

The Effect of the Uptick Rule on Spreads, Depths, and Short Sale Prices

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Abstract

We examine the effects of the uptick rule on the quoting and trading of NYSE-listed stocks, and find that the uptick rule increases liquidity by decreasing quoted spreads and increasing ask depths. We also find that when the rule is suspended, those short sell orders that are executed take place at a price that is, on average, above the quote midpoint.

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Short selling is quite common on the NYSE. Alexander and Peterson [2007] report that short selling makes up about 27% of the trading volume for a sample of NYSE stocks during 2005. This level of shorting activity is significant, given the various impediments to short selling, such as margin requirements and prohibitive stock lending rates.

Under examination by U. S. regulators is a third short selling impediment known as the uptick rule or, more formally, as Rule 10a-1. This rule prohibits short selling of exchange-listed stocks into a declining market. Specifically, short sales are allowed to occur only on an uptick or a zero-uptick. This means that a short sale cannot be executed at a price lower than the transaction price of the previous trade, and can only be executed at the same price as the previous trade if, going backwards in time, the first trade at a different price was at a lower price. The purpose of this paper is to illustrate the effect of the uptick rule on spreads, depths, and short sale prices, thereby providing traders and other market participants with insights into what can be expected if it is removed as proposed recently by the SEC [2006b].¹

As an example of how the uptick rule impedes short selling, consider the hypothetical series of trade prices shown in Exhibit 1. Assuming a trade is made at \$30 and is then followed by a second trade at \$30.04, the minimum shortable price after the second trade is \$30.04 since such a short trade would be taking place at a zero-plus tick (a short trade at a price lower than \$30.04 would be illegal, as it would be made on a downtick). With a third trade taking place at the same price of \$30.04, the minimum shortable price remains the same at \$30.04, again because a short trade at that price would be taking place at a zero-plus tick. Following a fourth trade at \$30.02, the minimum shortable price is \$30.03, an uptick, because a short trade at \$30.02 would be taking place on a zero-down tick and hence would be illegal. Lastly, a fifth trade at

\$30.02 would not change the minimum shortable price since it is at the same price as the fourth trade.

[INSERT EXHIBIT 1 HERE]

Short sellers primarily use market orders or limit orders. Since short sales cannot execute on downticks or zero-downticks regardless of order type due to the uptick rule, a short market order may sometimes be treated as if it is a limit order, and a short limit order may have its limit price adjusted upwards.² The implications of the uptick rule are that the rule has the potential to: (1) reduce the likelihood of the execution of short orders; (2) delay the execution of short orders; and (3) either narrow the quoted spread by lowering the offer price or increase the liquidity on the offer side of the market by adding to the depth.³

Regulators have recently considered whether the uptick rule is, on balance, beneficial for equity markets. To address this concern, the U. S. Securities and Exchange Commission adopted Regulation SHO that established a pilot program exempting a group of stocks, which we refer to as pilot stocks, from the uptick rule.⁴ It also allowed researchers to obtain short selling data from the exchanges and the over-the-counter markets. For example, Blau, Van Ness, and Van Ness [2006] use these data to analyze where short sales occur for NYSE-listed securities. The pilot program went into effect on May 2, 2005 and is expected to remain in effect until August 6, 2007.

As of today, several studies have used the short selling data to assess the costs and benefits of the uptick rule and a similar price test that is used for Nasdaq stocks. These studies include: Alexander and Peterson[2007], Diether, Lee, and Werner[2006], SEC[2006a], and Wu[2006]. In general, the studies indicate that the uptick rule is an impediment to short selling of NYSE-listed securities. Additionally, these studies show that the uptick rule results in a

distortion of liquidity by narrowing quoted spreads and making ask depths relatively larger than bid depths. Unlike the uptick rule, Nasdaq's price test does not appear to have much of an effect on short selling of Nasdaq stocks.⁵ Therefore, we concentrate on the implications of the uptick rule for NYSE-listed stocks.

DATA AND SAMPLE

In this study we use the same sample as described in Alexander and Peterson [2007]. This sample includes 223 pilot stocks listed on the NYSE that were exempt from the uptick rule after May 1, 2005. Each pilot stock was matched with those NYSE stocks that were not exempt from the uptick rule but were from the same industry (2-digit SIC) and had the same option trading status. Of the stocks meeting these two criteria, the best match was chosen based on stock price (as of 12/31/2004), market capitalization (as of 12/31/2004), 2004 trading volume, stock return during 2004, and book-to-market ratio (as of 12/31/2004). We refer to the set of 223 matching NYSE stocks as control stocks.

We obtained intraday data over the January – August 2005 time period, excluding a week before and a week after the suspension of the uptick rule took effect to allow market participants to make adjustments to portfolio holdings and trading strategies. From January to April pilot stocks were not exempt from the uptick rule. This four month period is referred to as the pre-period. The subsequent four months are referred to as the post period, a period in which pilot stocks were exempt from the uptick rule.

Trades and quotes were taken from the TAQ database. Short sales were obtained from each of the exchanges and Nasdaq, where third market trading takes place. Using these data, we formed the following datasets. First, we used the quotes from the TAQ database to compute the

National Best Bid and Offer (NBBO) for each of the pilot and control stocks. Second, we combined the TAQ trades and quotes to obtain, for each point in time, the minimum shortable price (based on the uptick rule), and the contemporaneous quotes associated with the minimum shortable price.⁶ Third, we combined the short sale data with the NBBO data in order to see where short sales were executed relative to the contemporaneous quotes.

THE MINIMUM SHORTABLE PRICE

To illustrate how the uptick rule may influence the quoting and execution of short sales, Exhibit 2 plots the minimum shortable price for a representative control stock between noon and 12:15pm. It shows that if a short market order is entered, it will often not be executed at the bid due to the uptick rule, so the spread will frequently contract. For example, consider the trading interval between 12:02 and 12:05. During this time the national best bid (hereafter the bid) is \$116.90 and the national best offer (hereafter the ask) is \$116.99. When there is a downtick with a trade at \$116.91 following a trade at \$116.99, the minimum shortable price becomes \$116.92. If a short market order is entered at this time, the spread will contract to \$116.90 bid, \$116.92 offered. When there is an uptick with a trade at \$116.99 following a trade at \$116.91, the minimum shortable price becomes \$116.99 since a trade at this price would be on a zero-plus tick. If a short market order is entered at this time, the spread will not change but its depth will be added to the offer, increasing it at \$116.99. Note that we do not observe short *orders* in our data. Therefore, the contraction in the spread between 12:06 and 12:12 may be attributable to short market orders being entered and treated as limit orders with the limit price equal to the minimum shortable price.

[INSERT EXHIBIT 2 HERE]

THE UPTICK RULE AND CHANGES IN THE SPREAD AND ASK DEPTH

Given the description of the minimum shortable price above, we believe that the uptick rule has implications for the bid-ask spread ($= \text{ask} - \text{bid}$) and the ask depth. To examine this we computed the overall average time-weighted spread for each pilot and control stock during the pre-period. The daily time-weighted spread for each stock during the pre-period and the post-period was also calculated and then divided by the overall average spread during the pre-period, resulting in what we refer to as daily relative spreads. Next, for each day in both the pre-period and the post-period we separately averaged the pilot and control relative spreads, and then subtracted the latter average from the former average, creating a daily average abnormal spread for pilot stocks.

Exhibit 3 plots the average daily average abnormal spread for pilot stocks. This graph indicates that, relative to control stocks, pilot stocks had an increase in bid-asked spreads. Because the abnormal spread includes considerable noise, we also plot a 5-day moving average of the same series. The moving average operation acts as a low-pass filter, removing the high frequency noise components. As expected, the daily average abnormal spread is around 0% in the pre-period, but it increases to 5% in the post-period. Similarly, Alexander and Peterson [2007] show that quoted spreads of pilot stocks increase by 1.2 basis points. Thus, one effect of the uptick rule is that it results in narrower quoted spreads because some short market orders which would otherwise take liquidity are instead forced to make liquidity.

[INSERT EXHIBIT 3 HERE]

In a similar way, we compute the daily abnormal time-weighted ask depth for the pilot stocks and display the results in Exhibit 4. As expected, this graph indicates that the daily abnormal ask depth is around 0% in the pre-period, but decreases to -20% in the post-period.

That is, the uptick rule causes ask depths to increase. In sum, this rule frequently turns short market orders into limit orders, causing quoted spreads to decrease and ask depths increase. These results are also consistent with those reported by Alexander and Peterson [2007], Diether, Lee, and Werner [2006], and SEC[2006a].

[INSERT EXHIBIT 4 HERE]

SHORT SALES PRICE LOCATION

Next, we examine how the uptick rule influences the execution price of short trades. To do this we compute a variable which we term the short sales price location, defined as $2(\text{Price} - \text{Quote Midpoint}) / (\text{Ask} - \text{Bid})$. The price location indicates, numerically, where the short sale executes relative to the bid and ask quotes. For example, if a trade occurs at the bid, then the price location is equal to -1 . In contrast, if it executes at the ask, the price location is equal to $+1$. If the short sale executes at a price between the quotes the price location will be between -1 and $+1$, and it will be exactly 0 if the short sale executes at the quote midpoint.

We computed the daily trade-weighted price location for each pilot stock during the pre-period and post-period. The cross-sectional average daily price location is plotted in Exhibit 5. In the pre-period the average price location of a short sale is about 0.5 , indicating that the typical short sale is executed at a price half-way between the midpoint and the ask. For example, if the stock is quoted $\$100.00$ - $\$100.20$, the typical short sale would execute at $\$100.15$. In the post-period, the average price location drops to around $.15$, or roughly $\$100.12$ in the example. Interestingly, these data indicate that the average short sale continues to be executed at prices above the midpoint after the uptick rule is suspended, and therefore, short sellers can continue to be viewed as, on average, liquidity providers.

[INSERT EXHIBIT 5 HERE]

CONCLUSION

We examine the effects of the uptick rule on the quoting and trading of NYSE-listed stocks, and find that the uptick rule increases liquidity by decreasing quoted spreads and increasing ask depths. While previous research such as Alexander and Peterson [1999, 2002] has shown that the uptick rule results in fewer short orders being executed relative to similar regular sell orders, we find that even when the rule is suspended, those short sell orders that are executed take place at a price that is, on average, above the quote midpoint.

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Exhibit 1: Price and Tick Sequence

Time	1	2	3	4	5
Price	\$30.00	\$30.04	\$30.04	\$30.02	\$30.02
Tick	NA	Uptick	Zero-uptick	Downtick	Zero-downtick
Minimum Shortable Price*	NA	\$30.04	\$30.04	\$30.03	\$30.03

*The minimum shortable price would be in effect after the trade takes place at time t.

Exhibit 2: The Uptick Rule and the Minimum Shortable Price

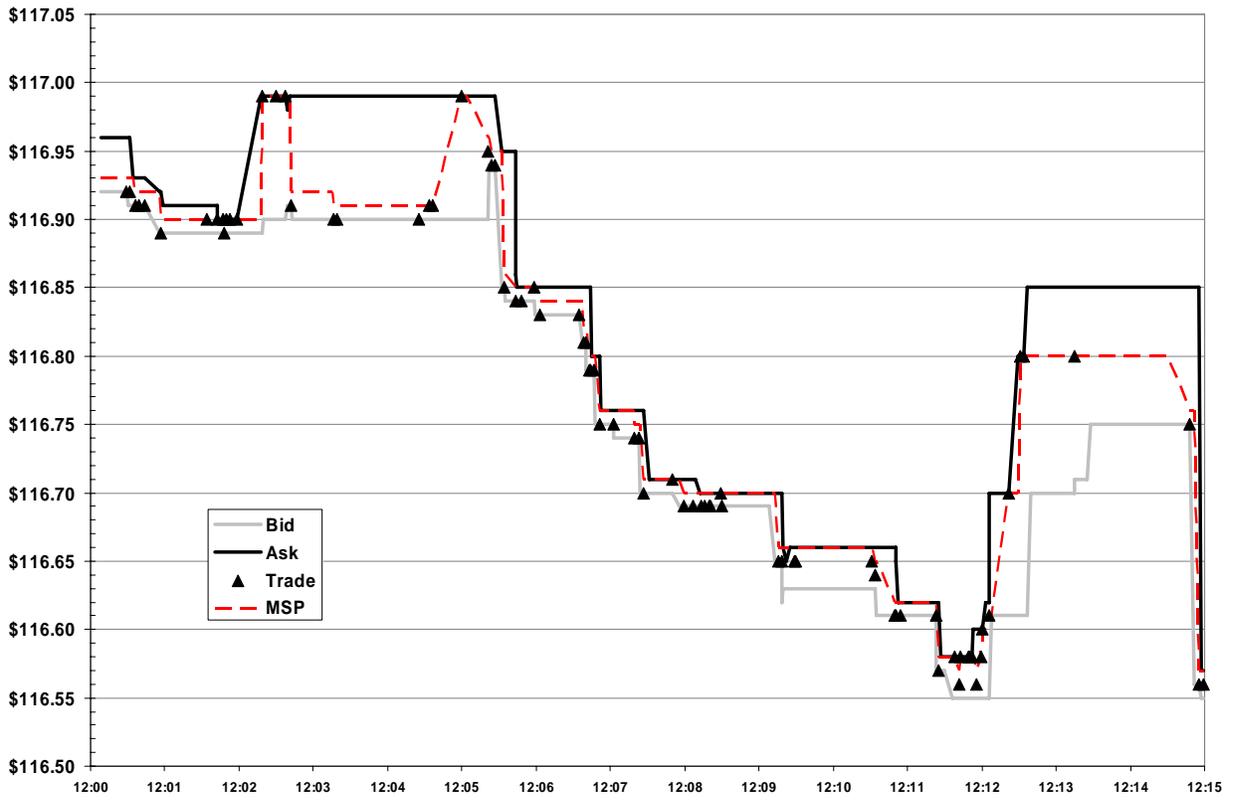


Exhibit 3: Daily Abnormal Spread for Pilot Stocks

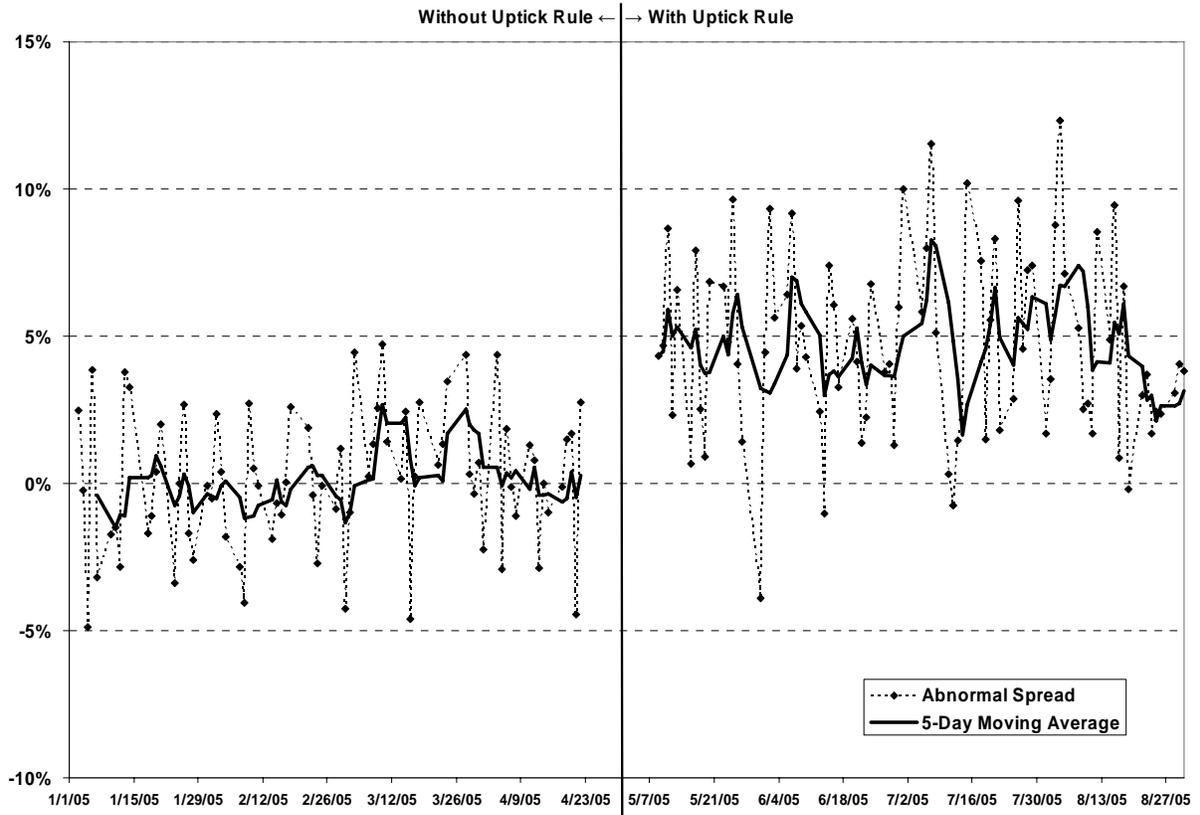


Exhibit 4: Daily Abnormal Ask Depth for Pilot Stocks

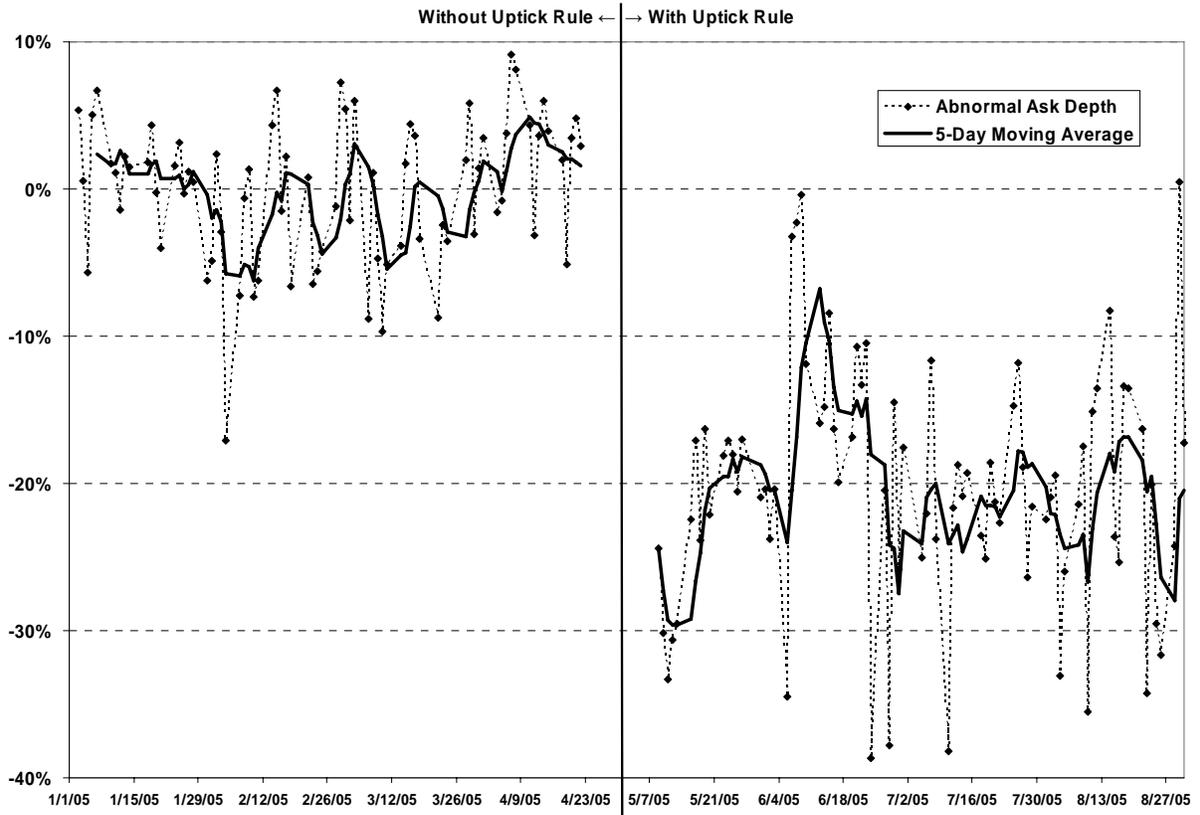
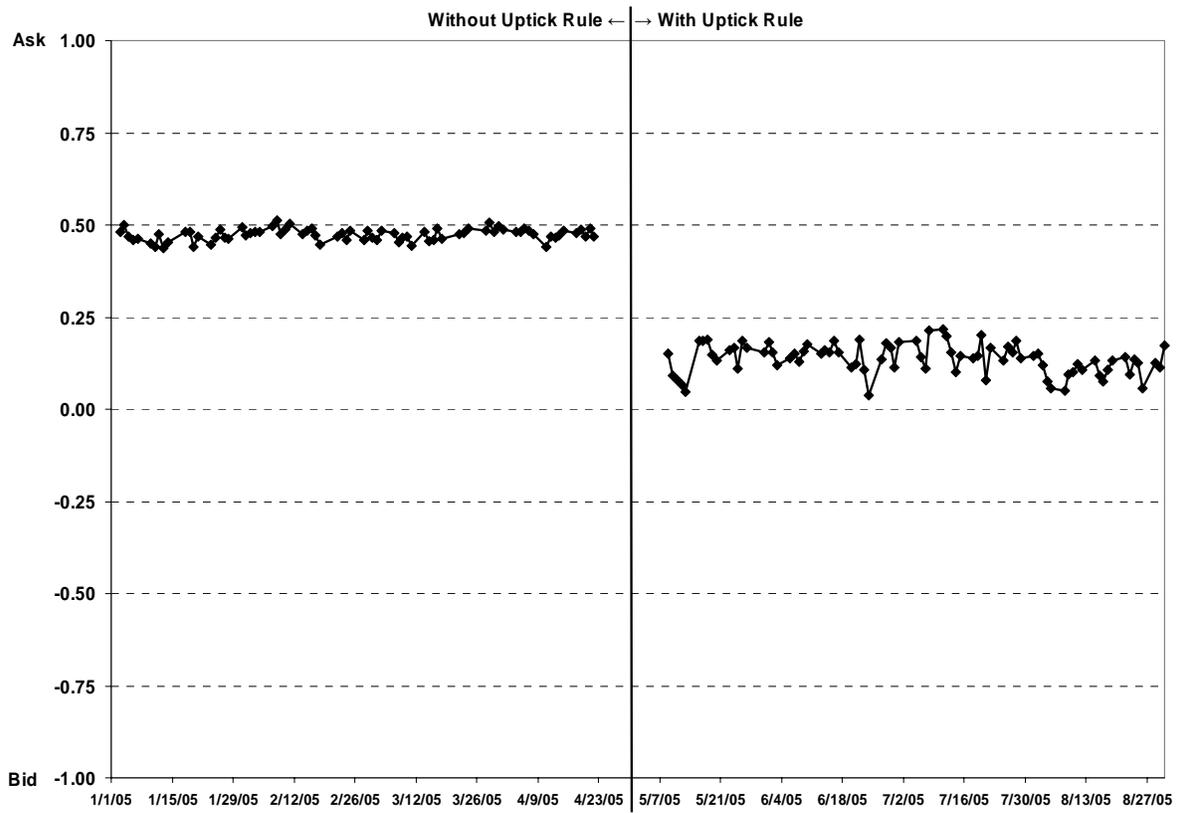


Exhibit 5: Daily Trade-weighted Price Location of Short Sales of Pilot Stocks



Endnotes

¹ The proposal was released on December 7, 2006.

² Short marketable limit orders have a limit price of the bid, and, for all practical purposes they are handled like short market orders. Hence, when we refer to limit orders, we are referring to those with limit prices above the bid such as quote improving (a limit price above the bid and below the offer) and at the quote (a limit price equal to the offer) limit orders.

³ See Alexander and Peterson [1999, 2002] for fill rates and the time to execution of short orders of NYSE stocks.

⁴ For more information on Regulation SHO, see SEC[2006a].

⁵ See, e.g., Ferri, Christophe, and Angel [2004] and Alexander and Peterson [2007].

⁶ As described in Alexander and Peterson [1999, p. 92], each exchange is allowed to elect whether short-sell orders are to be governed by the tick test in terms of either its own market or all markets in an effective transaction reporting plan. Therefore, the minimum shortable price may be different across exchanges and the third market. Because we are analyzing short sales of NYSE-listed stocks, of which a significant fraction occur off the NYSE, we include all short trades in our analysis and use the National Best Bid and Offer as the quotes.