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Stabilization Activities by Underwriters after Initial Public Offerings

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ABSTRACT

Prior research has assumed that underwriters post a stabilizing bid in the aftermarket. We find instead that aftermarket activities are less transparent and include stimulating demand through short covering and restricting supply by penalizing the flipping of shares. In more than half of IPOs, a short position of an average 10.75 percent of shares offered is covered in 22 transactions over 16.6 days in the aftermarket, resulting in a loss of 3.61 percent of underwriting fees. Underwriters manage price support activities by using a combination of aftermarket short covering, penalty bids, and the selective use of the overallotment option.

RESEARCHERS ARE STILL TRYING TO UNDERSTAND the price behavior of initial public offerings (IPOs).[1] Short-run underpricing and long-run overpricing continue to be a puzzle. Underpricing refers to the initial trading of IPOs above the offer price in the immediate aftermarket, whereas overpricing refers to long-run underperformance. However, finance research has paid little attention to the *specific* activities of underwriters in the aftermarket that are likely to have an impact on IPO price performance. These interventions by underwriters are not well understood because of both lack of data and lack of transparency in industry practices. The unique data set used in this paper allows for the first time a comprehensive analysis of exactly how these aftermarket activities are conducted, the characteristics of IPOs in which un-

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[1] See Beatty and Ritter (1986) and Miller and Reilly (1987) for short-run performance; Aggarwal and Rivoli (1990) and Ritter (1991) for long-run performance; and Asquith, Jones, and Kieschnick (1998) and Ruud (1993) for distributional properties of IPOs in the short run.

derwriters engage in such activities, for how long these activities are carried out, the costs associated with these activities, and their impact on IPO price behavior.[2]

Aftermarket activities are price-influencing activities that affect both issuers and investors. We discuss and empirically analyze the use of the following three forms of aftermarket activities:

1. Underwriters post a stabilizing bid to purchase shares at a price not exceeding the offer price if the distribution of shares is not complete. To the degree that these shares must be resold if a negatively sloped demand curve is assumed, this postpones a price drop. We refer to this direct intervention as *"pure" stabilization*.
2. Underwriters initially sell shares in excess of the original amount offered, thereby taking a short position prior to the offering. This short position can be covered by exercising the overallotment option and/or by short covering in the aftermarket. Almost all IPOs have an overallotment option whereby the underwriter can sell additional shares up to 15 percent of the offer size, exercisable for 30 calendar days after the offering. In offerings where weak demand is anticipated, underwriters frequently take a naked short position by allocating more than 115 percent of the stated size of the offering. We refer to this form of price support as *aftermarket short covering*.
3. Underwriters may penalize members of the selling group whose customers quickly "flip" shares in the aftermarket by taking away their selling concession. This is referred to as a *penalty bid*.

The underwriter provides price support by stimulating demand in the first two cases and by restricting supply in the third.

Academic research has attempted to develop inferences about what form these activities take, who benefits from the activities, the circumstances under which they are undertaken, and their effects on IPO returns.[3] However, because aftermarket activities of underwriters are not directly observable, the literature has not been able to address these issues adequately. There have been two main limitations in the research: (i) researchers have had to hypothesize about which offerings were stabilized and which were not by using certain proxies and (ii) researchers have had to make assumptions about how price support is carried out. By observing stabilization activities directly, we are able to empirically test the validity of several models in the literature.

Price support activities are seen as a complement to underpricing. If underwriters do not engage in these activities, it is possible that investors will cancel an indication of interest or renege on an order. If price support is not

[2] Ellis, Michaely, and O'Hara (2000) examine the market making activities of the lead underwriter. Aggarwal and Conroy (1999) analyze the role of the lead underwriter in the initial price discovery process in the aftermarket.

[3] For example, see Ellis et al. (2000), Krigman, Shaw, and Womack (1999), Wilhelm (1999), Benveniste, Erdal, and Wilhelm (1998), Prabhala and Puri (1998), Benveniste, Busaba, and Wilhelm (1996), Chowdhry and Nanda (1996), and Hanley, Lee, and Seguin (1996).

provided and the aftermarket price is below the offer price, potential buyers can renege on their orders and cause a cascade, as discussed by Welch (1992). IPO investors have the legal right to cancel an order before the end of the settlement period, on the logic that they have not seen the final prospectus prior to the issuance. The aftermarket activities of underwriters may prevent such cascades. An investment bank's reputation for price support ensures that IPOs underwritten by the firm are perceived ex ante as less likely to be overpriced. Investors are more likely to buy IPOs if they expect price support.

We find that pure stabilization, in which an identified stabilizing bid is posted, is never done, and that aftermarket short covering is the principal form of stabilization. As we discuss in detail, aftermarket short covering leads to the same results as "pure" stabilization but has no disclosure requirements. The short position must be taken ex ante, before trading starts, so we do find that sometimes short covering has to be done in the aftermarket even for IPOs that go up in price. Underwriters cannot predict completely which offerings will trade above or below the offer price. We also find that, on average, aftermarket short covering is not expensive for underwriters and amounts to a very small proportion of the gross spread they receive. Penalty bids are used selectively and tend to be assessed only for weak offerings. The underwriter can manage the price stabilization process by the combined use of covering the short position in the aftermarket, exercising the overallotment option, and restricting flipping by using penalty bids. The availability of these various options limits the losses incurred by the underwriter.

There is a clear relationship between these aftermarket activities and first-day IPO returns even after controlling for other determinants of returns, which implies that these activities must be considered when modeling or studying IPO price behavior. There appears to be a small drop-off in returns when short covering activities are terminated, but returns bounce up again after a few days.

The rest of the paper is organized as follows: Section I describes each of the three forms of aftermarket activities; the details of the transaction by transaction data are discussed in Section II along with the sources for other data used in the paper; Section III discusses the empirical findings; and a summary and conclusions are provided in Section IV.

I. Three Types of Aftermarket Activities

A typical IPO has investment banks in the role of the lead manager, one or more co-managers, and syndicate members who underwrite and distribute the offering. Ellis et al. (2000) provide a detailed overview of the IPO process. Initially, the lead underwriter and the issuer agree on a general range of proceeds, gross spread as a percentage of proceeds, and an overallotment option. The lead underwriter then conducts due diligence and a preliminary prospectus is prepared. This prospectus and the road show are used for marketing the issue. During the road show, the underwriter gathers indications

of interest that help to determine the demand for the offering. It is only then that the lead underwriter gets an idea of whether demand for the offering will be strong or weak and therefore if price support will be needed.

Typically, on the day prior to the offering day, after the market closes, the final offer price and quantity are determined. At this time, the lead underwriter establishes a short position by allocating more than 100 percent of the shares and also decides whether to have a penalty bid in effect. The lead manager is responsible for all of the aftermarket activities on behalf of the syndicate. In this section we discuss the three forms of aftermarket price support activities: pure stabilization, short covering, and penalty bids. We also discuss how the lead underwriter manages the whole stabilization process.

A. Pure Stabilization and Its Rationale

Stabilization activities have existed for a long time. On March 18, 1940, in Release 2446, the Securities and Exchange Commission (SEC) issued one of its first statements on the problem of regulating the "pegging, fixing, and stabilizing" of security prices. In this Release the SEC stated, "The Commission is unanimous in recognizing that stabilizing is a form of manipulation." The dilemma faced by regulators was whether to allow stabilizing to continue unregulated, to completely prohibit it, or to regulate it. One of the key reasons given for stabilization was that underwriters do not have enough capital to do firm-commitment offerings and if they cannot perform these functions, then capital will not flow to industry.[4] The tension between price manipulation and capital raising is evident even today. Release 38067 (1997, p. 81) states, "Although stabilization is a price influencing activity intended to induce others to purchase the offered security, when appropriately regulated it is an effective mechanism for fostering the orderly distribution of securities and promotes the interests of shareholders, underwriters, and issuers."

Of the three forms of aftermarket activities, the SEC regulates only pure stabilization in a direct way. In pure stabilization, underwriters are allowed to post a stabilizing bid to purchase shares at a price not to exceed the offer price. These stabilizing bids are also required to have a flag identifying them as stabilization bids. Such a flag would send a clear signal to the market that the offering is weak and stabilization is required, and this appears to be one of the reasons why underwriters avoid using pure stabilization. Underwriters must disclose information on pure stabilization activities to the appropriate self-regulatory organization, such as the New York Stock Exchange or the National Association of Securities Dealers (NASD). The

[4] At that time Commissioner Healy was opposed to stabilization. It is interesting to consider one of his statements, "I do not for one minute question the value of stabilizing to the underwriter." He was concerned that stabilization interferes with free and open markets, but the SEC felt that stabilization is "a *negative* type of manipulation since it seeks to retard and to create *affirmative* market movements." At that time, underwriters were private partnerships with very limited capital, and overallotment options did not come into being until the 1963 Green Shoe Manufacturing Company IPO.

NASD requires prior notification from market makers who initiate stabilization. Stabilizing bids are then supposed to be identified by a symbol on the Nasdaq quotation display. On the exchanges, underwriters must notify the exchange and provide disclosure separately to the recipient of the bid (e.g., the specialist). After the original shares have been distributed, the syndicate is broken/terminated and "pure" stabilization is not allowed.

B. Short Covering Conducted in the Aftermarket

The SEC is aware "that underwriters rarely engage in classic stabilizing but engage in significant aftermarket activities following the breaking of the syndicate. . . ."[5] An alternative to pure stabilization, which does not require disclosure, is the practice of underwriters overselling the issue. The overallotment or "green shoe" option allows the underwriting syndicate to sell additional shares to a maximum of 15 percent of the offering. It is common for the underwriting syndicate to have a short position even in excess of 15 percent (naked short) in weak offerings. Therefore, ex ante the underwriter knows it will engage in aftermarket price support. Because sufficient shares are held in street name, it is easy for the lead manager to take a short position.

If the price of the IPO drops in the secondary market, the short position is covered with shares purchased in the aftermarket. However, underwriters typically do earn a seven percent spread on all shares issued; therefore, they have an incentive to exercise the overallotment option, and it is not surprising to find them exercising this option even for offerings that start trading a little below the offer price. If the price of the IPO rises, then the overallotment option is used to cover the short position. If the short position is more than 15 percent, the naked short must be covered by purchases in the secondary market at prices above the offer price. This raises the question of why underwriters sell additional shares if they expect to buy them back, rather than just selling a smaller number of shares initially. Ritter (1998) proposes three possible explanations: Total demand to hold the stock may be larger if more shares are allocated initially; buying back shares is a way to favor some preferred clients who are more likely to sell back their allocation; and by offering price support, the underwriter is signaling that the issue is not overpriced and therefore investors are willing to buy at the offer price. Prabhala and Puri (1998) argue that the sale of excess shares creates liquidity in the aftermarket.

For hot IPOs, there may be a small short position in excess of the overallotment option either because the underwriters did not anticipate the price increase or because they want to satisfy the demands of their favored clients. In these cases, part of the short position has to be covered in the aftermarket above the offer price and therefore at a loss. A question arises about why investment banks would incur such losses. It is not possible to

[5] See the article, "SEC proposes Regulation M to replace trading practices rules," *Insights* 19(9), 1996.

directly differentiate between short covering for the purpose of stopping a price decline or for other purposes. We examine all of the aftermarket short covering activities performed by the lead underwriter.

C. Use of Penalty Bids to Control Flipping

The third form of aftermarket activity is the use of penalty bids. The purpose of penalty bids is to control flipping or reselling of shares. Flipping is the term used for selling shares in the immediate aftermarket that have been received in an initial allocation. When there is strong demand, underwriters are frequently happy to see flipping (and the commissions the trading generates). However, when demand is weak, selling pressure due to flipping requires that the underwriter either stabilize the price or see it decline below the offer price. On average, the volume of shares traded on the first trading day of an offering is 60 to 70 percent of the stated number of shares offered and poses a major problem for the lead underwriter.

The underwriting contract may or may not include penalty bids. Even when penalty bids are part of the contract, they may not actually be assessed. Each firm that makes up the selling group receives compensation, called the selling concession, for each share it distributes/sells.[6] If the distribution firm's customers who bought in at the initial offer price sell their shares in the first few days (i.e., flip), then penalty bids may be assessed on the distributing firm. Assessment of penalty bids results in forfeiture of the selling concession received for the distribution of shares that are repurchased by the lead manager in the secondary market because of flipping.

The lead underwriter faces two costs associated with flipping. The first is the sales commission that is paid on the flipped shares which must be resold, and the second is linked to the selling price of the reacquired shares which may have to be resold at a lower price. Flipping of shares can now be formally tracked via the Depository Trust Company's (DTC) IPO Tracking System. Even for IPOs that considerably increase in price, the accepted practice seems to be to keep the tracking on for 30 days.[7] In such cases, penalty bids may not be imposed, but investment banks like to collect the information for future use. The SEC approved this system based on the reasoning that it should "further aid in the efficiencies of the clearance and settlement system because the IPO Tracking System should reduce costs, risks, and delays associated with the physical delivery of certificates."

[6] In typical IPOs, underwriters receive a commission of seven percent. Of this, 60 percent tends to be selling concession and is paid to the selling group for distributing the shares; management fees and underwriting fees are about 20 percent each. Any losses incurred in aftermarket activities are deducted from the underwriting fees. For more details on the compensation structure, see Chen and Ritter (2000).

[7] The costs of using the DTC System are minimal and do not depend on the length of the tracking period.

D. Managing the Stabilization Process

Underwriters can use a combination of pure stabilization, aftermarket short covering and selective use of the overallotment option, and penalty bids to manage aftermarket activities. Ex ante, they can establish a short position and specify a penalty bid in the contract. Aftermarket short covering allows them to absorb shares flipped in the first few days of trading; otherwise, flipping would put downward pressure on the stock price. Therefore, in weak offerings the underwriters must have a large enough short position to absorb the selling pressure from flipping, else the stock price falls. If the short position is not large enough and flipping is excessive, they are not able to provide effective price support unless they take a long position and hold inventory of the stock. Underwriters also try to restrict flipping by including a penalty bid in the underwriting contract. For weak offerings, they actually penalize those syndicate members whose clients flip. If flippers do not cause the price to drop, the underwriter can cover the short position up to 15 percent by exercising the overallotment option.[8]

II. Data

The Securities Data Company's (SDC) New Issues database is used to identify all common stock offerings that take place during the period May to July 1997. A total of 137 IPOs (excluding unit offerings and American Depository Receipts) are identified. The period May to July is selected because, starting in April 1997, lead underwriters are required under the new SEC rules to keep records of short covering transactions and penalty bids in addition to pure stabilizing information. These records are not automatically submitted to the SEC but are maintained by the lead manager. For the purpose of this study, the records were requested from each lead manager.

The most common method used for providing price support is covering short positions in the aftermarket. For 114 of the 137 new offerings, we have detailed records on each aftermarket short covering transaction. For each offering, the data collected include the size of the syndicate, the total number of shares short, the date and time of each aftermarket short covering transaction, the price at which the shares are bought, the number of shares bought, and whether penalty bids are part of the contract and if they are actually assessed.

There are 23 offerings for which stabilization is not applicable or the records are not available. In two cases a non-U.S. subsidiary managed the deal so there was no requirement to keep records; in three cases the data are not clear; in two cases the underwriter went out of business; and in one case the

[8] Fishe (1999) develops a theoretical model to analyze the impact of flipping on price stabilization.

SDC described the deal as non-underwritten. It is safe to say that all large offerings and offerings handled by large or medium-sized investment banks are included in our sample.

The SDC database is used to obtain information on offer price, offer date, offer size, number of shares issued, underwriter gross spread, and overallotment exercised. We find that information on the exercise of the overallotment is incomplete on the SDC database for almost 30 percent of our sample.[9] The missing information is filled either by cross-checking on the SEC's EDGAR database or by contacting the lead underwriter. The other data are also cross-checked with the information directly provided by the lead manager for each offering. The daily closing price and volume of trading for each issue for 40 days after the offering are collected from either Dow Jones News Retrieval or Bloomberg.

III. Empirical Results

A. Evidence on Pure Stabilization

An examination of the data shows that pure stabilization, in which direct stabilization bids would be placed, does not occur in any offering in the U.S. market. This finding is not unique to the sample period of the study. A random check of offerings was conducted for a longer time period in 1997 to determine whether pure stabilization was being done; not a single offering had these bids.[10] Investment banks also clearly indicated that they do not place such stabilizing bids. This finding is contrary to academic wisdom. Benveniste et al. (1996, p. 227) hypothesize about stabilization activities, "(stabilization) effort is ordinarily undertaken by posting a stabilizing bid at the offer price in the secondary market," and Benveniste et al. (1998, p. 742) state, "Traditionally, the stabilization effort has involved posting a stabilization bid at the offer price."[11] Underwriters do not place these pure stabilization bids, as intended in the SEC's regulations. In fact, the industry practice is to break up the syndicate before trading begins. The breaking up of the syndicate implies that the distribution is complete, and if the syndicate has been broken up, then according to SEC rules, stabilization bids cannot be posted.

[9] Our cross-checking shows that the blank in the SDC database for the number of overallotment shares exercised means either no overallotment is exercised or the information is not available. Researchers should not assume that the blank means no overallotment is exercised. We find that in a large majority of cases with blanks the overallotment option is indeed exercised. We also find that when SDC does report the number of shares exercised for overallotment, the number tends to be correct.

[10] Also, an examination of several years of Nasdaq quote and transaction data shows no flags that are required for stabilizing bids.

[11] They do point out that underwriters may have a naked short position beyond the overallotment option and the repurchased shares may be used to cover this short position or may be carried in inventory.

B. Widespread Use of Aftermarket Short Covering

We analyze short covering transactions that are conducted in the aftermarket mainly as a mechanism to provide price support. These are aftermarket transactions and do not include the exercise of the green shoe option. However, there is a very important relationship between the exercise of the green shoe option and aftermarket short covering that is analyzed later. This section analyzes the relationship between aftermarket short covering and offer price, offering size, underwriter spread, syndicate size, first-day returns, and filing price range. The percentage of shares short covered in the aftermarket is also estimated along with the losses incurred by the underwriting syndicate in aftermarket short covering activities. Before discussing the empirical evidence on short covering, a sample case is presented to show how short covering is done.

B.1. Short Covering Transactions for a Sample Case

Issuing firm ABC was taken public on June 19, 1997, by a syndicate made up of 25 investment banks.[12] The syndicate started with a short position of 600,700 shares representing 16.37 percent of the 3.67 million shares offered. Therefore, the syndicate has a naked short position of 1.37 percent beyond the 15 percent overallotment option. As seen in the Appendix, short covering was completed on July 2, 1997. The maximum price at which short covering was done in this case was $0.50 above the offer price of $15. The smallest transaction was for 200 shares and the maximum for 44,900 shares. A total of 35 transactions were made by the lead underwriter to cover the short position. The syndicate had total profits of $165,313, which represents 4.29 percent of the total underwriter spread of $3,853,500. The aftermarket short covering price was above the offer price for only three of the 35 transactions. The full short position established ex ante was covered in the aftermarket and the overallotment option was not exercised at all.[13] Next we present results for the full sample.

B.2. Characteristics of Offerings with Short Covering

The mean offer price and first-day return are $13.14 and 16.22 percent, respectively, for the full sample, as seen in Table I. These first-day returns, measured from the offer price to the closing market price, are representative

[12] The true identity of the issuing firm and the underwriter are not mentioned here. Many of the trades have also been combined in order to shorten the example; therefore, the average trade size is overestimated. Some of the other numbers have also been changed.

[13] The lead underwriter is also a market maker. The syndicate desk sends its buy orders (for short covering) to the trading desk. The market maker at the trading desk treats these orders just like other orders and notes the price at which they are filled. The syndicate desk bears the profits/losses for these transactions. Sometimes the trading desk allocates these transactions to the syndicate desk at its average price for the day. The syndicate and the trading desk are both motivated to maximize their own profits.

Table I

Descriptive Statistics on All Offerings

The sample consists of 114 IPOs during the period May to July 1997. In 61 offerings the lead underwriter conducted short covering transactions in the aftermarket and in 53 offerings no such transactions are done. *N* is the number of observations; first-day return is the percentage difference between the closing price on day 1 and the offer price; market-adjusted return is the raw return adjusted for changes in the S&P 500; underwriter spread is the gross spread in percentage terms; size of syndicate is the total number of investment bankers forming the syndicate; total short position is the short position of the syndicate at the time of the initial IPO allocation as a percentage of the total number of shares offered; overallotment shares exercised is the number of overallotment shares exercised as a percentage of the total number of shares offered; and shares short covered is the total number of shares short covered in the aftermarket as a percentage of the total number of shares offered. If no overallotment shares are exercised, then zero is used to calculate the mean and median.

	Full Sample (N = 114)		Short Covering in Aftermarket (N = 61)		No Short Covering in Aftermarket (N = 53)		Difference in Means
	Mean	Median	Mean	Median	Mean	Median	t-statistic
Offer price ($)	13.14	12.75	12.68	13.00	13.66	13.00	0.97
Issue size (millions of $)	96.21	45.15	81.74	43.10	112.87	48.30	1.04
First-day return (%)	16.22*	10.67	9.28*	5.00	24.22*	20.31	3.73*
Market-adjusted initial return (%)	15.82*	10.44	8.87*	5.01	23.82*	20.00	3.72*
Underwriter spread (%)	6.95	7.00	7.01	7.00	6.88	7.00	−1.10
Size of syndicate	20.73	19.50	21.00	20.00	20.42	19.00	−0.30
Total short position (%)	17.08	15.00	20.34	17.71	13.44	15.00	−4.49*
Overallotment shares exercised (%)	11.48	15.00	9.77	14.98	13.44	15.00	3.56*
Shares short covered in aftermarket (%)	—	—	10.75	10.31	—	—	—

* indicates significant difference from zero at the 5 percent level, assuming normality and independence.

of U.S. IPOs in the 1990s. The average underwriter spread and syndicate size are 6.95 percent and 20.72 firms, respectively. The syndicate starts out with a total short position of 17.08 percent on average, which is higher than the maximum overallotment option of 15 percent. This is the major reason that Ellis et al. (2000) find that the lead underwriter accumulates a positive inventory position. This ex ante short position can be covered either by exercising the overallotment option (up to a maximum of 15 percent) and/or by short covering in the secondary market. Next, we analyze what factors determine which of the two options is used by the underwriters to cover the short position.

Prabhala and Puri (1998) hypothesize that underwriters are more active in aftermarket activities for less risky IPOs. The proxies for risk in their model include offer price, size of offering, and underwriter spread. A comparison of IPOs in which the underwriter covers a short position in the aftermarket versus those in which no short covering is done finds no statistically significant differences between the two groups in terms of average offer price ($12.68 versus $13.66), offering size ($81.74 million versus $112.87 million), and underwriter spread (7.01 percent versus 6.88 percent). Underwriters earn a somewhat higher spread for issues with short covering in the aftermarket than for issues with no aftermarket short covering, but the difference in the means is not statistically significant and the medians are exactly the same at seven percent.

Both groups of issues also have a similar syndicate size.[14] Underwriter spread and the composition of the syndicate are usually determined early in the IPO process, much before the road show; therefore, these results are not surprising. Chowdhry and Nanda (1996) point out that the syndicate abandons stabilization activities after incurring certain losses; however, our analysis suggests that the short position has to be covered completely. Therefore, ex post the syndicate does not have too many options to abandon these activities. If the total short position of the syndicate is 15 percent or less, then the syndicate does have the option to exercise the green shoe and/or cover the short position in the aftermarket. The option of abandoning stabilization as discussed by earlier work would be available only in the case of pure stabilization, but we find that this method is not used.

Raw initial return (RIR) and market-adjusted initial return (MIR) are defined as:

$$\text{RIR} = \frac{(P_1 - OP)}{OP} * 100 \quad \text{and} \quad \text{MIR} = (\text{RIR} - R_m), \tag{1}$$

where, P_1 is the closing price on day 1, OP is the offer price, and R_m is the one-day market return. The proxy used for the market is the Standard and Poor's 500 index.

[14] The lead underwriter performs aftermarket short covering activities on behalf of the syndicate even though the syndicate is disbanded after the distribution of the offering is complete.

As expected, the mean first-day return of 9.28 percent for IPOs with aftermarket short covering is positive, but significantly lower than the mean of 24.22 percent for IPOs with no aftermarket short covering. Table I also reports that the mean total short position is 20 percent and 13 percent for IPOs with and without aftermarket short covering, respectively. The difference between the means of the two groups is statistically significant. Weaker offerings, with lower first-day returns, are the ones for which the total short position is larger and this short position is covered more in the aftermarket rather than by exercising the overallotment option. However, underwriters frequently exercise the overallotment option even for weak offerings because of the gross spread. From the issuer's perspective, if the overallotment is exercised, it gets more proceeds. Flipping tends to put downward pressure on the price of IPOs; therefore, there must be a large enough short position for weak offerings that can be covered in the aftermarket to absorb the flipped shares so that the market price does not fall below the offer price.

For the 53 IPOs with no short covering in the secondary market, the initial short position is covered entirely by exercising the overallotment option. IPOs that jump up in price do not require price support; therefore, short covering is not done in the aftermarket. The exercise of the overallotment option also protects underwriters from buying stock in the aftermarket above the offer price, which would result in losses.

B.3. Short Covering and Initial Returns

Figure 1 shows the strong negative relationship between first-day returns and the percentage of offerings with short covering in the aftermarket. A very large proportion of offerings that have low first-day returns have aftermarket short covering, but the proportion is very small for IPOs with high first-day returns. The percentage of shares short covered in the aftermarket is also high for IPOs with low first-day returns, but the number is small for IPOs with high returns. The reverse relationship is observed for the overallotment option. A small proportion of the 15 percent maximum allowed is exercised for weak offerings, but for offerings with high first-day returns the maximum tends to be exercised. These results are consistent with the findings of Schultz and Zaman (1994), Benveniste et al. (1998), and Logue et al. (1998), who also show that the overallotment option is exercised less for stabilized offerings.

There are 42 IPOs with first-day returns of five percent or less (referred to as weak offerings); 33 of these have short covering in the secondary market and nine do not, as shown in Table II. Seventy-two offerings have first-day returns greater than five percent (referred to as strong offerings); 28 of these have aftermarket short covering and 44 do not. The literature generally proxies for stabilization by assuming that price support is provided only for offerings that trade at or below the offer price. However, underwriters tend to provide price support even for offerings that trade a little above the offer price. If this price support is not provided, then some IPOs that are

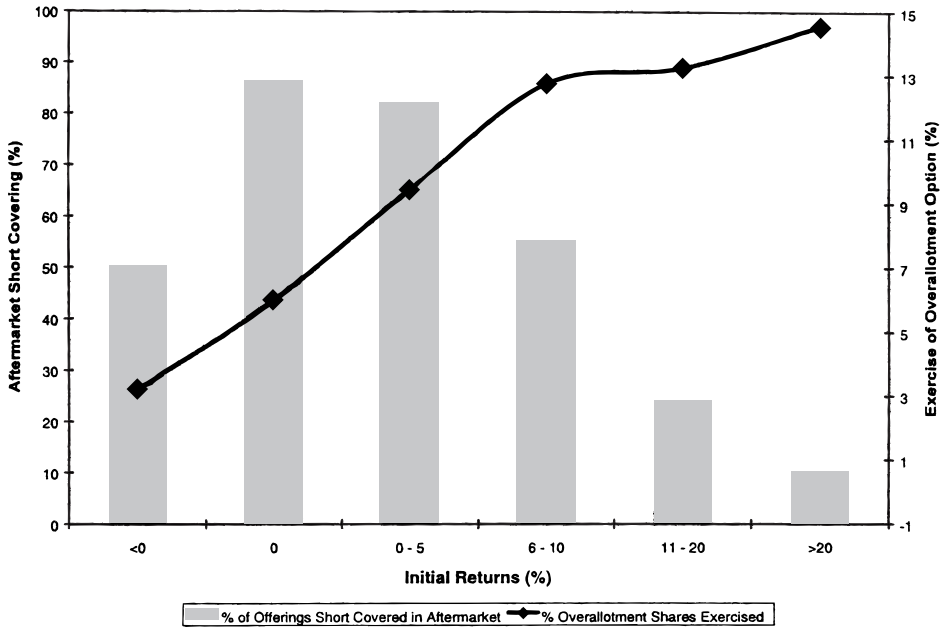

Figure 1. Aftermarket short covering and exercise of overallotment option. The short position can be covered in the aftermarket and/or by exercise of the overallotment option. The relationship between initial returns and the percentage of offerings short covered in the aftermarket versus the exercise of the overallotment option is shown. If initial returns are low then a large proportion of offerings are short covered in the aftermarket and the overallotment option is exercised much less.

observed to be trading above the offer price in the initial aftermarket may actually trade at lower prices. Therefore, a five percent cutoff is used in Table II.[15]

We estimate the percentage of shares short covered in the aftermarket and the losses incurred by the underwriting syndicate in taking up these activities. The percentage of shares short covered (SHORT) is defined as

$$\text{SHORT} = \frac{\text{total short position covered in the aftermarket}}{\text{total number of shares offered}} * 100; \qquad (2)$$

the total number of shares offered is the prospectus amount and does not include the short position. The percentage profit/loss on shorted covering (PROFIT) is defined as

$$\text{PROFIT} = \frac{\text{total profit/loss in covering short position}}{\text{total underwriting fees, in dollars}} * 100. \qquad (3)$$

[15] The analysis is also done using a cutoff of zero percent and the results are similar.

Table II

Short Covering and Initial Returns

Of the 114 IPOs that took place during the period May to July 1997, there are 42 offerings for which the initial return on day 1 relative to the offer price is less than or equal to five percent. For 72 offerings, the first-day return is greater than five percent. First-day return is the percentage difference between the closing price on day 1 and the offer price; market-adjusted return is the raw return adjusted for changes in the S&P 500; underwriter spread is the gross spread in percentage terms; size of syndicate is the total number of investment bankers forming the syndicate; total short position is the short position of the syndicate at the time of the initial IPO allocation as a percentage of the total number of shares offered; overallotment shares exercised is the number of overallotment shares exercised as a percentage of the total number of shares offered; shares short covered is the total number of shares short covered in the aftermarket as a percentage of the total number of shares offered; profit (loss) on shorted shares is total profit (loss) related to short covering activities in the aftermarket expressed as a percentage of the underwriting gross spread; number of short transactions is the total number of transactions done in the aftermarket to cover the short position; and days to cover short is the number of days taken to cover the short position in the aftermarket. If no overallotment shares are exercised, then zero is used to calculate the mean and median.

	First-Day Return ≤ 5% (N = 42)				First-Day Return > 5% (N = 72)			
	No Short Covering in Aftermarket (N = 9)		Short Covering in Aftermarket (N = 33)		No Short Covering in Aftermarket (N = 44)		Short Covering in Aftermarket (N = 28)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Offer price ($)	7.83	7.50	11.36	10.50	14.85	14.00	14.24	14.00
Issue size (millions of $)	22.80	19.60	64.22	35.70	131.29	58.15	102.38	51.05
First-day return (%)	0.01	0.00	0.68	0.76	29.17*	22.65	19.41*	17.22
Market-adjusted initial return (%)	−0.65	−1.10	0.17	0.33	28.83*	23.29	19.13*	17.14
Underwriter spread (%)	7.05	7.00	7.10	7.00	6.84	7.00	6.91	7.00
Size of syndicate	17.11	14.00	20.97	20.00	21.09	19.00	21.04	20.00
Total short position (%)	8.34	10.80	21.55	18.48	14.49	15.00	18.81	15.80
Overallotment shares exercised (%)	8.34	10.80	7.12	5.06	14.49	15.00	12.89	15.00
Shares short covered in aftermarket (%)	—	—	14.43	14.39	—	—	6.09	3.27
Profit (loss) on short covering in aftermarket (%)	—	—	1.25	0.00	—	—	(9.78)	(3.68)
Number of short covering transactions	—	—	27.06	8.00	—	—	16.14	3.00
Days to cover short in aftermarket	—	—	14.21	9.00	—	—	19.58	7.00

* indicates significant difference from zero at the 5 percent level, assuming normality and independence.

The profit/loss on each short covering transaction is calculated as: profit(loss) on each transaction = (offer price-short cover price) ∗ number of shares bought; and the total profit/loss is the sum of the profit/loss on each transaction. We know the exact price at which each short covering transaction is done. All of these short covering transactions are in the aftermarket and are not part of the green shoe.

In our sample, there are six offerings with negative returns on day 1, ranging from −15 percent to −3.41 percent. In three of these offerings, there are short positions of 18.00, 18.06, and 14.61 percent, resulting in short covering profits of 35, 5.29, and 25.82 percent of underwriting fees, respectively. Even though this sample is limited, the results clearly show that IPOs with price declines on day 1 are also being stabilized, a result that is contrary to the assumption of Prabhala and Puri (1998). In fact, the short position covered in the aftermarket is very large for these cases. It is possible that in spite of stabilization, the price continues to drop, as can be seen in the sample case discussed in Section B.1 above. Note as well that the three IPOs with negative returns that do not have short covering are done by very small underwriters.

Fourteen IPOs close on the first day at a price equal to the offer price. In 12 of these 14 IPOs, the underwriter covers a short position in the aftermarket. The underwriter starts out with a short position in excess of the 15 percent overallotment option (naked short) in six out of 14 cases. Twenty-two IPOs have returns greater than zero but less than five percent on the first trading day; 18 of these 22 offerings also have short covering in the aftermarket.[16]

Table II shows that aftermarket short covering is done for 79 percent of weak offerings (first-day returns less than or equal to five percent) and 39 percent of strong offerings (first-day returns greater than five percent). The total short position taken ex ante is larger for weak offerings and a large proportion of this short position is covered in the aftermarket ex post as compared to strong offerings. Only a small proportion of the total short position is covered by exercising the overallotment option for weak offerings. These results suggest that when underwriters expect the offering to be weak, they start out with a large short position (in excess of 15 percent) which they expect to cover in the aftermarket to stabilize the offering. If the offering is weak, then on average no money is lost on the short covering transactions in the aftermarket; instead, underwriters have a mean profit of 1.25 percent of their direct fees. If the offering is strong and underwriters have to cover the short in the aftermarket, possibly because they have a short position in excess of the 15 percent, then they incur a mean loss of 9.78 percent (median of 3.68 percent). The green shoe option makes it less risky and less expensive to provide price support via a short position than by placing pure sta-

[16] The average short position covered in the aftermarket amounts to 2.28 percent and 0.62 percent for IPOs whose initial returns are between 11 and 20 percent and above 20 percent, respectively.

bilization bids. Pure stabilization would involve placing bids to buy shares and holding on to inventory of overpriced stock. Price support through aftermarket short covering is relatively inexpensive because of the ability of the underwriter to manage aftermarket activities.

It takes 27 transactions and 14 days to complete short covering in the aftermarket for weak offerings. In the sample, the maximum number of transactions required is 243 and the maximum number of days needed to cover the short position is 95. Although aftermarket short covering of certain issues can continue for many days, on average short covering is done in a few days. Underwriters generally engage in aftermarket short covering either when the stock initially starts trading or when they see the stock price weakening the most.

B.4. Short Covering and IPO Price Filing Range

Benveniste and Spindt (1989), Hanley (1993), and Ritter (1998), among others, discuss how the book building process is used to assist in pricing IPOs. The final offer price is partially adjusted to reflect the information gathered from prospective investors. Similarly, underwriters must also decide the size of the short position before the IPO takes place. If the short position is in excess of 15 percent (naked short), the underwriter is ex ante committed to providing price support. Ex post the underwriter has to decide the proportion of the overallotment option to exercise and this reduces the total short position. IPOs with upward price revisions are likely to have more underpricing.

We examine IPOs based on whether the final offer price is above the filing range, below the filing range, or within the range. As shown in Table III, if the actual offer price is above the filing range, then the average returns on day 1 are very high at 27.71 percent, the average total short position is 15.26 percent, the average percentage of shorted shares covered in the aftermarket is only 3.31 percent, and the average loss on short covering as a percentage of gross spread is 2.69 percent.[17] When the offer price is set above the range, the underwriter knows there is a high probability of the offering doing well and, therefore, ex ante they usually take a total short position that can be covered by the green shoe. In other words, 115 percent of the shares are allocated. Short covering in the aftermarket is done for only 10 of 29 IPOs in this category.

In contrast, aftermarket short covering is done in 81 percent of the cases in which the final offer price is below the filing range. On average, the total short position for these offerings is 23 percent and the short position covered in the aftermarket is also much higher at 16 percent. In this group, 122.66 percent of the shares are allocated but only 106.97 percent are issued. The

[17] The analysis is performed using the amended filing range and the preliminary filing range. Because the overall results are quite similar, the reported results are based on the amended filing range.

Table III

Short Covering and Filing Range of IPOs

Of the 114 IPOs, there are 29 offerings in which the offer price is set above the amended filing range, 64 offerings in which the offer price is within the amended filing range, and 21 offerings in which the offer price is below the amended filing range. First-day return is the percentage difference between the closing price on day 1 and the offer price; total short position is the short position of the syndicate at the time of the initial IPO allocation as a percentage of the total number of shares offered; overallotment shares exercised is the number of overallotment shares exercised as a percentage of the total number of shares offered; shares short covered is the total number of shares short covered in the aftermarket as a percentage of the total number of shares offered; percentage (profit) loss on shorted shares is total profit (loss) related to short covering activities in the aftermarket expressed as a percentage of the underwriting gross spread; and days to cover short is the number of days taken to cover the short position in the aftermarket. If no overallotment shares are exercised, then zero is used to calculate the mean and median. The mean and median are calculated only for offerings with short covering.

	Offer Price > Filing Range (N = 29)		Offer Price within Filing Range (N = 64)		Offer Price < Filing Range (N = 21)	
	Mean	Median	Mean	Median	Mean	Median
First-day return (%)	27.71*	22.71	14.29*	9.24	4.09*	2.45
Total short position (%)	15.26	15.00	16.05	15.00	22.66	17.56
Overallotment shares exercised (%)	14.06	15.00	10.79	15.00	9.96	14.98
Shares short covered in aftermarket (%)	3.31	0.19	10.45	11.43	15.69	11.95
Percentage of offerings short covered in aftermarket (%)	34.48	—	50.00	—	80.95	—
Profit (loss) on short covering in aftermarket (%)	(2.69)	(0.55)	(1.83)	(0.53)	(7.49)	(0.31)
Days to cover short in aftermarket	10.90	1.50	19.84	10.00	13.76	9.00

* indicates significant difference from zero at the 5 percent level, assuming normality and independence.

Table IV

Frequency of Aftermarket Short Covering after the Offering Date

The table shows the percentage of offerings for which short positions are covered in the aftermarket on each trading day after the offering day. For the total of 114 IPOs, some short covering is done in the aftermarket in 61 offerings (53.51 percent of the offerings).

	IPOs (N = 114)	
Day After Offering	Number Stabilized	Percentage Stabilized
Day 1	61	53.51%
Day 2	41	35.96%
Day 3	38	33.33%
Day 4	35	30.70%
Day 5	35	30.70%
Day 6	35	30.70%
Day 7	33	28.95%
Day 8	32	28.07%
Day 9	29	25.44%
Day 10	26	22.81%
Day 15	22	19.30%
Day 20	18	15.79%
Day 25	11	9.65%
Day 30	7	6.14%
Day 35	7	6.14%
Day 40	7	6.14%

mean loss on aftermarket short covering activities is 7.49 percent, but this result is due to one outlier. The median loss for this group is the smallest at 0.31 percent. When the offer price is below the range, the expectation is that the offering will be a weak one. Underwriters therefore take a large total short position in these offerings and the proportion covered in the aftermarket also tends to be large. It also takes much longer to cover the short position in IPOs in which the offer price is below the filing range, as compared with IPOs in which the offer price is above the filing range.

B.5. Duration of Aftermarket Short Covering Activities

Earlier research has had to make assumptions about the length of time for which underwriters provide price support. We are able to directly observe the duration of aftermarket short covering activities. Most price support activities end within 10 to 15 trading days, but in some cases they continue for months. Table IV shows the frequency distribution of the number of days for which aftermarket short covering continues. In the sample, more than half of the IPOs have short covering transactions in the aftermarket. By trading day 10, almost 23 percent of IPOs are still being covered, but this falls to six percent by trading day 40. There is no regulation that restricts the duration of these activities. Penalty bids are generally lifted within 30

calendar days and the overallotment option is also typically exercised during this 30-day period. The short position that is established ex ante must be covered ex post either in the aftermarket and/or by exercising the overallotment option. If the ex ante short position is greater than 15 percent, then part of it has to be covered in the aftermarket. However, because the underwriter has 30 days to exercise the overallotment option, it can observe the aftermarket performance of the IPO before deciding how to cover the short position.

C. Impact of Penalty Bids

Penalty bids are another type of aftermarket activity in which the selling concession is taken away from a syndicate member who allocates shares to a client who subsequently flips the shares. The purpose of penalty bids is to restrict the supply of shares in the aftermarket and they are assessed ex post. Penalty bids are imposed to discourage flipping of IPOs when there is weak demand. The data include information on penalty bids for 112 IPOs and indicate whether or not a penalty bid is contractually specified in the underwriting contract. Penalty bids might be part of the contract, but the lead underwriter may decide not to assess them. In 54 of the 112 cases, a penalty bid is part of the contract, but it is actually assessed in only 28 cases (see Table V).

Penalty bids tend to be assessed in offerings in which first-day returns are low (mean of 8.20 percent). A large percentage of these offerings (60 percent) have aftermarket short covering with a large percentage of shares being bought back in the aftermarket (13.14 percent). Therefore, it can be concluded that penalty bids are assessed selectively in weak offerings. If the syndicate has a very large short position, it buys actively in the aftermarket and it does not want flipping of shares.[18] When penalty bids are assessed, the mean short covering losses are only 0.99 percent. This result is expected because these offerings tend to be weak and their prices do not jump up much. The green shoe option is exercised less for offerings in which penalty bids are assessed.

Penalty bids are contractually specified and assessed to deter flipping.[19] An open question is whether penalty bids are effective. An indirect way to determine this is to examine the trading volume of IPOs in which penalty bids are contractually specified. As seen in Table V, the average trading volume on day 1 is 67.59 percent of the shares offered for the 58 IPOs in which penalty bids are not part of the contract, 56.14 percent for the 54 IPOs in which penalty bids are part of the contract, and 48.59 percent for IPOs in which penalty bids are actually assessed. The volume turnover is almost 20 percent lower for the group with penalty bids assessed compared to the group that has no penalty bids specified in the contract.

[18] Even though the syndicate is disbanded earlier, the short covering activity is done by the lead manager on behalf of the whole syndicate.

[19] For example, see Siconolfi and McGeehan (1998a).

Table V

IPOs with and without Penalty Bids

There are 112 IPOs for which information on penalty bids is available. In 58 offerings, penalty bids are not part of the contract between underwriters; in 54 offerings penalty bids are part of the contract. Of the 54 issues in which penalty bids are possible, they are actually assessed in 28 cases. When a penalty bid is assessed the selling concession has to be given up. The table provides mean and median descriptive statistics for issues with penalty bids not imposed, penalty bids imposed, and penalty bids imposed and assessed. First-day return is the percentage difference between the closing price on day 1 and the offer price; market-adjusted return is the raw return adjusted for changes in the S&P 500; underwriter spread is the gross spread in percentage terms; size of syndicate is the total number of investment bankers forming the syndicate; total short position is the short position of the syndicate at the time of the initial IPO allocation as a percentage of the total number of shares offered; overallotment shares exercised is the number of overallotment shares exercised as a percentage of the total number of shares offered; shares short covered is the total number of shares short covered in the aftermarket as a percentage of the total number of shares offered; profit (loss) on shorted shares is total profit (loss) related to short covering activities in the aftermarket expressed as a percentage of the underwriting gross spread; and volume turnover is reported for one, two, five, and 10 days after the offering. If no overallotment shares are exercised, then zero is used to calculate the mean and median. The mean and median are calculated only for offerings with short covering.

	Penalty Bids Not in Contract (N = 58)		Penalty Bid in Contract (N = 54)		Penalty Bids Assessed (N = 28)	
	Mean	Median	Mean	Median	Mean	Median
Offer price ($)	13.90	13.75	12.49	12.00	11.79	11.75
Issue size (millions of $)	104.09	46.30	90.49	47.45	96.47	43.70
First-day return (%)	19.38*	13.39	13.48*	5.82	8.20*	4.58
Market-adjusted initial return (%)	18.97*	13.69	13.09*	6.20	7.89*	4.77
Underwriter spread (%)	6.96	7.00	6.93	7.00	6.94	7.00
Size of syndicate	18.69	18.00	22.96	22.00	21.64	18.50
Total short position (%)	18.26	15.00	15.81	15.07	15.55	15.17
Overallotment shares exercised (%)	12.59	15.00	10.15	15.00	8.80	15.00
Shares short covered in aftermarket (%)	13.14	11.66	9.22	9.94	11.06	15.00
Profit (loss) on short covering in aftermarket (%)	(6.23)	(3.21)	(1.72)	(0.42)	(0.99)	0.00
Percentage of offerings short covered in aftermarket (%)	43.10	—	61.11	—	60.71	—
Vol. turnover on day 1	67.59	63.24	56.14	51.21	48.59	51.20
Vol. turnover on day 2	13.74	12.06	12.70	8.90	9.78	9.34
Vol. turnover on day 5	5.97	3.87	4.49	3.47	4.66	3.58
Vol. turnover on day 10	3.23	2.36	2.25	1.92	1.98	1.69

* indicates significant difference from zero at the 5 percent level, assuming normality and independence.

Penalty bids do seem to restrict flipping and therefore provide indirect price support. However, there might be other issue-related characteristics that may be partially responsible for the lower turnover. For example, initial returns are much lower for the group of IPOs in which penalty bids are assessed. Some of the volume might be due to day traders, but this percentage is expected to be small. Even with penalty bids, turnover is quite high at almost 50 percent. This means some investors are not restricted.[20] Hanley et al. (1996) indirectly show that the extent of flipping is related to share allocations to second- and third-tier syndicate members in the case of closed-end funds.

D. Aftermarket Activities and IPO Returns

D.1 Regression Results

The literature has tried to examine which offering-specific variables might explain aftermarket returns. Prabhala and Puri (1998) use offer price, size of offering, and spread as proxies for risk to test their hypothesis that only less risky IPOs are stabilized. In our models we include both traditional variables discussed in the literature and explanatory variables related to aftermarket activities.

We perform a regression analysis to examine whether aftermarket activities are significant in explaining market-adjusted cumulative returns one trading day (CDRET1), 20 trading days (CDRET20), and 40 trading days (CDRET40) after the offering. The independent variables are as follows:

RELPRICE - final offer price minus midpoint of filing range

SIZE - log of proceeds, in millions

DPENALTY - dummy equal to one if a penalty bid is assessed and zero otherwise

SHORT - percentage of shares short covered in the aftermarket

PROFIT - percentage profit (loss) on shares short covered in the aftermarket

SYNSIZE - number of investment banks in syndicate

SPREAD - percentage underwriter spread

OVERALL - percentage overallotment exercised (maximum is 15 percent).

Two sets of models are estimated in Table VI. The models are estimated with and without the percentage of overallotment shares exercised (OVERALL) as an independent variable to explain cumulative abnormal returns because these two variables are almost certainly jointly determined.

The final offer price relative to the filing range (RELPRICE) and the aftermarket short covering dummy (SHORT) are statistically significant in explaining returns on days 1, 20, and 40. The profit/loss incurred in after-

[20] Some states have launched a probe into penalty bids to examine how penalty bids are assessed and whether the practice is applied differently to flipping by individual versus institutional investors. For details see Siconolfi and McGeehan (1998b).

Table VI

Regression Results for Aftermarket Returns

Results for regressions of cumulative market-adjusted returns on day 1 (CDRET1), day 20 (CDRET20), and day 40 (CDRET40) on: relative price (RELPRICE), the final price minus the midpoint of the original filing range; the log of proceeds (SIZE); the size of the syndicate (SYNSIZE); the percentage gross spread (SPREAD); the percentage of shares short covered in the aftermarket (SHORT); the percentage of profit or loss due to short covering (PROFIT); the dummy variable (DPENALTY), which equals one if the penalty bid was assessed and zero otherwise; and the percentage of overallotment shares exercised (OVERALL). *t*-statistics are in parentheses.

	Without Percentage of Overallotment Shares Exercised			With Percentage of Overallotment Shares Exercised		
	CDRET1	CDRET20	CDRET40	CDRET1	CDRET20	CDRET40
Constant	13.13	32.16	58.77	4.85	16.07	42.09
	(0.33)	(0.61)	(0.89)	(0.13)	(0.34)	(0.68)
RELPRICE	4.16	5.37	5.80	3.93	4.92	5.34
	(3.16)*	(3.09)*	(2.65)*	(3.11)*	(3.13)*	(2.59)*
SIZE	−0.00	−1.26	−2.75	−1.14	−3.48	−5.05
	(−0.00)	(−0.28)	(−0.49)	(−0.35)	(−0.86)	(−0.96)
SYNSIZE	−0.14	−0.05	0.28	−0.13	−0.03	0.30
	(−0.64)	(−0.16)	(0.76)	(−0.62)	(−0.11)	(0.87)
SPREAD	1.75	0.12	−3.05	1.40	−0.56	−3.76
	(0.40)	(0.024)	(−0.42)	(0.33)	(−0.11)	(−0.54)
SHORT	−11.35	−16.89	−16.78	−7.19	−8.80	−8.39
	(−2.68)*	(−3.02)*	(−2.38)*	(−1.68)**	(−1.65)**	(−1.20)
PROFIT	−0.16	−0.55	−0.67	−0.03	−0.29	−0.40
	(−0.97)	(−2.48)*	(−2.38)*	(−0.18)	(−1.42)	(−1.47)
DPENALTY	−5.34	−10.01	−10.97	−2.96	−5.39	−6.18
	(−1.18)	(−1.67)**	(−1.45)	(−0.67)	(−0.98)	(−0.86)
OVERALL	—	—	—	1.10	2.13	2.21
				(3.08)*	(4.81)*	(3.81)*
Adjusted R^2	20.43	24.68	18.74	26.82	38.67	28.68
F-statistic	4.82	5.87	4.43	5.76	9.20	6.23

* and ** indicate significance at the 5 and 10 percent levels, respectively, assuming normality and independence.

market short covering is also significant in explaining CDRET20 and CDRET40. The dummy variable for whether a penalty bid is assessed (DPENALTY) is significant for the model with CDRET20 as the dependent variable. The variables related to aftermarket activities of underwriters are important in explaining aftermarket returns. If these variables are included in the model, some of the traditional variables such as the size of the offering are no longer significant.

In the next set of model estimations, we include the percentage of overallotment shares exercised (OVERALL). The exercise of the overallotment option is statistically significant in all of the models along with the relative

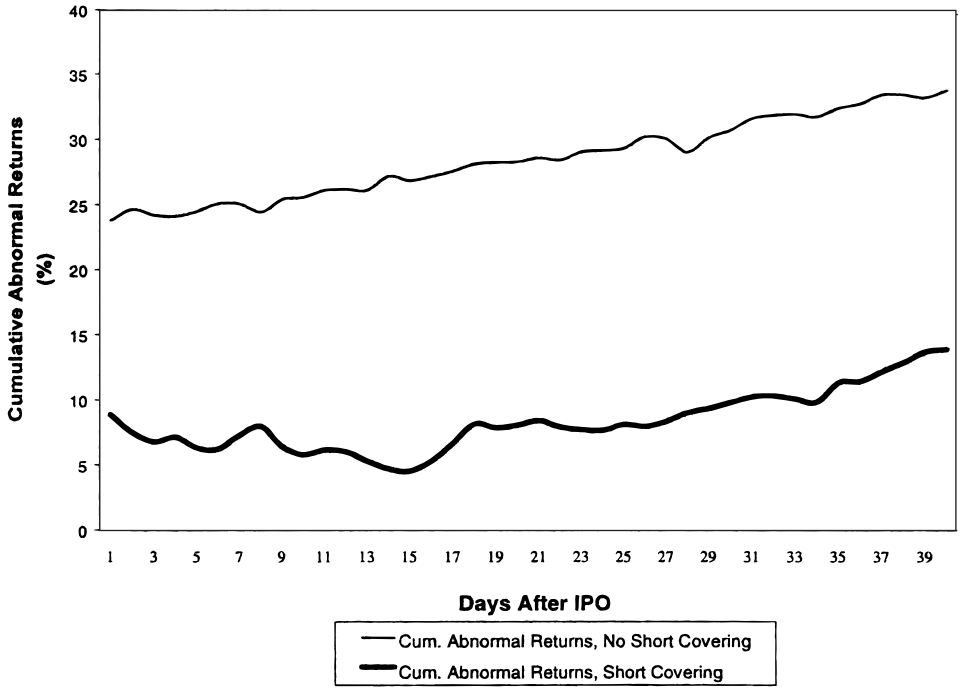

Figure 2. Cumulative abnormal returns with and without aftermarket short covering. Aftermarket returns are shown from trading day 1 to trading day 40 for the group of 53 offerings that had no short covering in the aftermarket and for the group of 61 offerings that did have aftermarket short covering. Weak offerings needed price support and short covering was typically done for them.

final offer price (RELPRICE). The SHORT variable is also significant in explaining CDRET1 and CDRET20. The adjusted R^2 ranges from 18.74 percent to 24.68 percent when OVERALL is not included as an independent variable, and from 26.82 to 38.67 percent when it is included.[21]

D.2. Short Covering and IPO Returns

An unresolved question in the literature is whether stabilization has a temporary or permanent effect on the price. Figure 2 and Table VII show the mean cumulative abnormal returns (CARs) for IPOs with and without short

[21] The overlapping time periods in the sample can overstate the test statistic from an ordinary least squares regression; therefore, we also use a generalized method of moments approach suggested by Richardson and Smith (1991) and expanded by Andrews (1991) to explicitly model the dependencies. The explanatory variables related to short covering (SHORT, PROFIT) continue to be significant in most models without OVERALL. DPENALTY is not significant in the models.

Table VII

Cumulative Market-Adjusted Returns for IPOs

Market-adjusted return is the raw return adjusted for changes in the S&P 500. Raw returns are changes in the closing price from one day to the next day. For day 1, return is calculated using the offer price. The returns reported in the table are cumulated and equal $\sum_{i=1}^{N}\sum_{t=1}^{T}(R_{it}-R_{mt})*1/N$, where R_{it} is the return on offering i in period t, and R_{mt} is the corresponding return on the market. The results are reported here for IPOs with and without aftermarket short covering.

	Short Covering in Aftermarket (N = 61)		No Short Covering in Aftermarket (N = 53)		Difference in Means
Market-Adjusted Cum. Return on Trading Day	Mean (%)	Median (%)	Mean (%)	Median (%)	t-statistic
1	8.87	4.59	23.82	19.55	3.89*
2	7.53	2.98	24.65	21.14	4.19*
5	6.33	1.56	24.53	19.78	4.27*
10	5.83	1.12	25.61	19.53	4.26*
20	8.11	4.50	28.37	21.50	3.91*
30	9.87	6.45	30.88	29.74	3.63*
40	14.01	13.66	34.02	32.22	3.14*

* indicates significant difference from zero at the 5 percent level, assuming normality and independence.

covering. The short covering group consists of all of the 61 offerings in which a short position is covered, irrespective of how long it takes to cover the short. Day 1 is the first trading day after the offering date. IPOs with no short covering have much higher returns than IPOs with short covering. The offerings with short covering show a slight decline in cumulative abnormal returns for the first few days, but the returns start to drift upward after about 15 days. Our findings for aftermarket returns are very similar to the results of Benveniste et al. (1998) for stabilized and nonstabilized offerings.

The mean cumulative market-adjusted returns start at 8.87 percent on day 1 and drop to 5.83 percent by day 10 for the short covering group, as seen in Table VII. However, by day 20, the mean cumulative market-adjusted returns are 8.11 percent and they rise to 14.01 percent by day 40. The mean cumulative market-adjusted return for IPOs in which no short covering is done starts at 23.82 percent on day 1, goes to 25.61 percent by day 10, rises to 28.37 percent on day 20, and is at 34.02 percent by day 40. There is no downward drift for this group of IPOs between days 5 and 10. The difference in the CARs for each time period is statistically significant for the two groups.[22] The analysis also shows that the lead manager takes 16.58 days on average to cover the short position with the median being eight days.

[22] The overallotment option does not have to be exercised typically for 30 calendar days, therefore it is possible that an IPO that starts with a price rise but is hit with selling pressure

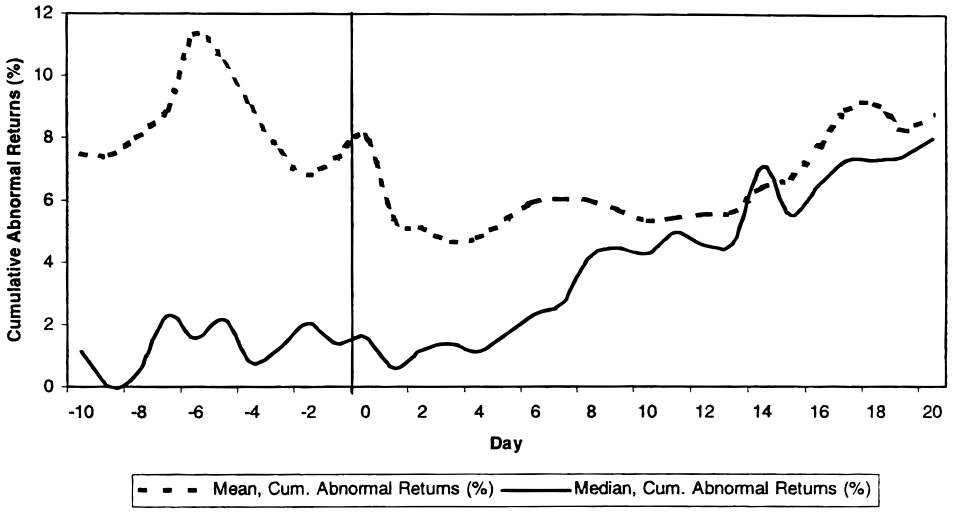

Figure 3. Cumulative abnormal returns for IPOs with aftermarket short covering. The mean and median cumulative abnormal returns are shown for offerings with aftermarket short covering. Day 0 is the last day of aftermarket short covering. The time period is the days during which aftermarket short covering is carried out. The number of days for which short covering is done varies from offering to offering. The analysis is continued for 20 trading days after short covering in the aftermarket is completed.

We further examine the price performance of IPOs after short covering stops. Figure 3 plots mean and median cumulative abnormal returns during and after the period when short covering stops. Day 1 in the graph is the first day after short covering has stopped. Both the mean and median cumulative abnormal return fall when short covering activities are completed. However, the graph also shows that prices bounce back up again after a few days. Stabilization seems to have a permanent rather than a temporary effect. Schultz and Zaman (1994) find similar evidence, but Hanley, Kumar, and Seguin (1993) find a negative drift after 10 days, and conclude that the effect is temporary.

IV. Summary and Conclusions

This paper uses a unique data set to examine exactly what types of aftermarket activities underwriters engage in, how long these activities last, what costs the underwriters incur, and how the combination of these activities helps to provide price support to weak IPOs. Three types of aftermarket

after 15 trading days may, at that point, have the overallotment option exercised. So aftermarket short covering may be done toward the end of this period.

activities are discussed: pure stabilization, short covering, and penalty bids. One of the major findings is that pure stabilization does not occur; underwriters do not post "stabilizing bids" to provide price support, as has been previously hypothesized in the literature.

The forms of aftermarket activity that do occur are aftermarket short covering to stimulate demand and penalty bids to restrict supply. However, neither of these activities can be observed by public investors in the secondary market. Aftermarket short covering achieves the same purpose as pure stabilization but is less risky and can be done without disclosure. Underwriters have to decide on the size of the short position ex ante. If a short position in excess of the overallotment maximum of 15 percent (naked short) is established, the commitment to short cover in the aftermarket is made even before the firm goes public. After the firm goes public, the underwriter still has the flexibility to decide how much of the short position to cover by exercising the overallotment option (up to a maximum of 15 percent).

The costs of aftermarket short covering to the lead underwriter are found to be minimal, amounting to three to four percent of the underwriting fees. The selective use of the overallotment option helps to reduce the costs of these price support activities. Aftermarket short covering tends to last for 10 to 15 days and helps to absorb flipped shares which may otherwise put downward pressure on the price of weak offerings. Penalty bids are also often used in IPOs to discourage flipping and are specified in almost 50 percent of the contracts during our sample period. The penalties are actually assessed in about half of these cases, predominantly for weaker offerings.

The literature has generally assumed that stabilization is done only for offerings that are trading at or below the offer price. We find that underwriters are actively engaged in aftermarket activities even for offerings that are trading a little above the offer price. These offerings would probably trade at or below the offer price if underwriters were not engaged in aftermarket activities.

The results presented in this paper show that underwriters manage the stabilization process and limit their losses by using a combination of short covering in the aftermarket, penalty bids, and exercise of the overallotment option. These activities are relatively inexpensive because the underwriter can manage the process. Aftermarket price support activities by underwriters are performed in ways that are not transparent to investors, regulators, or researchers. However, because these activities have a pronounced effect on IPO price behavior, they are clearly of interest to both IPO researchers and investors. The results presented here also pose a challenge to regulators. The activity to which current regulations are addressed—pure stabilization—does not occur, probably in part *because* it is regulated. Underwriters have developed other mechanisms to achieve the same ends with less cost, risk, and disclosure. Flexible and effective public policy should be designed to be responsive to new as well as to old forms of price-influencing activities by underwriters.

Appendix. Aftermarket Short Covering Transactions for One Sample IPO

Shares offered = 3,670,000; Overallotment option = 550,500 shares; Syndicate size = 25
Total short position = 600,700; Overallotment shares exercised = 0; Gross spread = 7 percent

	Offer Price	Short Covering Price	Offer − Short Covering Price	Shares Short Covered	Profit (Loss) on Short Covering
6/20/97	15.00	15.000	0.000	27100	0
6/20/97	15.00	15.000	0.000	35000	0
6/20/97	15.00	15.000	0.000	30000	0
6/20/97	15.00	15.000	0.000	30300	0
6/20/97	15.00	15.000	0.000	44900	0
6/20/97	15.00	15.125	−0.125	15000	−1875
6/20/97	15.00	15.000	0.000	19000	0
6/20/97	15.00	15.000	0.000	17900	0
6/20/97	15.00	15.000	0.000	25000	0
6/20/97	15.00	15.000	0.000	29100	0
6/23/97	15.00	15.500	−0.500	3000	−1500
6/23/97	15.00	15.125	−0.125	5500	−687.5
6/23/97	15.00	15.000	0.000	200	0
6/23/97	15.00	15.000	0.000	2000	0
6/23/97	15.00	15.000	0.000	5900	0
6/24/97	15.00	15.000	0.000	20100	0
6/24/97	15.00	15.000	0.000	22400	0
6/24/97	15.00	15.000	0.000	10000	0
6/24/97	15.00	15.000	0.000	16000	0
6/24/97	15.00	15.000	0.000	6900	0
6/25/97	15.00	15.000	0.000	3300	0
6/25/97	15.00	14.750	0.250	19200	4800
6/25/97	15.00	15.000	0.000	2400	0
6/25/97	15.00	15.000	0.000	9400	0
6/25/97	15.00	14.750	0.250	3700	925
6/25/97	15.00	14.750	0.250	40000	10000
6/25/97	15.00	15.000	0.000	21000	0
6/25/97	15.00	14.500	0.500	4000	2000
6/25/97	15.00	14.000	1.000	20000	20000
6/25/97	15.00	14.000	1.000	10400	10400
6/26/97	15.00	13.750	1.250	25000	31250
6/26/97	15.00	13.500	1.500	25000	37500
6/26/97	15.00	13.500	1.500	20000	30000
6/26/97	15.00	14.500	0.500	19000	9500
7/2/97	15.00	14.000	1.000	13000	13000
Total shares short covered				600,700	
Shares short covered as percentage of shares offered				16.37%	
Profit on short covering ($)				165,313	
Profit on short covering as percentage of underwriting fees				4.29%	

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