Journal of Financial Economics 98 (2010) 21–39

Contents lists available at ScienceDirect

Journal of Financial Economics

journal homepage: www.elsevier.com/locate/jfec

Short selling in initial public offerings ☆

Amy K. Edwards [a,*], Kathleen Weiss Hanley [b]

[a] Office of Economic Analysis, U.S. Securities and Exchange Commission, 100 F Street NE, Washington, DC 20549, USA
[b] Division of Research and Statistics, Federal Reserve Board of Governors, 20th & C Streets, NW Washington, DC 20551, USA

ARTICLE INFO

Article history:
Received 29 December 2008
Received in revised form
15 May 2009
Accepted 4 June 2009
Available online 7 April 2010

JEL classification:
G14
G24
G28

ABSTRACT

Short sale constraints in the aftermarket of initial public offerings (IPOs) are often used to explain short-term underpricing that is subsequently reversed. This paper shows that short selling is integral to aftermarket trading and is higher in IPOs with greater underpricing. Perceived restrictions on borrowing shares are not systematically circumvented by "naked" short selling. Short sellers, on average, do not appear to earn abnormal profits in the near term and our findings are not driven by market makers. Short selling in IPOs is not as constrained as suggested by the literature, implying that other factors may be responsible for underpricing.

Published by Elsevier B.V.

1. Introduction

One of the longstanding puzzles in finance has been the pricing of initial public offerings. One explanation for underpricing in IPOs and their subsequent long-run performance was originally proposed by Miller (1977). He argues that restrictions on short selling immediately following an IPO contribute to pricing inefficiencies in the short-term, which are subsequently reversed in the long-term as these constraints are relaxed. In addition, the literature on the limits to arbitrage often uses underpricing in IPOs as an example of the impact of short sale constraints on pricing.[1]

The premise that short selling is difficult immediately after an IPO is based upon the perceived high cost of borrowing shares (Ljungqvist, Nanda, and Singh, 2006), limits on underwriters lending shares during the first month of trading (Houge, Loughran, Suchanek, and Yan, 2001), the lockup of insider shares which restrict supply (Ofek and Richardson, 2003), and difficulties in locating shares prior to the closing of the offer. By examining short selling in the context of IPOs, we are able to assess the speed with which short selling is available even in the shares of stocks that have no previous trading history. We test whether these potential constraints restrict short selling in the immediate aftermarket of IPOs by examining newly available data on actual short selling transactions.

Contrary to popular belief, we find that short selling is an integral part of the aftermarket trading of IPOs. Despite possible constraints on both the ability and cost of

☆ We would like to thank Reena Aggarwal, Ekkehart Boehmer, Peter Chepucavage, Jon Garfinkel, Jacqueline Garner, Robin Greenwood, Jerry Hoberg, Ambrus Kecskés, Stewart Mayhew, Bill Megginson, Tim McCormick, David Musto, Mark Peterson, Kristian Rydqvist, Ajai Singh, Rajdeep Singh, Richard Smith, Chester Spatt, Ingrid Werner and seminar participants at American University, Babson College, Tulane University, the University of Virginia, Rutgers University, the 2007 Financial Management Association meetings, the RS-DeGroote Conference on Market Structure and Integrity, the EFM Oxford IPO Symposium, the Washington Area Finance Association, the May 2008 National Bureau of Economic Research Microstructure Meeting, the 2008 Western Finance Association meetings, and the Securities and Exchange Commission for their helpful and valuable comments. The Securities and Exchange Commission disclaims responsibility for any private publication or statement by any of its employees. This study expresses the authors' views and does not necessarily reflect those of the Commission, the Commissioners, or the Board of Governors of the Federal Reserve System.
* Corresponding author.
E-mail address: edwardsa@sec.gov (A.K. Edwards).

[1] See, for example, Scheinkman and Xiong (2003), Duffie, Garleanu, and Pedersen (2002), and Mitchell, Pulvino, and Stafford (2002).

0304-405X/$ - see front matter Published by Elsevier B.V.
doi:10.1016/j.jfineco.2010.03.010

borrowing shares for delivery, we show that short selling occurs simultaneously with the open of trading and without a delay, as previously thought. Short selling occurs on the offer day in 99.5% of the IPOs in our sample and the majority of first-day short sales occur at the open of trading. The average level of short sales on the offer day exceeds 7% of the shares offered and subsequently declines over the first month of trading. By the fifth trading day, the ratio of short selling to volume is only slightly lower than that shown by Diether, Lee, and Werner (2009a) for a large cross-section of stocks. We interpret this finding as an indication that the level of short selling in IPOs quickly approaches an "equilibrium" level.[2]

Miller (1977) suggests that investor divergence of opinion combined with the inability to short sell the security leads to higher initial returns than would otherwise occur. For example, the models of Derrien (2005) and Ljungqvist, Nanda, and Singh (2006) predict that underwriters and issuing firms take advantage of investor sentiment or irrational exuberance by pricing issues above their intrinsic value. In this case, investor sentiment combined with short selling constraints leads to greater underpricing and an aftermarket trading price that exceeds the "true" value of the security.

Our results indicate that the magnitude of short selling on the first trading day is positively and significantly related to variables that proxy for divergence of opinion: the change in offer price, the first-day return from the offer price to the open, and initial trading volume. These findings are consistent with Diether, Lee, and Werner (2009a) who find that short sellers are contrarians who "increase their trading following positive returns." However, our results do not support the role of short sale constraints in divergence of opinion models of IPO pricing, as short selling and first-day returns are positively related. Thus, short sellers do not appear to correct *observed* underpricing.[3]

We further examine the supposed difficulties in locating or borrowing shares by testing the hypothesis that short sellers are engaging in "naked" short selling activities. According to the Securities and Exchange Commission (SEC) Web site, "a "naked" short sale is a short sale where the seller does not borrow or arrange to borrow the securities in time to make delivery to the buyer within the standard three-day settlement period [and, as] a result, the short seller fails to deliver securities to the buyer when settlement is due (known as a "failure to deliver" or "fail to deliver")."[4] Failures to deliver, in practice, are often used as a measure for the presence of "naked" short selling.[5] Using a unique database, we examine whether short sales immediately following the IPO are positively correlated with failures to deliver. Such a test allows us to reconcile whether the observed level of short selling can be explained by an avoidance of significant constraints. To our knowledge, we are the first paper to examine the relationship between short selling transactions and failures to deliver in any context.

Like short selling, we find that failures to deliver are prevalent early in the aftermarket trading of IPOs. Approximately 61% of the IPOs in our sample have failures to deliver of at least 10,000 shares on *the first* standard settlement day.[6] In fact, almost one-third of IPOs have enough fails to deliver over the first five standard settlement days to qualify for the Regulation SHO threshold list on the first possible date and almost 40% appear on the list within the first month of trading.[7]

Contrary to the hypothesis that failures to deliver in IPOs are due to "naked" short selling, we find no relationship between the level of short selling and subsequent level of fails to deliver. Thus, there is no evidence that short sellers systematically engage in "naked" short selling in IPOs, and therefore, no indication that too few shares are available to be borrowed in time for settlement.

We do show, however, that failures to deliver are more likely to occur in IPOs that are price supported. This suggests that failures to deliver in price supported IPOs may arise from the mechanics of the offering process. Underwriters generally allocate more shares in an IPO than are offered (e.g., Hanley, Lee, and Seguin, 1996; Aggarwal, 2000). If the first-day return is positive, the underwriter covers this overallocation by exercising the overallotment option.[8] In the case of IPOs needing price support, the underwriter will purchase shares in the open market to cover the overallocation.[9] These overallocated shares could result in fails to deliver if investors sell them before the

[2] While short selling is slightly below that shown by Diether, Lee, and Werner (2009a) by the fifth trading day, the level of short selling as a percentage of volume on the first trading day is lower than that reported for a typical stock. The difference in short selling on the first trading day in an IPO, as compared to seasoned stocks, may be due to the fact that the volume on the first trading day is extremely large.

[3] It could obviously be the case that the level of first-day return in these offers might have been higher if fewer short sales were able to be executed.

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

[5] The Commission has stated that fails to deliver can be indicative of abusive or manipulative naked short selling and can deprive shareholders of the benefits of ownership, such as voting and lending. See page 8 of the release proposing to amend Regulation SHO (SEC Release no. 34-54154, July 14, 2006).

[6] The first settlement date refers to 3 days after the issue starts trading in the stock market. This is also the first-day that a failure to deliver can occur.

[7] When a stock has a fail to deliver level of at least 10,000 shares and 0.5% of the shares outstanding for five consecutive settlement days, the trading venue listing the stock is required to place it on a list known as the Regulation SHO threshold list.

[8] Underwriters typically have an option to purchase additional shares from the issuer following the IPO. This option is called the overallotment option or the "green shoe" option.

[9] The creation of an uncovered short position by underwriters in connection with an offering is a permissible activity that facilitates an offering and is different from the delivery obligations relating to "uncovered short selling" of securities that is discussed in the Regulation SHO adopting release (SEC Release no. 34-50103, July 28, 2004 and 69 FR 48008, August 6, 2004). These are two distinctly different activities. Underwriters cover the overallocation either through the exercise of the overallotment option or through open market purchases (also known as "syndicate short covering"). Syndicate short covering, which is defined in Regulation M as "the placing of any bid or the effecting of any purchase on behalf of the sole distributor or the underwriting syndicate or group to reduce a short position created in connection with the offering," is regulated by Rule 104 of Regulation M, which governs certain aftermarket activities in connection with an offering. The