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Fails-to-deliver, short selling, and market quality ☆

Veljko Fotak [a], Vikas Raman [b], Pradeep K. Yadav [c,*]

[a] School of Management, University at Buffalo, The State University of New York, USA
[b] Warwick Business School, UK
[c] Price College of Business, Division of Finance, University of Oklahoma, 307W. Brooks, Room 205A, Norman, Oklahoma 73019, USA

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ABSTRACT

We investigate the aggregate market quality impact of equity shares that fail to deliver (hereafter “FTDs”). For a sample of 1,492 NYSE stocks over a 42-month period from 2005 to 2008, greater FTDs lead to higher liquidity and pricing efficiency, and their impact is similar to our estimate of delivered short sales. Furthermore, during the operative period of a Security and Exchange Commission (SEC) order mandating stock borrowing prior to short sales, the securities affected display relatively lower liquidity and higher pricing errors. Finally, we do not find any evidence that FTDs caused price distortions or the failure of financial firms during the 2008 financial crisis.

1. Introduction

Trades in US stock markets are settled on a three-day cycle: for trades on day t, if the net delivery obligations of a clearing member are not fulfilled on day $t+3$, any undelivered position becomes a “failure-to-deliver” (or FTD). Regulators and financial journalists have widely perceived FTDs, and specifically “naked” short sales, as having a very negative impact on markets.[1] For example, a report in *Time Magazine* (“Watch out, they bite,” November 9, 2005), quoting estimates by former Under Secretary of Commerce Robert J. Shapiro, alleges that naked short selling has “cost investors $100 billion and driven 1,000 companies into the ground”; and an article in *Euromoney* (“Short selling: the naked truth,” December 2008) claims that, “Fails to deliver in the US equity market have exacerbated the sharp declines in share prices of financials. Although the SEC is clearing up the mess caused by naked short selling, more drastic measures might be needed to restore confidence.” In this context, this paper investigates the overall net impact (on day $t+1$) of the change in the open interest of undelivered positions (i.e., the change in FTDs) generated

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* Corresponding author at: Price College of Business, Division of Finance, University of Oklahoma, 307 W. Brooks, Room 205A, Norman, Oklahoma 73019, USA. Tel.: +1 405 325 5591; fax: +1 405 325 5491.
E-mail address: pyadav@ou.edu (P.K. Yadav).

[1] The term “naked short sale” is used (in this paper) to describe a short sale that, *irrespective of any intent considerations*, fails to deliver because of the short seller not making timely stock borrowing arrangements.

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collectively by trades on day t (and observed on day $t+3$). First, we analyze the effect of FTD changes on pricing efficiency and liquidity. Second, we examine whether FTD changes played a causal role in the major price declines or the demise of financial institutions during the 2008 financial crisis.

Settlement on US stock exchanges is done electronically through the Depositary Trust and Clearing Corporation, its subsidiaries, and associated agencies (hereafter collectively referred to as the DTCC). Ownership records are largely held, tracked, and transferred electronically through the DTCC, with more than 99.9% of all trades involving only electronically held securities (Morris and Goldstein, 2009). The DTCC becomes the central counterparty of all duly-matched error-reconciled trades, and electronically checks and updates relevant stock ownership accounts. If the stock ownership accounts associated with a clearing member with a net delivery obligation do not actually include the stock needed for delivery on settlement day, the undelivered position becomes a FTD.[2] FTDs can potentially arise from both short and "long" sales (i.e., sales of duly-owned stock). In a short sale, such a delivery shortfall arises when the stock is not borrowed in time to credit the stock ownership account by settlement day.[3] In a long sale, a delivery shortfall arises, for example, when (duly-owned) sold stock has been lent out and not returned to the stock ownership account in time for settlement; or because the broker has not ensured electronic recording of a paper certificate prior to the trade; or in conjunction with oversubscribed securities at security issuance.

There has been a strong regulatory focus on reducing FTDs. In January 2005, Regulation SHO introduced requirements to "locate" stock prior to every short sale to reduce FTDs due to stock-borrowing delays; it also forced firm stock-borrowing arrangements prior to short sales in "threshold-list" stocks (that is, securities with high levels of FTDs) unless existing FTDs were "closed-out." In July/August 2008, a temporary SEC order mandated stock borrowing arrangements prior to short selling in select financial stocks to "eliminate any possibility that naked short selling may contribute to the disruption of markets" (SEC Release 58166, 2008). After Lehman's collapse in September 2008, through Rule 204T (later made permanent), FTDs arising from short sales were virtually eliminated by requiring borrowing or purchasing by the broker by the morning after the failure day; FTDs arising from long sales or market-maker FTDs were given three additional days. Similarly, in November 2012, new EU rules instituted a pre-trade borrowing requirement for short sales. Regulatory concerns have been further exacerbated by the widespread allegations and the extensive litigation about FTDs being used manipulatively by naked short sellers. Such "abusive" naked short selling is widely alleged to have contributed to the financial crisis by precipitating sharp price declines of financial firms.[4] Notwithstanding extensive concerns, the SEC (in Report 450, March 2009) says that "there is hardly unanimity in the investment community or the financial media" on the dangers involved, and "despite its assertions regarding the potential of danger… the [SEC] Report can cite to no [relevant] bona fide studies" on the associated market impact.

In the context of the strong regulatory focus, we begin by examining whether changes in FTDs are followed by changes in prices, pricing errors, intraday volatility, bid-ask spreads, and order imbalances. Our main sample consists of all the 1,492 NYSE ordinary common-share issues for which all relevant data are available over the period January 2005 to June 2008. For robustness, we replicate our core analysis on a similarly constructed sample of 2,381 Nasdaq ordinary common-share issues over the same period. First, we analyze liquidity and pricing efficiency for securities in different portfolios based on the number of FTDs. Second, we utilize ordinary least-squares (OLS) regressions and Granger-causality tests to investigate the link between FTD changes and market quality. Third, given the complex and endogenous interrelationships between market quality metrics and other market variables, we fit vector autoregressive models and test these relationships using impulse response functions. Fourth, we examine whether FTDs by market-makers affect securities differently from FTDs by other "public traders," by using a proxy based on the reduction in FTDs subsequent to SEC Rule 204T in September 2008, which selectively precluded public-trader FTDs but not market-maker FTDs.

We find that, during our sample period, FTDs affect about 95% of NYSE securities. For this NYSE sample, we conclude that an increase in FTDs equivalent to 0.1% of the number of outstanding shares leads to a 3% reduction in the magnitude of positive and absolute pricing errors; a 0.2% decline in intraday volatility; a 1.7% reduction in bid-ask spreads; and a 0.70% reduction in order imbalances. Each of these changes is statistically significant and not subject to significant subsequent corrections. Similar results are obtained in subsamples of securities affected by high levels of FTDs, or by persistent FTDs. Further, the beneficial

[2] A delivery failure by an individual client account will not become a FTD at DTCC level if another client account held with the same clearing member lends the stock explicitly, or implicitly because of being due to receive delivery. Due to such "netting," a FTD at DTCC level cannot generally be uniquely attributed to a specific trade or trader; nor is it possible to identify whether it originated from a short or long sale.

[3] The Regulation SHO "locate" requirement introduced in January 2005 requires broker-dealers to ensure (prior to a short sale) that there are "reasonable grounds" to believe that the security could be borrowed for timely delivery, rather than identify a separate block of shares for each specific short sale. As a consequence, a lender may indicate to multiple potential borrowers that shares are available, but be unable to meet all demands. The requirement could also often be fulfilled by using published lists of easy-to-borrow securities (Welborn, 2008).

[4] Over a two-year period leading up to the 2008 financial crisis, the SEC received more than 5,000 complaints in this regard (*Wall Street Journal Asia*, March 20, 2009), and a Factiva search shows over 4,600 printed English-language articles on the subject. Several investor associations and high-profile chief executive officers (CEOs) lobbied aggressively. The huge volume of litigation alleging associated stock price manipulation led to "naked" short selling being called the "Holy Grail….bigger than tobacco" for plaintiffs' lawyers (Stokes, 2009). Examples of lawsuits include the Biovail lawsuit against Stephen Cohen, Gradient, and others; the Overstock lawsuit against Rocker Partners, Gradient, and others; and the NFI lawsuit against Bank of America (the Specialist) and the Prime Brokers.