The Efficacy of Regulation SHO in Resolving Stock Market Fails-to-deliver

1. Overview

Miller (1977) theorized that bearish investors are constrained to owning zero shares of a stock when they actually want to own negative shares. Most papers on shorting assume short sales restrictions related to transaction costs, loan costs, and the inability to use the proceeds generated by the short sale. This paper seeks to offer evidence that those restrictions may no longer apply and that certain investors have found a way to synthetically create Miller's negative shares.

It is almost universally accepted that shorting stock is an important adjunct to helping moderate the upward stock price bias and is often necessary for liquidity purposes.[1] Short selling reduces the upward bias which would encourage overpricing as has been demonstrated in numerous articles such as Duffie, Garleanu and Pedersen (2002), and Diamond and Verrecchia (1987). In addition, Ofek and Richardson (2003) and Lamont and Thaler (2003) argue that the limited supply of shares available for borrowing contributed significantly to the late 1990's technology stock price bubble. In this paper, the phenomena of naked shorting is examined, both its existence and impact on markets and investors.

The contributions of this paper are several, including being the first to specifically examine the impact of this nascent regulation and one of the first to examine aspects of the phenomenon of naked shorting. We use previously unavailable data to identify severely naked shorted NYSE, AMEX, NASD and OTCBB firms. This paper is among the first to expand on Black and Hu's morphable ownership[2], detailing a mechanism which may give rise to this form of ownership.

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[1] Market makers are generally exempt from short sale delivery restrictions due to the need to fill small orders in thinly traded issues. According to SEC Rule 203(b)(2)(iii), market makers do not have to deliver shares on short sales for "bona-fide market making activities in the security for which this exception is claimed."

[2] Morphable Ownership is described by Hu and Black who refer to the fact that a security owner who allows his security to be borrowed has legally surrendered the voting rights while maintaining the economic benefits: "Both outside investors and corporate insiders can now readily decouple economic ownership of shares from voting rights to those shares. This decoupling—which we call "the new vote buying"—is often hidden from public view and is largely untouched by current law and regulation…. Sometimes hedge funds hold more economic ownership than votes, though often with "morphable" voting rights—the de facto ability to acquire the votes if needed. We call this 'hidden morphable ownership' because under current disclosure rules, the economic ownership and (de facto) voting ownership are often not disclosed."

We present results from a number of statistical tests which offer insight into the determinants of naked shorting and Regulation SHO's impact upon them, particularly securities qualifying for and appearing on the Threshold List. We examine whether Regulation SHO reduces the naked shorting position of the most severely shorted stocks.

This paper differs from others on naked shorting, including Boni-Falls (2004) and Finnerty (2005) by using actual securities identified as having naked short positions and examining regulations targeted specifically at reducing excessive positions. Both Boni-Falls' and Finnerty's papers focused on firms pre-Regulation SHO. While many of the stocks in our study may have had pre-existing naked short positions, this does not adversely affect our study; rather it serves to enhance it by providing firms with extreme and persistent fail positions with which to test the efficacy of Regulation SHO. Edwards and Hanley (2008) examine naked short selling's impact on the short-term performance of IPOs, finding that IPOs affected by naked short selling are more accurately priced. But they don't specifically address the impact of Regulation SHO.

Fotak, Raman and Yadav (2009) examine the effect of naked shorting surrounding the financial crisis of 2008 and interestingly find no evidence that price declines were impacted by naked shorting. They do briefly consider Regulation SHO's impact but it is not the central focus of the paper.

This paper contributes to the academic literature of short sale activity generally (for an introduction to the literature, see Lamont and Thaler, 2003) and naked short selling particularly (see Brooks and Moffett, 2008). Specifically, our paper extends the understanding of short sales and government regulation in the U.S. stock markets (Jones and Lamont, 2002; Geczy, Musto, and Reed, 2002), and naked shorting (identified as strategic delivery failures in Evans et al, 2003). It is the first paper to our knowledge that documents the pervasiveness of naked short selling and examines the effectiveness of Regulation SHO for U.S. equities.

2. Shorting and Naked Shorting

2.1. Shorting

The abuse of short selling has a long and storied history in capital markets. The earliest speculative markets witnessed the struggle between bulls and bears. T. Maccius Plautus, a Roman playwright in the second century before Christ, identified two types of investors engaged in trading shares in *Curculio*, or *The Forgery*.[3] The first, he referred to as 'mere puffers' (the bulls or pumpers) and the second type was described as 'impudent, talkative, malevolent fellows, who boldly, without reason, utter calumnies about one another' (the bears, those speaking negatively about others in the hopes that others would not follow their investing strategies). In Great Britain, early in the 1800's, the term 'bear' was coined to describe one who would sell short in a falling market. This term apparently arose from the story of a trapper who sold a bear's skin prior to capturing and skinning the bear. By all accounts, the term first appeared many years or decades before the coining of the alternate term 'bull.' Market history is replete with stories of seventeenth century Amsterdam, where a conflict between the 'liefhebbers' (literally, the 'lifters-up'), who were described as 'were scared of nothing', and the 'contremines' (the 'underminers'), who were credited with being 'completely ruled by fear, trepidation, and nervousness.'[4] These 'underminers' gained notoriety by organizing themselves into bear pools, called cabala, in an effort to drive prices down in a bear raid. Bernheim and Schneider (1935), in a report for Twentieth Century Funds, recounted similar activity on the London Stock Exchange in the early 1700's, which then resulted in the British Parliament banning short selling.[5] The law was in effect for nearly 140 years, until 1860, when it was repealed.

Looking at modern practices in U.S. markets, short sellers normally have three days from the trade date to deliver shares they sold. If the shares are not delivered at the end of the 3 days (T+3), they are then recorded by the Depository Trust Clearing Corporation (DTCC) as failed-to-deliver (FTD). Sometimes these fails arise from normal problems in the system – lost or improperly executed certificates or other mistakes common with holding actual physical certificates instead of holding shares in book form. While hard data is unavailable, consistent with other business practices involving paper transactions,

[3] Devil Take the Hindmost: A History of Financial Speculation, Edward Chancellor, Farrar Straus & Giroux, Chapter 1.
[4] http://prudentbear.com/press_room_short_selling_history.html
[5] Short selling remains restricted in many stock markets today. In Taiwan, short sells by foreigners are illegal, Hong Kong requires that all short selling be publicly declared and Japan forbids short sells at or below the current market price. Lilico (2002).

these human mistakes account for but a small percentage of the total fails. If it were a serious or pervasive problem, it would be logical to assume that measures would be taken by the participants to develop a new system or improve the process rather than continue to allow these serious mistakes to proliferate.

2.2. Naked Shorting

The phrase naked shorting is used to describe the shorting of a stock and failing to deliver or borrow the shorted stock within the T+3. The term naked shorting is a common name used to describe securities with a fail-to-deliver position (as described by the DTCC and brokers). For individual investors normal good delivery is three days after the sale at which time the sellers either have to deliver the securities they own (and have sold) or borrow a like security for delivery to the purchaser. Should the seller borrow a certificate for delivery they are required to pay interest on the borrowed amount until the seller goes out into the market and purchases the shares to replace the ones borrowed. The money they (an individual, this requirement doesn't apply to brokers registered as market makers) receive from the short sale is held as collateral and the interest earned on the collateral is credited against the interest on the borrowed shares.

In the U.S. markets, market makers have a special exemption by nature of their registration and can short the stock while not having to borrow it from another account for delivery. Options market makers may hedge a position by naked shorting the stock. The market maker, according to SEC Rule 203(b)(2)(iii), is exempt from the borrowing and delivery requirements (Brooks and Moffett, 2008). If the market maker engages in a naked short sale, the market maker experiences no borrowing or transaction costs and also has the advantage of using the proceeds from the naked short sale. There is no time limit on the securities sold in terms of having to be delivered. Boni-Falls (2004) points out that "options market makers may maintain short stock positions for longer periods than equity market makers. Thus strategic fails by options market makers may make stock with options listings more likely to experience persistent fails." There is little discussion as to what happens to the naked short position when the options positions are closed. For options market makers, there is no hedge risk or necessity in maintaining the short position after the corresponding option position has been exercised or expired.

In the case of an FTD, the buyer's broker then creates a 'marker' in the account and the stock shows up in the account as being owned by the buyer. The buyer is unable to distinguish whether or not his shares are naked shorted or if there has been good delivery as expected. The notice the buyer receives is no different for naked shares supplied to him versus good delivery of authorized shares. There is no way for the buyer to determine if good delivery was made.

There is evidence that some have abused this regulatory flexibility of shorting without having to borrow (and pay the interest) or actually buy the security in the market for delivery. These market participants have naked shorted hundreds of millions of shares or in some cases hundreds of billions of shares, and failed to deliver on them. As of 2003, one estimate on the proceeds from naked short selling exceeded $100 billion.[6]

The corresponding collapse of the stock price has often caused the companies to fail, unable to secure capital or sustain borrowing, having their loans called due to collapse of capital.[7] If the company fails, then the market maker never has to go out and make good delivery on the stock.

Culp and Heaton (2007) point out that from an economic perspective, the failure to borrow securities "allows the short seller to borrow shares *de facto* from the stock buyer rather than the current share owner." As in a normal short sale, securities are owed by the seller. However, unlike a normal short sale, in this case the 'lender' and the buyer are the same. This brings up some unusual ownership/governance issues, as the lender normally loses the right to vote the shares as the buyer acquires them.

This leads to Hu and Black (2006) who focus on a unique aspect of the shorting market – the decoupling of voting and economic power, detailing situations where investors (such as hedge funds) may hold more votes than economic ownership. This gives them the de facto ability to acquire votes if needed. They suggested that while decoupling was not new, the ability to do so on a large scale may be.

2.3. Cellar Boxing

[6] Rob Wherry, Wall Street's Next Nightmare!, Forbes, Oct. 13, 2003, pg. 66.
[7] Dateline NBC, Broken Dreams, July 31, 2005, transcript on file with Houston Law Review, *cf.* with Averay & Koh, The Curious Incident of Shares that Didn't Exist, *Euromoney*, April 2005, pg. 32.

Floor traders refer to naked shorting a stock to its lowest levels as cellar boxing. It derives this name from the fact that the regulatory agencies have established a floor price at which a stock can trade. This level is set at $0.0001 or one-ten thousandths of a dollar. This level is aptly named the cellar. Reaching this floor is the goal of naked short selling as it maximizes the profits of the seller and hastens the company's demise, removing any future liability from the seller. NASD Rule 3370 permits market makers to short sell (naked short sell) at various times for their own account including when there are significantly larger number of buy orders than sell orders.[8] Theoretically, a market maker can sit on the ask at $0.001 to fill the orders for these micro-cap companies, reducing the risk to the market maker of a forced cover.

Jarrow (1992) details the large trades that create momentum which leads to asymmetric price elasticities between sales and purchases of stocks. The trades are large enough to create upward price momentum, which is then used by the large trader by selling back to noise investors at a higher price. It is likely that Jarrow's result could be extended to shorters seeking to capture additional returns. The large trader (market maker or hedge fund[9]) simply short sells large positions, which create negative price momentum leading to the price cellar. This short strategy is persistent and sustainable due to the information asymmetry of the nature of individual trades. This promotes naked short selling as an attractive economic transaction for the seller.

Cellar boxing has become more popular since 1999 when the market went to a decimalization basis on stock prices. Prior to this the minimum market spread for stocks was set at 1/32nd of a dollar and the market makers were guaranteed a rather generous spread. Since decimalization, the spreads often are down to as much as a penny in some larger cap, highly traded stocks. As a result of the decline in

[8] On July 12, 1990, the Commission extended the affirmative determination requirements of Rule 3370 to NASD members effecting short sales for their own account. The Commission also approved express exceptions from such member account trading requirements for transactions: "(1) [i]n corporate debt securities, (2) for bona fide market transactions by a member (A) in NASDAQ securities for which it is registered as a NASDAQ market maker, and (B) in non-NASDAQ securities for which it publishes a two-side quotation to an independent quotation medium, and (3) for transactions in fully hedged or arbitraged positions." See Release No. 32-28186.

[9] Asquith and Meulbroek (1996) show how hedge fund managers prefer short selling over the option market due to its reduced cost.

income, market makers became more active in the smaller cap markets - the OTCBB and Pink Sheets.[10] The reasoning is twofold. First, this allows a larger percentage spread on each share, as the price of the stock in question is forced down. In addition, these markets have a reputation for a reduced level of regulation where the protective effects provided by the SEC's Regulations are not as rigorously enforced.[11] Some examples include Rule 10-a (the tick test)[12], and various NASD Rules including, but not limited to 3350, 3360, and 3370 (these deal with the affirmative determination in writing of "borrowability" by settlement date and allowing market makers to legally naked short sell into markets characterized by a plethora of buy orders at a time when few sell orders are in existence). Protections offered investors by these rules are either limited or suffer from lax enforcement in the smaller cap markets.

2.4. Growing Awareness of Naked Shorting

Naked short selling is a relatively unknown activity among market participants and regulators. Even as late as April of 2005, an experienced shorter as Mark Cuban was denying the existence of naked shorting.[13] There are no textbook references available and few if any published academic papers on the subject. Prior to Regulation SHO, the SEC never mentioned its existence, the DTCC, in a letter by its senior counsel Larry Thompson, practically denied that it was even possible or that the stock borrow program run by the DTCC contributed to it (Brooks and Moffett, 2008). While the precise nature of any

[10] In testimony concerning the effects of decimalization on the securities markets, Laura S. Unger, Acting Chair of the U.S. Securities and Exchange Commission, testified that "preliminary reviews by the Commission's Office of Economic Analysis ("OEA") and Nasdaq indicate that at least some of the anticipated benefits of decimalization, such as the significant narrowing of quotation spreads, are already evident. For example, OEA estimates that, from December 2000 to March 2001, quotation spreads in securities listed on the New York Stock Exchange ("NYSE") narrowed an average of 37%, and effective spreads narrowed 15%. An even more dramatic reduction in quotation spreads was observed in Nasdaq securities, with spreads narrowing an average of 50% following decimalization, and effective spreads narrowing almost as much."

[11] USA TODAY, Matt Krantz, "Pink Sheet Scams May Give Investors Nightmares", November 10, 2005: "Stocks on the Pink Sheets system fall between the cracks of regulation. The NASD regulates brokers, not the stocks they trade. The Securities and Exchange Commission, with few exceptions, regulates only companies with more than $10 million in assets and more than 500 shareholders. Virtually no stocks traded on the Pink Sheets clear that bar. "As a practical matter, smaller companies tend to fall below the SEC's radar and state regulators'," says John Coffee, securities law professor at Columbia University. "They're too small."

[12] SEC Rule 10a-1 provides that an exchange traded security may not be sold short at a price that is either on a minus tick (a price lower than the previous price) or a zero-minus tick (price is the same as the previous price which was lower than the sale price of the yet preceding price. On June 13, 2007, the Commission voted to remove the tick test of Rule 10a-1 and to amend Regulation SHO to provide that no short sale price test, including any price test of any exchange or national securities association, shall apply to short sales in any security. The Commission has established a compliance date of July 6, 2007 for the changes.

[13] http://www.blogmaverick.com/2005/04/16/the-naked-shorts-get-some-clothes/

one position may be up for debate, the existence of naked shorting is no longer in question. The SEC has documented the existence of such by enacting Regulation SHO, which is an attempt to identify those securities which have large naked short positions and to offer remedy for the shareholder – the efficacy and results of which this paper examines.

More recently, the SEC, in RELEASE NO. 58166, dated July 15, 2008, recognized naked short selling as excessively harmful to individual stocks and the market in general. It acted to restrict naked short selling in 19 financial stocks. In the order, the SEC described the impact of naked short selling: "we have concluded that requiring all persons to borrow or arrange to borrow the securities identified… is 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." The order included market makers, effectively removing their exemption to naked short temporarily. The SEC was very clear on the impact of naked shorting and the necessity of the order – to protect investors, maintain fair markets and prevent substantial disruption in the market. Given these effects, it is even more vital to understand the efficacy of efforts to regulate this activity.

Initially, we focus our attention towards the effect of delivery failures on certain securities in U.S. equity markets before and after the implementation of regulations governing shorting, in particular Regulation SHO. Data has been collected from the NYSE, AMEX and NASDAQ Self-Regulatory Organizations (SRO), the Center for Research in Securities Prices (CRSP), Compustat and several models developed to examine the effects on securities returns pre- and post-SHO.

In Sections III and IV we give an overview of Regulation SHO and the current literature. Section V provides the sample data and hypotheses for the data set of Threshold List securities. Section VI provides the model used to test the efficacy of Regulation SHO in relieving fail-to-deliver positions. In section VII we examine the results of the Fama-French-Carhart model and the results of several non-parametric tests.

3. Regulation SHO Overview

Prior to Regulation SHO's introduction in 2004, to our knowledge there were no significant regulatory comments by the SEC or NASD about naked shorting. There were no known prosecutions of naked shorting through December of 2004, prior to Regulation SHO being announced. There were several cases which have since come to light that involved naked shorting including the SEC v. Rhino Advisors and Refco. The issue was largely unknown to the investing public and received scant discussion with few published works or texts discussing naked shorting.

Recently, naked shorting has received significant regulatory review and increasing academic study. The SEC and DTCC (Depository Trust Clearing Corporation) acknowledged naked shorting not only existed and was possible but was present and abused as a trading technique. In July of 2004, the SEC adopted Regulation SHO with the intent of adopting additional constraints on short selling of stocks and curbing naked short selling abuses. The SEC highlighted the problem with routine fails to deliver by stating:

> Naked short selling can have a number of negative effects on the market, particularly when the fails to deliver persist for an extended period of time and result in a significantly large unfulfilled delivery obligation at the clearing agency where trades are settled. At times, the amount of fails to deliver may be greater than the total public float. In effect the naked short seller unilaterally converts a securities contract (which should settle in three days after the trade date) into an undated futures-type contract, which the buyer might not have agreed to or that would have been priced differently. (SEC, 2003b, page 7).

Naked short selling is tantamount to counterfeiting securities (note the SEC's own language – the FTD's may exceed the entire float). In effect, naked short sellers sell shares that don't exist, that they won't borrow and will never exist, except in opaque form on the buyer's confirmation statement. This phenomenon, if unrestricted, impacts voting rights as well as the actual return (or loss) on any investment in the effected issue (see Hu and Black, 2006, Brooks and Moffett, 2008). To this end, Regulation SHO

Rule 203 enacts new borrowing and delivery requirements on short-sellers, including requirements for stocks with extended delivery failures.

If Regulation SHO is effective in reducing delivery failures, one would expect short selling to become more tightly constrained after SHO became effective in January 2005, or after the firms first qualify as an identified security under Regulation SHO. Though SHO has not been in effect long, if the activity of naked shorting is pervasive and the requirements strict enough and enforced, there should be an immediate impact on those stocks affected by SHO as actual shares are procured to cover the existing short positions. Regulation SHO requires the NYSE, AMEX and NASDAQ to publish a daily list of companies which have excessive fail-to-delivers for that day. This is known as the Threshold List and is the basis for the data used in this study.

The Threshold List[14] was created by Regulation SHO to identify potential companies that have been naked shorted. One of the requirements for stocks with excessive fails is that each Self Regulatory Organization (SRO), including the NYSE, AMEX, and NASDAQ markets, will publish a daily list of those issues with a significant FTD problem. This list of excessive fails to deliver is known as the Threshold List, and is published daily based on information reported to the SRO's by the National Securities Clearing Corporation (NSCC), the clearing arm of the DTCC. This list does not contain the number of fails for the day or the total amount; it is simply a list of the companies who, for that particular day, qualified for threshold status. In order to qualify, the SEC defines Threshold Securities as equity securities that have an aggregate fail to deliver position for:

- five consecutive settlement days at a registered clearing agency (the NSCC);
- totaling 10,000 shares or more; and

[14] Nasdaq: http://www.nasdaqtrader.com/aspx/regsho.aspx (includes Nasdaq issues, OTCBB, and other OTC issues), NYSE: http://www.nyse.com/Frameset.html?displayPage=/threshold/ , AMEX: http://www.amex.com/amextrader/tradingData/RegSHO/TrDa_RegSHO.jsp (Amex listed securities only)

equal to at least 0.5% of the issuer's total shares outstanding.[15]

A study citing a paper by the Office of Economic Analysis showed that since the adoption of Regulation SHO, there was an average of 312 companies listed each day on the Threshold List during the period of our study, with an average of 1,346 failed positions, representing 189,000,000 shares.[16] That means that on a daily basis, just for these 312 companies, 189,000,000 shares, on average, failed to settle.

The SEC, in a study by the Office of Economic Analysis (OEA), stated that since implementation of Regulation SHO, the average number of daily FTDs has declined by 34% and the average number of issues on the Threshold List has declined by 6.5%.[17] Both are relatively strong numbers, if true. The time frame for the OEA's study was for the period of April 1, 2004 through Dec 31, 2004 for the pre-SHO period and Jan 3, 2005 through May 31, 2006 for the post-SHO period.

During the pre-SHO period, after it was announced that existing naked shorts would be grandfathered, the level of shorting shot up dramatically. From June 1, 2004 to December 31, 2004, the daily volume of fails rose from 155,000,000 shares a day on the NYSE and NASDAQ to 205,000,000 a day or an increase of 35%. For the AMEX and OTCBB, the relevant increase was more modest, going from 470,000,000 a day to 576,000,000 a 26% increase.

Figures 1 and 2 give the trend of the total FTDs on the NYSE and the number of NYSE companies with FTDs over the first 18 months Regulation SHO was in effect. The volume numbers are standardized or made scale invariant and combined with a 25-day moving average trendline. There is a slight decrease in the trends for the first 30 or 45 days, but both appear to have rebounded robustly to levels roughly approximating that of the pre-SHO period before the grandfather clause was announced.

(Insert Figure 1 and Figure 2)

4. Literature Review and Regulation SHO

[15] http://www.sec.gov/spotlight/keyregshoissues.htm
[16] Referenced by the Wayne Klein, Director, Division of Securities, for the State of Utah, in a letter to Nancy Morris, Secretary, Securities and Exchange Commission, dated September 13, 2006.
[17] Office of Economic Analysis, Memorandum dated August 21, 2006. Fails to Deliver Pre- and Post-Regulation SHO.

In the first part of this section we review the previous short selling literature, particularly as related to naked shorting. In the second section we develop the basis for our hypothesis with regards to examining SHO's efficacy in affecting the trading of shorted stocks by describing how Regulation SHO attempts to resolve the problem of excessive naked shorting.

4.1. SHO Clues

Boni-Falls (2004) indicated that "prior to Regulation SHO, most U.S. equity issues experienced at least a small percentage of failures-to-deliver each day." She also found that on three days, selected at random, more than 700 issues had FTDs of 60 to 120 million shares each, that had persisted for at least two months. In addition, she found over 800 unlisted stocks with fails of 120 to 180 million shares each that had persisted for at least two months.

Finnerty (2005) has developed a model demonstrating how naked shorting occurs in combination with securities he calls "Death Spiral Convertibles" to manipulate stocks of target companies. Finnerty concludes "recent securities innovation called floating-price convertible securities removes an important constraint on short selling by resolving the unraveling problem. I conclude that the current capital market environment and regulatory regime, Regulation SHO notwithstanding, are conducive to manipulative short selling."[18]

As mentioned previously, the DTCC[19], the central clearing agency for US securities, discussed the significance or pervasiveness of naked short selling in an open letter published on their website. Robert Shapiro, former Under Secretary of Commerce under President Bill Clinton, commented on the numbers released by the DTCC in the commentary written by Larry Thompson, General Counsel for the DTCC. Mr. Thompson stated the amount of FTD's to be about $6 billion per day, which includes both new and aged fails and compared this amount to "$400 billion in trades processed daily by the NSCC or

[18] The DTC has offered a critique of Section 4.1 of Finnerty's paper concerning the contribution of the Stock Borrow Program. It can be found at: **http://www.dtcc.com/news/press/releases/2006/finnerty.php**

[19] http://www.dtcc.com/Publications/dtcc/mar05/naked_short_selling.html - interview with Larry Thompson, DTCC Deputy General Counsel.

about 1.5% of the dollar volume." The implication by Mr. Thompson and the DTCC is that fails are an insignificant factor in the market.

Shapiro in his reply to Thompson disagreed noting:

> "By most people's standards, a problem involving hundreds of millions of shares valued at $6 billion every day is a very large problem. Moreover, the $6 billion total substantially underestimates the actual value of all failed-to-deliver trades measured when the trades actually occurred. Most of the $6 billion total represents uncovered or naked short sales, many of which have gone undelivered for weeks or months with their market price being marked-to-market every day. As a stock's price falls, the market price of naked shorts in that stock also declines, reducing the total value of the outstanding failures-to-deliver cited by Mr. Thompson."

Shapiro pointed out that the "comparison to the $400 billion in trades processed daily by NSCC seemed disingenuous and misleading, because that $400 billion total covers not only U.S. equity trades which can involve most of the failures-to-deliver at issue, but many other transactions also processed by the NSCC." Shapiro also noted the value of all equity transactions in U.S. markets averages over $82 billion per day. If the daily value of fails-to-deliver averages $6 billion, that total is equivalent to 7.31 percent of average daily equity trades or nearly five times the 1.5 percent level suggested by Mr. Thompson.

Shapiro also noted the DTCC claims to have "eliminated the need to settle 96 percent of total obligations." Extrapolating this number then $384 billion of the $400 billion in daily trades cited by Mr. Thompson are netted out, leaving only $16 billion in daily trades that require the actual delivery of securities. If there are $6 billion of fails-to-deliver securities existing on any day, this is then equivalent to 37.5 percent of the daily trades that require the delivery of securities, or 25 times the 1.5 percent level cited by Mr. Thompson. The DTCC has not replied publicly to these concerns.[20]

[20] It is also noteworthy that while the DTCC/NSCC claims naked shorting is insignificant they also recently declared itself not liable for its own "negligence, willful misconduct, or violation of Federal securities laws" (language taken from the rule). In Rule – SR-NSCC-2004-09, the NSCC (the clearing arm of the DTCC) announced:

One factor may distort the results of this study or others of the effects of appearing on the Threshold List by this model. Despite the claims that naked shorting is a relatively insignificant problem, in enacting regulation SHO, all prior naked shorts were grandfathered. Without transparency on the nature and origin of the FTDs it is impossible to ascertain whether the fails were recent or consist of fails that are protected for those companies that fall under the guidelines of Regulation SHO. It is impossible to determine when naked shorting began or the extent of the naked shorting in any issue. Regulation SHO does not require the release of volume or specific share information. It simply lists the companies who qualify for the Threshold List under the guidelines of Regulation SHO.

4.2. SHO Rules

To determine if Regulation SHO is effective in regulating, reducing and eliminating naked shorting, a basic understanding of how it works and the processes involved are necessary. Regulation SHO has affected some of the delivery and settlement requirements of stocks, most notably the close out and buy-in provisions. There are now locate requirements for stocks on the Threshold List, the short seller is required to locate (but interestingly, not required to borrow) shares available for borrowing in the shorted stock. In addition, Regulation SHO has a 13 day mandatory close out period, but lacks any penalty or enforcement provisions.

(Insert Table 1)

The requirements of Regulation SHO for qualified issues are summed up succinctly as follows:

The approved changes create a uniform standard limiting NSCC's liability to direct losses caused by NSCC's gross negligence, willful misconduct, or violation of Federal securities laws for which there is a private right of action. In addition, the changes: (a) memorialize an appropriate commercial standard of care that will protect NSCC from undue liability; (b) permit the resources of NSCC to be appropriately utilized for promoting the accurate clearance and settlement of securities; and (c) are consistent with similar rules adopted by other self-regulatory organizations and approved by the Commission.

- If a stock crosses above the threshold requirements in terms of the number of FTD's, and then stays there for five days without crossing back under the threshold, its name goes on the Regulation SHO Threshold List.
- Then, after 13 more days, if the stock continues to appear on the list, brokers are to inform the sellers that are failing to deliver that they must stop failing to deliver, they need to cover the short, and those brokers are not to take any more short sale orders from those accounts for those stocks.
- The close-out provisions of Regulation SHO do not apply to fail-to-deliver positions established prior to the first publication date of the Threshold List. These positions are effectively 'grandfathered.'[21] Should the previously existing positions be reduced, then only the reduced amount remains exempt from the close-out provision.
- There are no enforcement provisions or penalties for violations of the rules contained in Regulation SHO.
- Securities that are not fully subject to the reporting requirements of the Securities Exchange Act of 1934 are not covered by Regulation SHO. Therefore firms listed on the Pink Sheets and firms who temporarily have not met all of the filing requirements are not covered by Regulation SHO.
- Regulation SHO's affirmative determination rules (brokers must locate shares available for borrowing for securities on the Threshold List) only requires such shares be located, not actually borrowed. Hence it is possible the same shares may be located repeatedly.

We focus on Regulation SHO as it existed from its inception to June 2007 at which time the SEC adopted rules addressing several of the concerns considered in this paper. The amendments to Rules 200 and 203 eliminated the grandfather clause exception to the "close out" requirement and eliminated the market maker exemption, in effect adding 'teeth' to the previous legislation. Fotak Raman and Yadav (2009) consider SHO's impact during the 2008 financial crisis and find that SHO was successful in curbing the impact of manipulative naked short selling, which complements our findings.

[21] On June 13, 2007 the SEC voted to eliminate the grandfather provision in Rule 203(b)(3)(i) so that all fail to deliver positions in threshold securities will have to be closed out within 13 consecutive settlement days.

5. Sample Data and Hypotheses

5.1. Sample Data from the Threshold List

The sample data consists of stocks traded on the NYSE, AMEX and NASDAQ markets, who appeared on the SHO Threshold List a minimum of 100 times between its inception on January 3, 2005 and February 20th, 2006 as reported by each market at the end of each trading day. This minimum is used to serve as a certifying mechanism for those companies with the most severe naked short problems and to eliminate those appearing on SHO due to temporary fluctuations or perhaps reasonable applications of the market maker exemption.

In addition, issues to be used in the study must meet the following criteria: (1) the issuing company is listed on the Center for Research in Securities Prices (CRSP) daily tape during this time, (2) necessary data are available for the pre-event date (date first appearing) and post-event date, (3) the issue has no known unusual trade issues, and (4) if the firm has multiple issues, only the common stock is included. There were 77 companies listed for the 100 days, of which 15 were excluded for one of the previously mentioned issued. This left 62 companies in the sample.

Other data includes:

- Daily closing prices and trading volumes for the previous 150 trading days as determined from the date the issue first appears on the Threshold List, to 100 days after the appearance on the Threshold List, taken from the NYSE TAQ database for all listed stocks, Bloomberg and www.yahoo.com or www.pinksheets.com for OTCBB stocks
- Total shares outstanding, from CRSP, Compustat, and Bloomberg
- Monthly short interest for listed shares, from NYSE, AMEX, and Nasdaq

5.2 Hypothesis Development

The first hypothesis addresses whether Regulation SHO impacts the trading of stocks with the most significant naked short positions. Extending Jarrows (1992) momentum effects we examine the trading of Threshold Securities in short time horizons. With our sample of issues characterized by persistent and

significant FTD's, we should find that an appearance on the SHO Threshold List results in negative holding period returns (if negative momentum is present) or whether Regulation SHO encourages traders to increase the buy side pressure to close out the short position.

Hypothesis 1: *An appearance on the Threshold List results in continued negative momentum effects for those issues with the most significant short positions.*

Next, as has been previously pointed out, Regulation SHO lacks enforcement provisions. We hypothesize that Regulation SHO has a minimal positive effect on market returns due to forced closing out of the existing short positions. The impact should be most noticed in the period immediately preceding the appearance on the Threshold List, and should result in changes to the bid/ask spread due to the serial covariance in the trade flow and reduced probability of reversal (Choi, Salandro, Shastri, 1988), buy side pressure and increased demand.

Hypothesis 2: *Increased buying due to the short covering brought about by the requirements of Regulation SHO positively impact the trading of the shares volume and negatively impact bid/ask spread.*

If an appearance on the Threshold List for Regulation SHO caused an alteration in the trading behavior, then the number of days listed on the Threshold List should be significant in impacting the abnormal returns of the stock. However, if investors are not constrained due to the lack of enforcement provisions and the grandfathering of pre-existing naked short positions, we would expect to see very little significance attached to appearance on the Threshold List.

Hypothesis 3: *The length of time a stock appears on the Threshold List will not be statistically significant due to lack of enforcement and the grandfather clause.*

Industry and market returns are known to be significant contributors to the returns of individual stocks. If appearing on the Threshold List impacts the trading of the affected issues, we would anticipate a decoupling temporarily or in part of this relationship. This suggests our fourth hypothesis:

Hypothesis 4: *Appearing on the Threshold List does not lessen correlation with market returns for securities listed on the Threshold List.*

We have shown market makers have an exemption from the locate requirement of Rule 203(b)(1), if they are engaged in bona fide market making activities. This exemption applies even when the trade involves naked short sales in a threshold security. This exemption allows market makers to short the underlying stock for the purpose of hedging net short positions in puts or net long positions in calls regardless of whether borrowable securities can be identified. We believe these short sales for hedging purposes are more likely to result in increased delivery failures.

Hypothesis 5: *The number of market makers trading in threshold securities will be statistically significant and negatively correlated to abnormal returns, both pre- and post-SHO.*

6. Regression Model and Tests of Hypotheses

6.1. Regression Model

The purpose behind implementing Regulation SHO was to identify the securities which were in an excessive fail-to-deliver position and provide a structure in which the fails could be reduced. While guidelines and timeframes were identified in the specifics of the Regulation, there were no penalties included. Therefore, to examine the efficacy of Regulation SHO in providing remedy for naked shorts, we perform panel regressions on variables which will identify variations in trading patterns or pricing.[22]

[22] We employ panel analysis, a firm fixed-effect model, in order to control for both time-series and cross-sectional variations. Also, the model can control for the effect of time-invariant heterogeneity.

The variables include length of appearance on SHO, trade volume, number of market makers trading the stocks, industry returns, holding period return, bid/ask spread and an event dummy representing pre-and post-SHO appearance.

This model examines daily data for the 150 days preceding the first appearance on SHO and the 100 day period during which the company appeared on the SHO list. The period -150 days through -1 days before the event date (first listing on the Threshold List) is used for the pre-event window and 0 to +100 is used for the post event window. Shorter windows including -100 to 100, -60 to 60, and -30 to 30 day windows are also used to determine consistency of results or detect shorter term responses of the market to appearances on the Threshold List.

To determine Regulation SHO's impact on the affected issues stock returns, trading volumes and bid/ask spreads after appearing on the Threshold List, the effects of appearance on the Threshold List and the number of days on the List are estimated from the fixed-effect model. Parameters are estimated by[23]:

$$Ret_{it} = a_{1i} + \beta_1 Threshold\ (or\ Days)_{it} + \beta_2 Shrout_{it} + \beta_3 Vol_{it} + \beta_4 IndRet_{it} + \beta_5 MMCount_{it} + \beta_6 BA_{it} + \varepsilon_{it}$$

$$Vol_{it} = b_i + \gamma_1 Threshold\ (or\ Days)_{it} + \gamma_2 Shrout_{it} + \gamma_3 Ret_{it} + \gamma_4 IndRet_{it} + \gamma_5 MMCount_{it} + \gamma_6 BA_{it} + \nu_{it}$$

$$BA_{it} = c_i + \rho_1 Threshold\ (or\ Days)_{it} + \rho_2 Shrout_{it} + \rho_3 Ret_{it} + \rho_4 Vol_{it} + \rho_5 IndRet_{it} + \rho_6 MMCount_{tit} + \omega_{it}$$

Where:

$Ret_{i,t}$ = the daily return on the stock *i* at time t,

Vol = the natural logarithm of the daily trading volume,

BA = the spread between the bid and the ask,

Threshold = a dummy variable which equals 1 if a firm appears on the Threshold list,

Days = the natural logarithm of the number of days the issue appears on the Threshold List,

[23] A series of regressions were attempted with the inclusion of short interest, in an effort to determine if we were capturing any effects of legal shorting. In the full model and the reduced equations, short interest (proxied by the short interest/float ratio) was insignificant to the independent variable (daily holding period return.) It was noticeably less significant than Turnover, EventDate, Industry Returns and slightly less than Market Maker Counts. In no regression was short interest significant at the 0.10 level.

Shrout = the natural logarithm of the outstanding shares of the stock,

IndRet = comparable industry returns as supplied by CRSP,

MMCount = the number of market makers trading the stock,

and a_i, b_i, c_i are firm-fixed effects.

We perform the regressions using various window periods including -150 to 100, -100 to 100, -60 to 60, and -30 to 30 day windows.

The descriptive statistics of the variables are listed on Table 2 with pre-SHO detailed in Panel A and post-SHO in Panel B. The most noticeable differences in the two portfolios involve the changes in the mean returns of the portfolios. In the post-SHO detail, the Return variable (RET) becomes more highly skewed to the right, while the median shifts more to the left, into negative territory.

(Insert Table 2)

In addition the post-SHO mean trading volume is decreased by nearly 22%, which is evidenced by Figure 3, showing a modest decline in the return.

The average returns both pre- and post-SHO are shown, and there is 1.2 basis points difference between the two. This provides additional evidence that SHO did not reduce the short position of the securities identified on the Threshold List due to a lower but barely discernable return in the post-SHO window. If the short positions were closed and the shares acquired for delivery, it is probable that there would have been significant gains in the post-SHO window stock price.

(Insert Figure 3)

6.2. Regression Results

Table 3 reports the returns to portfolios formed on the basis of event day. To create the table, we sort all Threshold List firms based on event day ranking then divide them into different portfolios based on number of days before or after the implementation of Regulation SHO (Pre-SHO and Post-SHO

periods) and based on the exchanges where the stocks are traded. Table values represent the average daily holding return for the period and for each exchange.

(Insert Table 3)

Several key results emerge from Table 3. First, higher volume was often associated with lower returns, usually negative returns post-SHO. This is seen in the consistently positive returns pre-SHO and consistently negative returns post-SHO. In the 100-day windows surrounding implementation, the pre-SHO portfolio experiences a 0.255 basis point spread compared to the post-SHO window in daily returns as compared to 0.11 basis point differential in the Industry Average returns over the same period. However, the volume was 125% higher post-SHO. The negative momentum was consistent for each 30-day period after implementation. However, the momentum pre-SHO was positive in all time periods and two out of three exchanges (only NYSE was negative pre-SHO). Thus the results for Hypothesis 1 are mixed. The post-SHO momentum was negative, as expected, but was not consistent with the pre-SHO momentum. This negative momentum may also be further explained by the number of affected companies (total listed on the Threshold List) as well as the length of time some remain on the List (though not necessarily consecutive days). There were, for example, more than 376 companies who appeared on the Threshold list for 100 days or more in its first two years of existence, as evidenced by Table 4.

(Insert Table 4)

(Insert Table 5)

The effects of appearance on the SHO list on stock returns, trading volume, and bid/ask spread are examined in Table 5 where we estimate the firm-fixed regressions. To determine consistency of empirical results, we perform regressions using four different time windows; -150 to 100, -100 to 100, -60 to 60, and -30 to 30. In Panel A, the coefficient of Threshold represents the difference in holding period returns between before and after appearing on the List. The holding period returns are significantly negative after a firm is listed on the Threshold List. The result is consistent with Hypothesis 1 which predicts continued negative momentum effects for issues with the significant short positions. IndRet is consistent and robust in significance in all regressions in the pre-SHO regression. The coefficient of

Threshold*IndRet represents the difference in the effect of industry average returns on holding period returns between before and after appearance on the Threshold List. Significance of the interaction variable in all four regressions represents that the correlation with market returns does not lessen but increases after appearing on the Threshold List. This result is consistent with our fourth hypothesis. If Regulation SHO was effective in eliminating the short positions, we would expect this relationship with market returns to be weakened, as the impact of the short covering was realized. Shares outstanding and the number of market makers are significant and negatively correlated in each regression which is consistent with our fifth hypothesis, while there was no discernable movement in the bid/ask spread and trading volume.

The effects of Regulation SHO on trading volume and the bid-ask spread are examined in Panel B and C. Again, in this fixed-effect analysis, the coefficient of Threshold represents the difference in trading volume (or the bid-ask spread) between before and after appearance on Threshold List. This represents a clear test of hypothesis two which anticipated an increase in the trading behavior and decrease in the bid/ask spread for stocks identified as Threshold Securities. In Panel B, the coefficients of Threshold are positive and significant in all regressions using four different time windows. The result suggests that the trading of shares/volume significantly increases after the shares are listed on the Threshold List, consistent with our second hypothesis. With more market makers, the trading volume significantly increases as suggested by the negative coefficients of MMCount, again consistent with our fifth hypothesis. The table also shows the negative correlation between the bid/ask spread and trading volume, while the effects of holding period returns are not significant on trading volume. The result in Panel C is also consistent with our second hypothesis. The significant and negative coefficient of Threshold suggests that after appearing on the List, the bid/ask spread significantly decreases. Again, trading volume is negatively correlated with the bid/ask spread, while holding period returns do not significantly affect the spread.

(Insert Table 6)

Due to the lack of enforcement provisions and the grand fathering of pre-existing naked short positions, the third hypothesis predicts he number of days listed on the Threshold List have insignificant effects on trading behaviors. To examine this hypothesis, we perform panel regressions where the key regressor is Days, defined as the natural logarithm of the number of days the issue appears on the Threshold List. The variable Days (of appearing on the Threshold List) was insignificantly correlated the holding period returns (Panel A), trading volume (Panel B), and the bid/ask spread (Panel C). The results suggest that there is no short covering, no closing out of the naked position and provides support for our third hypothesis, that the lack of enforcement provisions provided no incentive for the naked shorts to be covered. Some additional evidence in support of this is shown on Table 4, where there are over 300 companies that have been listed for over 100 days on the Threshold List since its inception. Most of these, have not been consecutive days, as in our study, but nevertheless supports the hypothesis that Regulation SHO (prior to the 2007 amendments) had little effect on the behavior of naked short sellers. This dovetails nicely into Fotak, Raman and Yadav (2009) who show that after the amendments, Regulation SHO did curb the impact of naked short selling.

The coefficients of control variables, for the most part, are correctly signed. As predicted by the fourth hypothesis, the market return, IndRet, is significant for all four windows in the holding period returns regressions in Panel A, Also, shares outstanding and the number of market makers are negatively correlated, which was anticipated, showing that lack of hypothecable securities creates demand for naked shorting. In Panel B and C, the relation between the bid/ask spread and trading volume is significantly negative, consistent with our prior findings in Table 5

(Insert Figure 4)

Figure 4 shows a comparison of the mean returns on all stocks over the 150-day period before appearing on the Threshold List and the mean returns of all stocks for 100 days after listing – the event days in the study. Again the data is standardized and a 25-day moving average is included. This graphical representation of the effects of volume on returns, both pre- and post-SHO shows that there may

be some modest volume effects due to appearing on the Threshold List. It appears there is a modest but erratic downward trend leading to day 0 and moderation in the volume after the event day 0 when the full period of 150 days before SHO is compared to the period of 100 days after SHO. Regulation SHO appears to depress volume and trading effects.

There are some other interesting results when the analysis is conducted for both pre- and post-SHO, the parameter for the number of market makers dealing in the issue is negative and loses its significance for regressions for the smaller, less stringently regulated NASDAQ markets. This would indicate that market makers who have naked shorted the stocks have slowed their activity, but apparently have not begun to cover or institute actions that would reduce the naked short position. The Days Listed (on the Threshold List) is not significant in any post-SHO regression, indicating there is not covering activity after the 13-day mandatory closeout period has passed.

In addition, the outstanding number of shares is significant in both regressions and is negatively signed, indicating the larger the float, the greater the reduction in returns for the stock. This provides evidence that the event date of appearing on SHO is not significant to the market in altering how it trades the stock and doesn't appear to affect the continuing activity of shorting the stocks or reducing the short position by traders or market makers.

This effect, or the lack thereof, is further examined in reduced models. In Table 5, Panels A through D give results of a regression on Returns on the various individual markets and a window of 150 days prior to appearing on the Threshold List and 100 days after. Shares Outstanding is negatively signed and significant in the pre-SHO period for the AMEX and NASDAQ, but insignificant in the post-SHO period for all exchanges. Market Maker Count and Bid/Ask are largely insignificant in all regressions except the NASDAQ in the pre-SHO period. In the same regression, the Days Listed on SHO as well as EventDate are insignificant within all regressions again supporting the hypothesis that there is no discernable evidence of covering after an appearance on the Threshold List.

Figure 5 examines the effects of Regulation SHO on the market makers, who again have no restrictions on naked short selling for their accounts. The data used to examine their trading patterns was

the spread between the bid and ask prices which served as a proxy for indicating short covering by the market makers. Taking the difference between the two was for the purpose of examining any noticeable tightening of the spread (indicating a cover) or if trading in these issues by the market makers was affected by the appearance on SHO. Figure 3 graphically demonstrates that there is little if any change, and none significant as shown in the full regression model post-SHO.

(Insert Figure 5)

7. The Fama-French-Carhart Four Factor Model

Based on Fama-French (1993) model and Carhart's (1997) contribution of the momentum factor the abnormal returns are estimated using the four factor model (denoted FFC), based on daily factors. Fama (1998) posited that small firms are the most susceptible to the mis-specified model problem. Since our sample is heavily weighted with smaller, lower cap, thinly traded firms than studies using just NYSE or AMEX firms, empirical results based on an equal weighting are potentially more likely to be driven by a misspecified model. Fama argues that value weighting produces results more representative of abnormal performance and reduces model misspecification. Therefore, we apply the Fama-French-Carhart model using both weighting approaches. The model is:

$$R_{s,t} - R_{f,t} = \alpha_s + \beta_{1,s}(R_{m,t} - R_{f,t}) + \beta_{2,s}(SMB_t) + \beta_{3,s}(HML_t) + \beta_{4,s}(UMD_t) + e_{s,t}$$

where:

α_s = mean monthly abnormal return of the calendar time portfolio s,

$R_{s,t}$ = the calendar time portfolio of securities which have been naked shorted at time t,

$R_{f,t}$ = the return at time t of the one-month Treasury bill,

$(R_{m,t} - R_{f,t})$ = market risk premium, difference between return of the market and the risk-free rate,

$\mathbf{SMB_t}$ = the difference in returns between the value-weighted portfolios (or equal weighted portfolios) of small and big firm stocks,

$\mathbf{HML_t}$ = the difference in returns between the value-weighted portfolios (or equal weighted portfolios) of high and low book-to-market stocks,

$\mathbf{UMD_t}$ = the difference in returns of value-weighted (or equal weighted) portfolios of firms with high and low prior momentum (or up minus down).

The tests involve comparisons between the abnormal returns of a calendar time portfolio of those stocks that appear on the SHO Threshold List (those that are naked shorted in the extreme), which serves as the dependent variable and the explanatory factors proposed by Fama, French and Carhart. The explanatory factors are the returns of the excess market factor, the small firm less the big firm capitalization factor and the high less the low book-to-market factor. The test statistic calculated is the OLS test of the null hypothesis that the intercept is zero.

Since the true abnormal return model is unknown and the sample size is small, additional methods are employed to establish robustness. Specifically we use the Rank Z test and an additional non-parametric test - the generalized sign test. The Rank Z Test was introduced by Corrado (1989). It is a test which examines whether there is a greater probability for positive (negative) abnormal returns existing, subject to the testing sample. It relies on a comparison of positive to negative returns. If the Mean Cumulative Abnormal Return shows a significant negative drift, then it is interpreted as a lack of impact on the naked shorting position effected by Regulation SHO.

The generalized sign test adjusts for the fraction of positive abnormal returns in the estimation period instead of assuming 0.5 as suggested by Corrado (1989) and Campbell and Wasley (1993) when they suggested that the nonparametric rank test provides a more reliable inferences than do the standard parametric tests. Campbell and Wasley (1993) found the rank statistic to be "consistently the best specified and most powerful test statistic" and recommended its use in conjunction with market model abnormal returns based on equal-weighted NASDAQ market index and securities.

In examining the results of the FFC regressions, they are found to be consistent with the panel analysis as well as consistent with the non-parametric tests. As posited by the hypothesis, there is little support for the notion that an extended appearance on the SHO Threshold List for any of the issues had a significant impact on their trading over the 100-day post-SHO window. The regressions and non-parametric tests offer no evidence the naked short position was reduced or eliminated. The results are shown in Table 7, Panels A and B.

(Insert Table 7)

In both the equally-weighted models and the value-weighted model, the mean CAR on the stocks was positive in the 30-and 60-day periods prior to the first issuance of the Threshold List. This could be the result of some covering in anticipation of the new Regulation, and uncertainty as to how it would be enforced. However, only the 60-day period before listing was significant at the 0.1 level.

In contrast, the 30- and 60-day periods after the first appearance on the Threshold List resulted in a negatively signed CAR in both models and these results were significant at the 0.01 level for the value weighted portfolio. Both the sign test and Rank Z test confirm these results. The Z-test signs are negative for every result in the post-SHO models. This is strong evidence that in the 30- and 60-day periods after appearing on the Threshold List, these severely shorted stocks experience significant negative cumulative abnormal returns.

The equally-weighted portfolio has mean returns of -15.13 percent at 30 days, -13.21 percent at 60-days and while the value-weighted portfolio has mean returns of -19.02 and -21.85 percent, respectively. Most are significant at the 0.01 level.

It is possible that an appearance on the Threshold List could signal a buying strategy to investors. In both the FFC Time-Series models, the negatively signed CAR persists throughout all time periods for the securities after appearing on the Threshold List. For both the equal-weighted and for the value-weighted portfolios, the negative CARs are significant and remain strongly negative or even continue to grow in magnitude over time, suggesting the mean returns continue to be negative up through 100 days after appearing on the List. The equally weighted return for 100-day post-SHO period is -15.41%, while the value weighted return is -25.03%. This is significant at the 0.10 level for the equally weighted portfolio and at the 0.01 level for the value-weighted portfolio. Based on the evidence of this study, there is evidence that investors should seek a short position on the securities when they first appear on the Threshold List and would obtain significant returns.

8. Conclusions

This paper offers significant evidence that Regulation SHO does not positively impact the short position of stocks which qualify for the Threshold List due to naked shorting. There is evidence that the naked short continues to exist and in fact even increases over the time of the study.

In every regression form, every parametric and non-parametric test, the effects of appearing on the Threshold List under Regulation SHO, were at best insignificant and at worst resulted in a continuation of negative returns for the securities listed. If Regulation SHO were to have an impact on the patterns or activities of traders and market makers, its effect should be evident within a relatively short period of time (within the 30 to 60 day window, taking into consideration the 13-day notification period that the brokers are to inform the sellers that are failing to deliver that they must stop and must cover the existing short) and show significance in strengthening the buying pressure. However, contrary to expectations, the post-SHO signs of the parameters are largely negative (including the number shares outstanding and the market maker effects) or consistent with pre-SHO patterns in the initial panel regression. Most telling is the negative sign for the number of market makers post-SHO. An increase in the number of market makers trading a stock continues to bode poorly for the possibility of reversion of the stock's price due to any potential covering activity.

The Fama-French-Carhart model offers very significant evidence that the short position in the securities increases, resulting in larger negative CAR for the securities from the date of listing on the Threshold List. Despite Regulation SHO's stated intention of attempting to curtail the naked shorting position, there is evidence that the opposite occurs and that the negative returns are persistent throughout the 100-day window, but particularly in the 30-and 60-day event windows there is opportunity to earn abnormal profits.

In summary, there is significant evidence that Regulation SHO has been ineffective at reducing the naked short positions of the Threshold List stocks and that appearing on the Threshold List has negative consequences for stock price returns. There is evidence that naked shorting, despite being exposed to the market by Regulation SHO, still occurs and may be even increasing in selected issues.

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Table 1

Stock and Short Sale Delivery Requirements, Pre- and Post-Regulation SHO

This table details the requirements imposed by Regulation SHO and compares them to prior regulations. SHO's stated goal was to "establish uniform locate and close-out requirements in order to address problems associated with failures to deliver, including potentially abusive naked short selling."[24] Regulation SHO has affected some of the delivery and settlement requirements of stocks, most notably the close out and buy-in provisions. Regulation SHO applies only to listed stocks.

	Pre-SHO	***Post-SHO***
Threshold Security	There was no mechanism for identifying securities with excessive naked short positions.	Threshold securities are equity securities that have an aggregate fail to deliver position for: • five consecutive settlement days at a registered clearing agency (*e.g.*, National Securities Clearing Corporation (NSCC));15 • totaling 10,000 shares or more; and • equal to at least 0.5% of the issuer's total shares outstanding.
Marking Requirements	SRO's and Brokers were not required to mark sales of equity securities by type of sale.	Established uniform order marking requirements for sales of all equity securities. This means that orders placed with a broker-dealer must be marked "long," "short," or "short exempt." The sale could be marked "short exempt" if the seller is entitled to rely on an exception from the tick test of Rule 10a-1, or the price test of an exchange or national securities association. Short sales of pilot securities effected during the pilot should be marked "short exempt."

[24] http://www.sec.gov/spotlight/keyregshoissues.htm

Stock Locate Requirements	Prior to execution of the short-sale borrowable securities must be located but are not required to be borrowed. Exempt from requirements: • Options Market makers • Stock Market Makers • Hedgers • Arbitrageurs	Prior to execution of the short-sale borrowable securities must be located. Borrowing is not required. Market Makers are exempt.
Forced Buy-ins	Broker for the buyer may request buy-in from seller thru the NSCC.	Regulation SHO did not require forced buy-ins. There was no change in the policy.
Mandatory Close-outs	NASDAQ stocks with a fail-to-deliver position of at least 0.5% of the issuer shares outstanding and at least 10,000 shares, any positions which have failed for at least 10 days are required to be closed out. Exempt from requirements: • Options Market makers • Stock Market Makers • Hedgers • Arbitrageurs	For issues with fails of at least 0.5% of shares and 10,000 share for 5 consecutive days (the Threshold List requirements), positions that have failed for at least 13 days must be closed out. Exempt from requirements: • Grandfathered shorts New positions created by options market makers as hedges for pre-existing option positions. There is no time limit or requirement that the position be closed when the contract expires.
Other Requirements	NASD regulations restrict further short sales by sellers which have fail-to-deliver positions in a threshold security for at least 60 days.	Short sellers with fails of at least 10 days in Threshold List stocks cannot make additional short sales until the fail-to-deliver position is closed.

Table 2

Descriptive Statistics

This table presents summary statistics for the regression variables in the analysis of the efficacy of Regulation SHO. The sample is based on common stocks, listed on the NYSE, AMEX and NASDAQ, which appeared on the Regulation SHO Threshold List in the period beginning with its introduction on January 13, 2005 through February 20, 2006. The initial analysis evaluates the impact of the shares outstanding (SHROUT), the holding period return (Ret – scaled to basis points), EventDate (window, pre- and post-SHO), Number of Trades (NumberOfTrades), bid-ask spread (ba), Days Listed (on the Threshold List, 100 days was the minimum used in the study), value weighted returns (VWRETD), equal weighted returns (EWRETD) and return on S&P Composite Index (SPRTRN).

Panel A – Pre-SHO Variables

Variable	N	Mean	Median	Std Dev	Max	Min	Skewness
SHROUT	12,037	38,597	16,115	73,408	534,307	778	4.6943
RET	12,022	0.00173	0.0	0.06686	2.209	-0.667	7.344
EventDate	12,037	-119.112	-116.00	71.423	-1	-250	-0.10629
Vol	12,037	1,282,904	228,700	3,651,025	93,997,648	0	8.246
NumberOfTrade	12,307	1,706	12.00	7,229.85	209,222	0	11.0999
Ba	12,037	0.0662	0.03	0.104	1.74	-0.61	4.639
Days Listed	12,022	164.919	143	62.275	281	100	0.7384
VWRETD	12,037	0.00059	0.00082	0.00697	0.01786	-0.01596	-0.1747
EWRETD	12,037	0.000594	0.00155	0.00701	0.0163	-0.02124	-0.5143
IndRet	12,307	0.000594	0.001555	0.007015	0.01634	-0.02124	-0.5143
SPRTRN	12,037	0.000265	0.0005389	0.00689	0.01974	-0.01672	-0.0688

Panel B – Post-SHO Variables

Variable	N	Mean	Median	Std Dev	Max	Min	Skewness
SHROUT	5,538	36,785	16,684	74,882	538,017	778	5.5364
RET	5,538	0.000762	-0.00188	0.0681	3.125	-0.3757	19.1116
EventDate	5,538	49.85	50	29.084	100	0	0.00169
Vol	5,538	1,003,056	285,443	3,108,408	70,188,808	0	10.763
NumberOfTrade	5,538	1,483	104	6487.43	214,426	0	17.5053
Ba	5,538	0.0625	0.03	0.108	1.40	-0.35	5.4524
Days Listed	5,538	160.87	143	60.191	281	100	0.8812
VWRETD	5,538	0.000381	0.00087	0.00665	0.01786	-0.01678	-0.0996
EWRETD	5,538	0.000288	0.00792	0.00597	0.01298	-0.01645	-0.1737
IndRet	5,538	0.000288	0.000792	0.00597	0.01298	-0.01645	-0.17365
SPRTRN	5,538	0.000212	0.000699	0.00680	0.01974	-0.01672	-0.0724

Table 3

Returns on Portfolios: Price Momentum and Volume

This table present sub-sample results with portfolios constructed from Threshold List securities based on EventDay and Exchange for 16 price momentum and volume portfolios. The returns are based on daily holding period returns for the sample period/exchange. The periods for pre and post are based on the securities appearance on the Threshold List established by Regulation SHO. All securities from various exchanges are aggregated unless otherwise specified. A t-test based on differences in returns with unequal samples is calculated. All returns are stated in basis points. The symbols ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

	Mean Return	Std Deviation	Median	Volume	t-statistic		Industry Average
Average Pre-SHO Rtn:	0.119	5.950		1,094,983			0.059
Average Post-SHO Rtn:	-0.002	5.123		1,419,044			0.029
Pre–100 days	0.253	6.351	0.000	1,130,152	1.2946	**	0.139
Post-100 days	-0.002	5.123	0.000	1,419,044	0.0000		0.029
Pre-60 days	0.283	6.809	0.000	1,153,383	1.2368		0.121
Post-60 days	-0.020	5.233	-0.0233	1,146,924	-0.1596		0.010
Pre-30 days	0.041	6.243	-0.154	1,074,533	-0.4742		0.053
Post-30 days	-0.016	0.316	-0.189	1,274,232	-0.0979		0.042
Pre-31 to -60 days	0.526	7.329	0.000	1,232,730	2.9785	***	0.190
Pre-61 to -90 days	0.181	5.723	0.000	1,140,003	0.3978		0.142
Post-61 to -90 days	-0.074	4.914	-0.226	760,359	-0.5162		0.021
Post-31 to -60 days	-0.024	5.225	-0.283	1,019,462	-0.1517		-0.022
NasPreSHO	0.188	6.500	-0.055	1,290,698	1.0260		0.058
NasPostSHO	0.011	5.410	-0.294	873,211	0.2300		0.034
AmexPreSHO	0.122	6.620	0.000	563,423	0.0420		0.068
AmexPostSHO	0.012	5.169	0.000	266,177	0.2450		0.027
NysePreSHO	-0.030	3.669	-0.035	1,873,758	-2.8270	***	0.054
NysePostSHO	-0.048	4.222	0.000	2,006,566	-0.9300		0.017

Table 4

SHO Regulars

This table provides data on the persistency of companies on the Threshold List. Since enacted, over 4,500 companies have appeared on the Threshold List. A recent report by the Office of Economic Analysis (Fails to Deliver, August 21, 2006), indicated that 6,223 issues have graduated from the Threshold List, signifying that many have made repeat appearances. Regulation SHO requires forced close out and mandatory close out of positions if naked shorts in Threshold List companies extend beyond 13 days after initially qualifying for the Threshold List. This table is a summation of the number of companies that have resided on the Threshold List since its inception in January, 2005. The data for this table was taken from data provided by Buyins.net and is through February 22, 2007.

Minimum # of Days on Threshold List	***# of Companies***
At least 13	2735
At least 25	1735
At least 50	938
At least 100	376
At least 200	83
At least 300	24

Table 5

Regression Results: Appearance on the Threshold List and Trading Behavior

Results of separate regressions on 62 stocks, with portfolios formed in (-150, 100), (-100, 100), (-60,60) and (-30,30) day event windows. The event day is the first appearance on Regulation SHO's Threshold List. In Panel A, the dependent variable is Ret (holding period returns), while it is Vol (the natural logarithm of trading volume) and BA (the bid/ask spread) in Panel B and Panel C, respectively. The key independent variable is Threshold, a dummy variable equal to 1 if a firm appears on the Threshold list. Other control variables include Shrout (the natural logarithm of total outstanding on day of first appearance on the Threshold List), IndRet (industry returns as supplied by CRSP), MMCount (number of market makers registered to make a market in the stock). The estimated model is the firm fixed effect regressions, discussed in Section 6.1. The t-statistics based on robust standard errors are in parentheses. The symbols ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Effect of an Appearance on the Threshold List on Holding Period Returns

	Ret, holding period returns during			
Variable	-150 to150	-100 to 100	60 to 60	30 to 30
Threshold	-0.05766**	-0.02683***	-0.02896***	-0.03598***
	(-2.28)	(-3.12)	(-2.94)	(-2.89)
*IndRet*Threshold*	0.87522***	0.98530***	0.88931***	(0.6533)***
	(3.01)	(2.98)	(2.73)	(3.11)
IndRet	5.79366**	3.70099***	2.94710**	1.85528**
	(2.43)	(2.6)	(2.07)	(2.09)
Shrout	-0.00189***	-0.00273***	-0.00294**	-0.00138
	(-3.01)	(-3.76)	(-2.65)	(-0.95)
Vol	0.00091*	0.00143**	0.00134	0.00058
	(1.87)	(2.48)	(1.43)	(0.47)
MMCount	-0.00007*	-0.00009**	-0.00016**	-0.00017*
	(-1.99)	(-2.17)	(-2.42)	(-1.85)
BA	0.00803	0.01669	0.01266	0.02100
	(0.8)	(1.43)	(0.74)	(0.89)
NYSE dummy	-0.00221	-0.00298	-0.00506	-0.00695
	(-1.3)	(-1.52)	(-1.56)	(-1.58)
Alpha	0.00898	0.02914***	0.03469**	0.03036
	(1.29)	(3.04)	(2.43)	(1.61)
F-test	5.65	5.27	4.82	2.73
P-value	0.000	0.000	0.000	0.000
R^2	0.0209	0.0284	0.0203	0.007

Table 5 con't

Regression Results: Appearance on the Threshold List and Trading Behavior

Panel B: Effect of an Appearance on the Threshold List on Trading Volume

	Vol, the natural logarithm of average volume during			
Variable	-150 to150	-100 to 100	60 to 60	30 to 30
Threshold	1.83747**	2.82194**	3.68068**	3.83458*
	(1.98)	(2.27)	(2.01)	(1.76)
Shrout	0.65876***	0.68732***	0.54879***	0.42715**
	(3.79)	(4.08)	(3.38)	(2.66)
Ret	76.33880*	80.58420**	31.07110	8.01721
	(1.87)	(2.48)	(1.43)	(0.47)
IndRet	-33.98410	86.97120	36.27980	16.23300
	(-0.48)	(1.54)	(0.9)	(0.64)
MMCount	0.03679***	0.03492***	0.03787***	0.03698***
	(3.98)	(4.04)	(3.99)	(3.77)
BA	-9.33621***	-10.05814***	-9.41397***	-10.16578***
	(-3.59)	(-4.16)	(-4.24)	(-4.31)
NYSE dummy	1.34256***	1.31844***	1.42021***	1.37664***
	(2.9)	(3.03)	(3.07)	(2.8)
Alpha	4.79711**	1.98472	4.44220**	5.93515***
	(2.48)	(0.8)	(2.01)	(2.81)
F-test	14.58	15.09	13.62	12.31
P-value	0.000	0.000	0.000	0.000
R^2	0.0671	0.0339	0.0972	13.97

Table 5 con't

Regression Results: Appearance on the Threshold List and Trading Behavior

Panel C: Effect of an Appearance on the Threshold List on the Bid/Ask Spread

	BA, Bid/Ask Spread during			
Variable	-150 to150	-100 to 100	60 to 60	30 to 30
Threshold	-0.14669 **	-0.29094 ***	-0.34255 ***	-0.34263 ***
	(-1.99)	(-2.71)	(-2.8)	(-2.67)
Shrout	-0.01154	-0.00171	-0.00395	-0.00680
	(-1.19)	(-0.17)	(-0.39)	(-0.76)
Ret	1.66792	2.49284	0.91497	0.79677
	(0.8)	(1.43)	(0.74)	(0.89)
Vol	-0.02308 ***	-0.02674 ***	-0.02942 ***	-0.02783 ***
	(-3.59)	(-4.16)	(-4.24)	(-4.31)
IndRet	39.37188	58.80058 **	54.37650 **	21.71295 *
	(1.09)	(2.12)	(2.44)	(1.76)
MMCount	0.00074	0.00068	0.00078	0.00078
	(1.42)	(1.35)	(1.29)	(1.36)
NYSE dummy	0.06618 ***	0.05681 **	0.05999 **	0.05840 **
	(2.87)	(2.46)	(2.22)	(2.21)
Alpha	0.34368 ***	0.18295	0.22888 *	0.26479 **
	(3.86)	(1.46)	(1.84)	(2.34)
F-test	6.85	7.48	7.35	7.13
P-value	0.000	0.000	0.000	0.000
R^2	0.033	0.017	0.014	0.0061

Table 6

Regression Results: Length of Time on the Threshold List and Trading Behavior

Results of separate regressions on 62 stocks, with portfolios formed in (-150, 100), (-100, 100), (-60,60) and (-30,30) day event windows. The event day is the first appearance on Regulation SHO's Threshold List. In Panel A, the dependent variable is Ret (holding period returns), while it is Vol (the natural logarithm of trading volume) and BA (the bid/ask spread) in Panel B and Panel C, respectively. The key independent variable is Days, the natural logarithm of the number of days the issue appears on the Threshold List. Other control variables include Shrout (the natural logarithm of total outstanding on day of first appearance on the Threshold List), IndRet (industry returns as supplied by CRSP), MMCount (number of market makers registered to make a market in the stock). The estimated model is the firm fixed effect regressions, discussed in Section 6.1. The t-statistics based on robust standard errors are in parentheses. The symbols ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Effect of Length of Time on the Threshold List on Holding Period Returns

	Ret, holding period returns during			
Variable	-150 to150	-100 to 100	60 to 60	30 to 30
Threshold Days	-0.00022	-0.00172	-0.00510	-0.00312
	(-0.14)	(-0.92)	(-1.62)	(-0.79)
Shrout	-0.00092***	-0.00042***	-0.00034***	-0.00098***
	(-3.33)	(-3.89)	(-3.25)	(-2.88)
Vol	0.00092	0.00116*	0.00128	0.00022
	(1.94)	(2.11)	(1.4)	(0.19)
IndRet	5.73979**	3.70624**	3.47865**	2.67892***
	(2.19)	(2.33)	(2.53)	(2.69)
MMCount	-0.00007**	-0.00008**	-0.00015**	-0.00013**
	(-2.16)	(-2.26)	(-2.38)	(-2.05)
BA	0.00659	0.00785	0.00247	-0.00667
	(0.71)	(0.76)	(0.16)	(-0.33)
NYSE dummy	-0.00245	-0.00355*	-0.00504*	-0.00415
	(-1.6)	(-2.03)	(-1.71)	(-1.06)
Alpha	-0.00221	-0.00152	0.01580	0.02499
	(-0.21)	(-0.13)	(0.83)	(1.01)
F-test	4.3	3.78	3.86	4.38
P-value	0.00	0.00	0.00	0.00
R^2	0.033	.0311	0.0251	0.0226

Table 6 con't

Regression Results: Length of Time on the Threshold List and Trading Behavior

Panel B: Effect of Length of Time on the Threshold List on Trading Volume

	Vol, the natural logarithm of average volume during			
Variable	-150 to150	-100 to 100	-60 to 60	-30 to 30
Threshold Days	0.49488	0.84375	0.94221	0.67694
	(0.96)	(1.57)	(1.64)	(1.19)
Shrout	0.54115 **	0.38241 ***	0.38115 ***	0.29334 **
	(2.52)	(2.84)	(2.85)	(2.33)
Ret	107.44250 *	99.24102 **	42.61874	4.67214
	(1.94)	(2.11)	(1.4)	(0.19)
IndRet	-41.11600	-24.88470	-50.02720	-30.63356
	(-1.33)	(-1.35)	(-1.08)	(-0.27)
MMCount	0.03049 ***	0.02995 ***	0.03218 ***	0.03206 ***
	(2.95)	(3)	(2.97)	(2.91)
BA	-8.62480 ***	-8.21543 ***	-7.66800 ***	-9.01124 ***
	(-3.08)	(-3.07)	(-3.17)	(-3.53)
NYSE dummy	0.92136 *	1.07476 **	1.03523 *	0.96875 *
	(1.78)	(2.11)	(1.94)	(1.74)
Alpha	5.11530	4.91764	4.13360	6.28227
	(1.5)	(1.5)	(1.21)	(1.8)
F-test	10.65	10.59	10.19	8.57
P-value	0.00	0.00	0.00	0.00
R^2	0.1368	0.0243	0.0681	0.368

Table 6 con't

Regression Results: Length of Time on the Threshold List and Trading Behavior

Panel C: Effect of Length of Time on the Threshold List on the Bid/Ask Spread

	BA, bid/Ask Spread during			
Variable	-150 to150	-100 to 100	-60 to 60	-30 to 30
Threshold Days	0.00279	-0.00709	-0.00698	0.00276
	(0.1)	-(0.23)	-(0.19)	(0.08)
Shrout	-0.02269 *	-0.01865	-0.01901	-0.02002
	-(1.88)	-(1.56)	-(1.46)	-(1.61)
Ret	2.24766	2.15486	0.31986	-0.46993
	(0.71)	(0.76)	(0.16)	-(0.33)
Vol	-0.02531 ***	-0.02647 ***	-0.02979 ***	-0.02981 ***
	-(3.08)	-(3.07)	-(3.17)	-(3.53)
IndRet	32.64908	30.67831	43.43318	20.88490
	(0.63)	(0.77)	(1.38)	(1.24)
MMCount	0.00100	0.00095	0.00108	0.00097
	(1.65)	(1.54)	(1.47)	(1.4)
NYSE dummy	0.06571 **	0.06301 **	0.06460 *	0.05779 *
	(2.42)	(2.19)	(1.94)	(1.81)
Alpha	0.53900 ***	0.55971 ***	0.60490 ***	0.58958 ***
	(3.22)	(3.36)	(3.16)	(3.19)
F-test	5.68	5.45	5.48	5.3
P-value	0.00	0.00	0.00	0.00
R^2	0.083	0.089	0.092	0.077

Table 7

Fama-French-Carhart Model

This table gives the results of a Fama-French-Carhart regression on the companies listed on the Threshold List for more than 100 days. The factors are: SMB (Small Minus Big) is the average return on the three small portfolios minus the average return on the three big portfolios, HML (High Minus Low) is the average return on the two value portfolios minus the average return on the two growth portfolios, R_m-R_f, the excess return on the market, is the value-weight return on all NYSE, AMEX, and NASDAQ stocks (from CRSP) minus the one-month Treasury bill rate (from Ibbotson Associates) and the Carhart Momentum factor - Mom - the average return on the two high prior return portfolios minus the average return on the two low prior return portfolios. The regressions are segmented by period, with the centering event date being the day of first appearance on the Threshold List. There are 17,575 observations based on 79 qualifying issues. The symbols ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A

Fama-French-Momentum Time-Series Model, Equally Weighted Index

Days	*N*	*Mean Cumulative Abnormal Return*	*Positive: Negative*	*Portfolio Time Series (CDA) t*	*Rank Z Test*	
(-30,-1)	62	5.01%	28:34	1.224		-0.077
(-60,-1)	62	11.08%	28:34	1.914	*	-0.151
(0,+29)	62	-15.13%	21:41	-3.694	***	-3.338
(0,+59)	62	-13.21%	28:34	-2.3	*	-2.866
(-150,-1)	62	-3.73%	30:32	-0.408		-0.734
(0,+100)	62	-15.41%	28:34	-2.051	*	-2.201

Panel B

Fama-French-Momentum Time-Series Model, Value Weighted Index

Days	*N*	*Mean Cumulative Abnormal Return*	*Positive: Negative*	*Portfolio Time Series (CDA) t*		*Rank Z Test*
(-30,-1)	62	5.01%	27:35	1.189		0.229
(-60,-1)	62	12.20%	28:34	2.048	*	0.511
(0,+29)	62	-19.02%	17:45	-4.512	***	-4.034
(0,+59)	62	-21.85%	18:44	-3.697	***	-4.326
(-150,-1)	62	-8.76%	26:36	-0.929		-0.842
(0,+100)	62	-25.03%	23:39	-3.238	***	-3.335

Figure 1

Total Share Fails versus Days after SHO

Standardized volume reported by the New York Stock Exchange (NYSE) for fails-to-deliver after implementation of Regulation SHO on January 3, 2005 through May 31, 2006. This is the total daily volume of reported FTD by the NYSE for member firms; it does not include ex-clearing fail-to-delivers. A 25-day moving average trendline is shown.

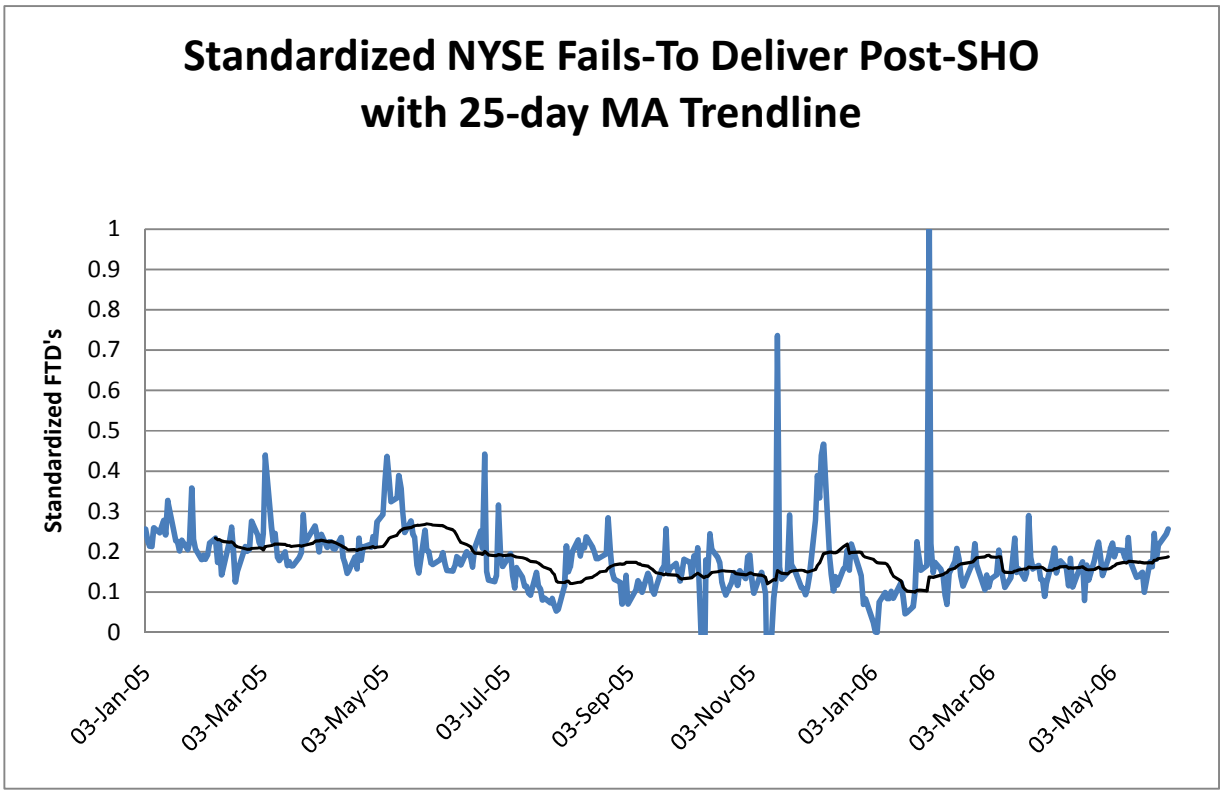

Figure 2

Total Issues with Fails after SHO

Standardized volume for the number of companies with fails-to-deliver as reported by the NYSE, after implementation of Regulation SHO on January 3, 2005 through May 31, 2006. This is the total daily volume of reported by the NYSE for member firms; it does not include ex-clearing (intra-broker) fail-to-delivers. This graph includes a 25-day moving average trendline.

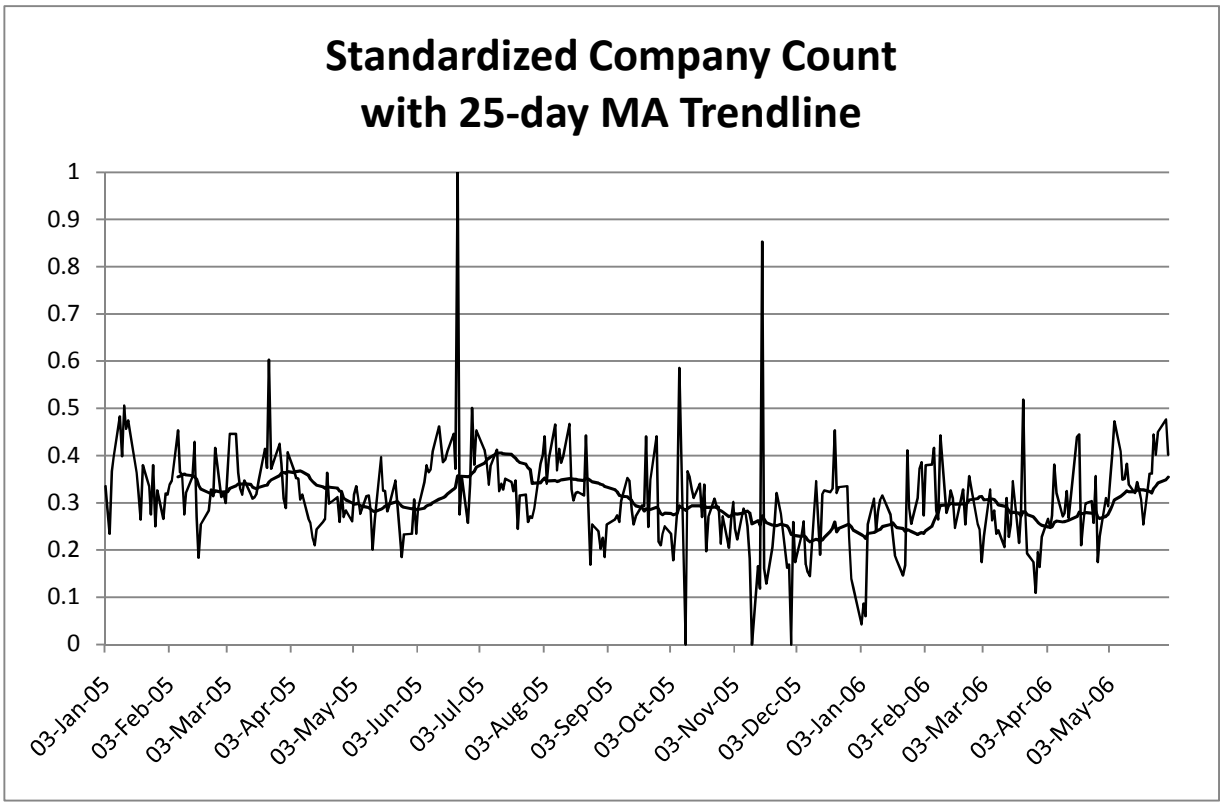

Figure 3

Return versus Event Dummy

The mean returns experienced by securities listed on the Threshold List in the pre- and post-SHO listing windows. This includes issues listed on the NYSE, AMEX and NASDAQ and appearing on the Threshold List a minimum of 100-days. Event Dummy 1 consists of a portfolio Threshold List securities mean daily returns for the 150-day window before first appearing on the Threshold List. Event Dummy 2 shows the mean daily returns for the 100-day period after the first appearance on the Threshold List.

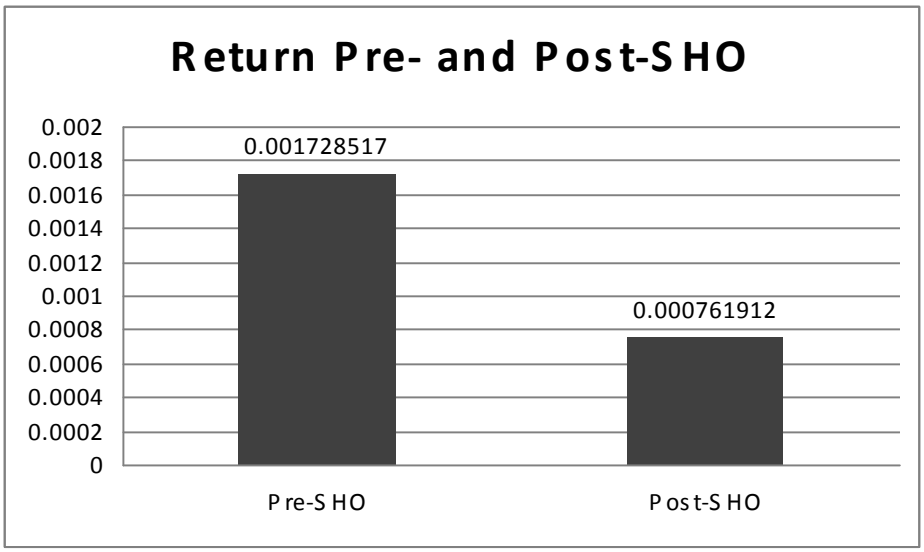

Figure 4

Total Share Volume versus Event Days

Standardized, scale invariant volume trends of the selected securities in the 150 days before implementation of Regulation SHO through the 100 Day window after implementation of Regulation SHO requirements or appearance on the Threshold List. This is the total daily volume of the stocks used in the full regression, including those issues from the NYSE, AMEX and NASDAQ which appeared on the Threshold List and remained for at least 100 days. A 25-day moving average trendline is shown.

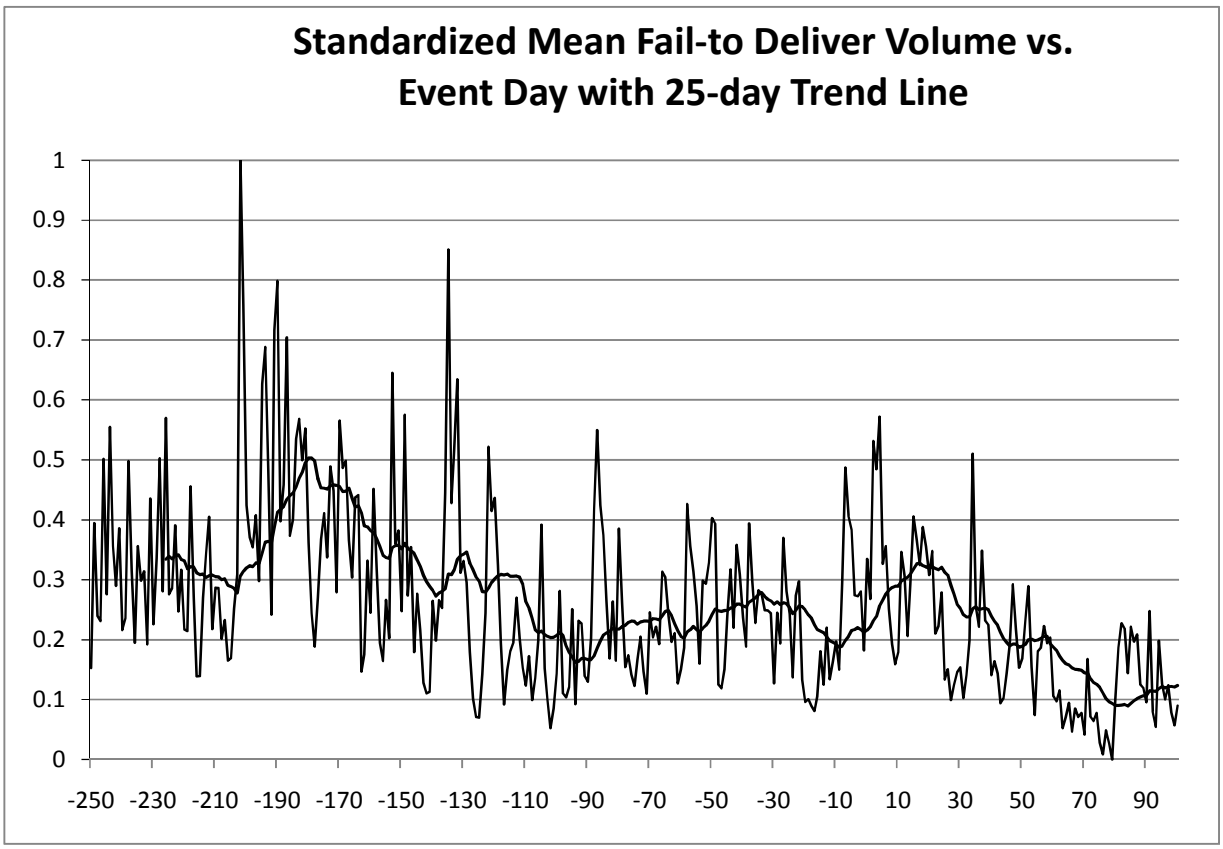

Figure 5

Bid Ask Spread versus Event Days

A standardized graphic analysis of the mean daily Bid/Ask spread for Threshold Securities over the event windows, both pre- and post-SHO listing. This includes those issues from the NYSE, AMEX and NASDAQ which appeared on the Threshold List and remained for at least 100 days. A 25-day moving average trendline is shown.