold list appearance. Quartile 4 (1) corresponds to firms experiencing the longest (shortest) absence from the threshold lists. Abnormal returns are calculated using the market model. CARs are reported over various windows, including the period leading up to threshold trades ([–12, –7] and [–8, –7]), the period between threshold trades and the threshold event ([–6, 0]), and the period following the public release of threshold information ([+1, +5]). ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Quartile	N	[–12, –7]	[–8, –7]	[–6, 0]	[+1, +5]	[+6, +13]	[–6, +13]
First-time threshold listed		1,001	0.0065	0.0147**	0.0163***	0.0178***	0.0010	0.0351***
30-day absence	4	488	0.0299**	0.0346**	0.0231***	0.0095	0.0072	0.0398***
	3	487	0.0293**	0.0283**	0.0106	0.0212***	–0.0023	0.0294**
	2	492	0.0274**	0.0243***	0.0085	0.0102*	–0.0069	0.0118
	1	477	0.0172	0.0107*	0.0121	0.0007	0.0095	0.0223*
90-day absence	4	283	0.0179	0.0222	0.0277***	0.0114	0.0083	0.0473***
	3	283	0.0350*	0.0407**	0.0136	0.0097	0.0098	0.0331**
	2	285	0.0453**	0.0424**	0.0104	0.0184**	0.0020	0.0308
	1	281	0.0417**	0.0263*	0.0127	0.0169*	–0.0179*	0.0118
180-day absence	4	178	0.0169	0.0196	0.0263	0.0040	0.0058	0.0361
	3	178	0.0520*	0.0580**	0.0183*	0.0182*	0.0104	0.0467***
	2	177	–0.0010	0.0073	0.0220**	0.0076	0.0067	0.0363**
	1	177	0.0711**	0.0693**	0.0244	0.0369***	0.0021	0.0632**