Stock Price Management and Share Issuance: Evidence from Equity Warrants

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Abstract

We investigate whether firms manage stock prices in anticipation of share issuance. Warrant exercise results in share issuance and warrant expiration dates are fixed years in advance, which precludes market timing. We predict firms manage stock prices to prevent (induce) warrant exercise when exercise is dilutive (anti-dilutive) to existing shareholders. To test our prediction, we examine stock returns around warrant expiration dates. We find that the difference between out-of-the-money (OTM) and in-the-money (ITM) firms' return patterns (i.e., post-expiration minus pre-expiration returns) is positive, and OTM (ITM) firms' return pattern is positive (negative). Return patterns of three sets of pseudo warrant firms differ from patterns of warrant firms. Return patterns are stronger when more feasible price changes are required to affect warrant expiration status, and firm-issued news items is a mechanism for price management. Thus, our findings provide evidence that firms engage in stock price management in anticipation of share issuance.

Keywords: Warrants; Market timing; Expectations management; Share issuance

JEL Codes: G14; G15; G32; M41

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I. INTRODUCTION

The question we address is whether firms manage stock prices in anticipation of share issuance. We address this question in the context of equity warrants, which result in share issuance when they are exercised.[1] We focus on warrants because warrant exercise dates are fixed years in advance and option pricing theory shows that, absent dilutive dividends, warrant holders should not exercise warrants prior to expiration. To provide evidence on stock price management, we examine the difference in the pattern of stock returns before and after warrant expiration dates between firms with warrants whose exercise is expected to be dilutive to existing shareholders and firms with warrants whose exercise is expected to be anti-dilutive. We find a predicted significant positive difference in these return patterns, which is consistent with firms managing stock prices in anticipation of warrant expiration to prevent (induce) exercise when issuing the associated shares is expected to be dilutive (anti-dilutive) to existing shareholders. Taken together, our findings reveal that in anticipation of share issuance firms engage in stock price management to increase value for existing shareholders.

Prior research documents negative stock returns following share issuance and offers two explanations for this finding. The first explanation is market timing, whereby firms issue shares when investors overvalue the firm's shares. The market timing explanation relies on firms taking stock price as given and selecting the timing of the share issuance. The second explanation is expectations management, whereby firms manage upward investor expectations,

[1] Throughout we refer to "equity warrants" as "warrants," which are call options written by firms on their own common shares. Also, we use the terms "firms" and "managers" when referring to actions by firms' managers.

and therefore stock price, prior to a planned share issuance. That is, rather than responding to price changes, firms manage investors' perception of firm value, and thus stock price.

The market timing and expectations management explanations are not mutually exclusive in that firms could both time the market and manage expectations. Although market timing is the typical explanation in prior research for negative returns following share issuance, it is an open question whether expectations management contributes to negative post-issuance returns. Evidence in prior research supporting the expectations management explanation is inconclusive because the evidence also could be attributable to market timing. This is because the research focuses on share issuance when firms select the issuance date, such as Initial Public Offerings (IPOs) and Secondary Equity Offerings (SEOs), which introduces the possibility that firms time the market. Without ruling out the possibility of market timing, it is not possible to provide conclusive evidence of expectations management in anticipation of share issuance.

Focusing on share issuance associated with warrant exercise has two key advantages over prior research investigating expectations management in anticipation of share issuance. First, and most importantly for our research question, warrant exercise can result in share issuance at warrant expiration dates that are fixed several years in advance. Thus, there is no potential for firms to time the market, assuming firms cannot predict stock price that far in advance. Because market timing largely is ruled out in this setting, we can attribute evidence of predicted return patterns to expectations management. Second, by issuing warrants, a firm commits to issuing shares if the warrant terms are met. Thus, we observe, and our tests include, firms that were committed to issue shares but did not because warrant terms were not met. As a result, our inferences are less susceptible to self-selection concerns than prior research, which usually uses as controls firms that did not contemplate issuing equity as well as firms that contemplated doing

so but chose not to. Moreover, warrant exercise can be economically significant; for our sample firms, shares outstanding would increase by about 27% on average if all warrants were exercised.

Warrant exercise results in share issuance when the warrants are in-the-money (ITM), and in no shares being issued when they expire out-of-the-money (OTM). Thus, we predict that warrant expiration on a pre-determined date creates incentives for firms to manage stock prices upward or downward depending on whether warrant exercise would increase the value of equity held by the firms' existing shareholders. Specifically, assuming firms act in the interest of existing shareholders, we expect firms to manage investors' expectations to increase stock price and induce warrant exercise—and share issuance—when the warrant exercise price exceeds the firm's belief of its intrinsic value (i.e., when the warrant is anti-dilutive to existing shareholders). In contrast, we expect firms to manage investors' expectations to decrease stock price and prevent warrant exercise—and share issuance—when the warrant exercise price is below the firm's belief of its intrinsic value (i.e., when the warrant is dilutive to existing shareholders).

Because the intrinsic value of equity is unobservable, we assume the firm strategically determines the expiration status of a warrant (i.e., OTM or ITM) and, thus, the status reveals the firm's belief regarding whether the warrant is dilutive or anti-dilutive to existing shareholders. That is, if a warrant is OTM (ITM), we assume exercise is dilutive (anti-dilutive) for existing shareholders. Thus, we address our research question by testing whether the difference between OTM and ITM warrant firms' return patterns around warrant expiration dates is consistent with our prediction. In particular, for firms with OTM warrants—hereafter OTM firms—we predict either (a) negative returns before warrant expiration and positive or flat returns after expiration or (b) flat returns before expiration and positive returns after. For firms with ITM warrants—hereafter ITM firms—we predict either (a) positive returns before warrant expiration and

negative or flat returns after expiration or (b) flat returns before expiration and negative returns after. These return patterns are consistent with OTM (ITM) firms strategically delaying (accelerating) the release of good news or accelerating (delaying) the release of bad news to prevent (induce) warrant exercise and, thus, share issuance when such issuance would be dilutive (anti-dilutive) to existing shareholders. Our predictions are opposite in sign for different types of warrant firms—namely, OTM and ITM firms. This feature distinguishes our predicted return patterns from those of prior share issuance research and mitigates concern that our findings are attributable to firm characteristics that differ for firms that issue warrants and firms that do not.

Some firms may manage investors' expectations by delaying the release of news and others might do it by accelerating the release of news. Thus, our tests focus on post-expiration returns minus pre-expiration returns, hereafter the "return pattern." We expect OTM firms' return pattern is positive and ITM firms' return pattern is negative. Thus, our primary prediction is that the difference between OTM and ITM firms' return patterns is positive (i.e., a positive return pattern for OTM firms minus a negative return pattern for ITM firms).

We base our inferences on return patterns for a sample of 688 warrants expiring from 1997 to 2012, which are issued by 619 firms domiciled in 11 countries. We measure pre-expiration returns beginning 120 trading days (i.e., approximately two quarters) before warrant expiration and ending on the expiration date. We measure post-expiration returns beginning the trading day after expiration and ending 120 trading days later.

Our main analysis comprises four components. First, we test our primary prediction relating to the difference between OTM and ITM firms' return patterns around warrant expiration dates. As predicted, we find that the difference between OTM and ITM firms' return patterns is significantly positive, which we interpret as evidence that firms engage in stock price

management in anticipation of share issuance. We also find that OTM (ITM) firms' return pattern is significantly positive (negative). Second, we assess whether these return patterns differ from those of three sets of "pseudo warrant firms" that we construct by varying firms, dates around which we calculate returns, and dates at which we determine expiration status. We find that return patterns of the pseudo warrant firms differ from those for actual warrant firms in ways that are consistent with our predictions. Third, we determine whether the return patterns are stronger for firms requiring more feasible stock price changes to affect warrant expiration status. As predicted, we find that they are, which is consistent with firms engaging in more stock price management when the change in stock price necessary to affect expiration status is more feasible. Fourth, we examine whether firm-issued news items is a mechanism for stock price management in anticipation of warrant expiration. As predicted, we find that when changing warrant expiration status is more (less) feasible, the content of firm-issued news items is significantly more (less) highly correlated with the return patterns we document, which suggests that firm-issued news items is a mechanism of stock price management for firms with warrants.

Our additional analyses reveal that the difference between OTM and ITM firms' post-expiration returns cannot be explained by their pre-expiration returns (i.e., return reversal); US and non-US warrant firms' return patterns are similar; and post-expiration returns are less likely to result from information in expiration status itself than from delayed release of news.

We contribute to the literature that studies firms' strategic behavior around share issuance by documenting return patterns consistent with firms managing investor expectations in a setting in which market timing is ruled out. Our evidence does not imply that market timing does not exist around share issuance; firms could time the market in other settings. Rather, our evidence establishes the existence of stock price management in anticipation of share issuance, which

suggests stock price management could explain post-issuance returns in other settings. We contribute to the warrants literature by finding evidence of strategic firm behavior in anticipation of warrant expiration. Relative to other equity transactions (e.g., IPOs, SEOs, and share repurchases) less is known about potential share issuance associated with warrants.

The study proceeds as follows. Section II discusses how our study relates to existing literature and offers institutional background on warrants. Section III outlines our predictions and research design. Section IV describes the sample and data and provides descriptive statistics. Section V presents the findings and Section VI concludes.

II. RELATED LITERATURE AND INSTITUTIONAL WARRANTS BACKGROUND

Related Literature

Prior literature offers two explanations for the long-run return underperformance of IPOs and SEOs. The first explanation is market timing. For example, Ritter (1991), Lerner (1994), Loughran and Ritter (1995, 2000), Baker and Wurgler (2000), and Hirshleifer (2001) suggest that stock prices periodically deviate from fundamental values, and that firms take advantage of overpricing by selling stock to overly optimistic investors. More specifically, these studies reason that firms time the market by issuing shares during a "window of opportunity" when investors overvalue the firm's equity, that is, they time the market. The central theme of this market timing explanation is that firms take share prices as given and issue equity to extract value for existing shareholders when prices are high.[2] For example, Ritter (1991) documents long-run return underperformance by IPO firms over the three years after IPO, relative to a set of firms matched on size and industry. Loughran and Ritter (1995) finds evidence of significantly lower returns during the five years after a firm engages in an IPO or SEO, relative to non-issuing

[2] q-theory (Tobin 1969) proposes that firms issue equity and make investments when the cost of capital is low. Hence, q-theory assumes that firms time the market when making investment and financing decisions.

firms. Both studies interpret their findings as consistent with firms timing the market and issuing equity when they perceive it to be overvalued.

However, Brav, Geczy, and Gompers (2000), Eckbo, Masulis, and Norli (2000), and Schultz (2003) cast doubt on the market timing explanation. For example, Brav et al. (2000) finds that post-issuance IPO returns are similar to those of firms with similar size and book-to-market ratios, and that SEO returns covary with those of similar non-issuing firms. Schultz (2003) proposes that poor long-run performance of IPOs and SEOs is evident because the more firms can receive for their equity the more likely they are to issue stock, even if the market is efficient and managers have no timing ability. Hence, equity issuances are concentrated at peak prices ex post, even though firms cannot identify peak prices ex ante.

The second explanation for the poor long-run performance of firms that issue equity is expectations management. Studies examining expectations management contend that issuing firms manage earnings to contribute to equity overvaluation, which results in underperformance when investors subsequently are disappointed when the managed accruals reverse. Teoh, Welch, and Wong (1998a, 1998b) find that prior to IPOs and SEOs firms have abnormally high positive discretionary accruals and interpret this finding as consistent with firms using earnings management to manage investor expectations upward in anticipation of share issuance. Rangan (1998) shows that earnings management during the quarter before, the quarter of, and two quarters following SEOs predicts both earnings changes and market-adjusted stock returns in the subsequent year. Cohen and Zarowin (2010) and Kothari, Mizik, and Roychowdhury (2016) find that pre-SEO firms manage earnings through real activities as well as accruals.

However, the validity of proxies for expectations management in this literature is open to debate, and some findings are sensitive to the proxies used and other research design choices.

Shivakumar (2000) reports that the inferences in Rangan (1998) and Teoh et al. (1998b) are attributable to test misspecification and concludes that SEO firms' earnings management reflects a rational response to anticipated investor behavior at offering announcements. Hribar and Collins (2002) finds that measuring accruals as the change in balance sheet amounts, rather than directly from the statement of cash flows, can lead to significant error and bias in accrual estimates because of non-articulation events or transactions such as mergers and acquisitions, divestitures, and foreign operations. Hribar and Collins (2002) finds no significant difference in discretionary accruals between SEO and control firms when measuring accruals from the statement of cash flows. This finding contrasts with those in Rangan (1998) and Teoh et al. (1998b), which measure accruals using balance sheet amounts.

Notwithstanding research design concerns, studies finding support for the expectations management explanation examine settings in which firms have some control over the timing of the issuance—largely those of IPOs and SEOs. As a result, it is difficult to attribute observed return patterns to expectations management, rather than to market timing, because both explanations predict the same patterns. Without evidence of expectations management in a setting when market timing is ruled out, it is difficult to infer whether firms manage investor expectations in anticipation of share issuance, which is our objective.[3]

Institutional Background on Warrants

[3] Aboody and Kasznik (2000, AK) examines returns around fixed grant dates of executive stock options and finds that prior to grant date firms manage investor expectations downward through voluntary disclosures and discussions with security analysts. Although AK provides evidence on expectations management, no shares are issued at option grant dates. Thus, it is not possible to infer from the findings in AK whether firms manage stock price in anticipation of share issuance, which is our research question. Also, in AK's setting managers act in their own self-interest in a way that potentially decreases value to existing shareholders, whereas in our setting, although managers act in their own self-interest to the extent they hold shares, they act to increase value for existing shareholders.

Warrants are financial instruments in which the holder has the right, but not the obligation, to purchase a share of equity at a specified price—the exercise price—on or before a pre-determined date—the expiration date. Once issued, warrants trade separately from the firm's equity shares.[4] These warrant features are similar to those of traded options. Importantly, in contrast to traded options, warrants are contracts between the firm and warrant holders, rather than between option writers and holders. As a result, warrant exercise increases the number of shares outstanding, which reduces the share of equity held by existing shareholders and increases the firm's cash. If the warrant exercise price, which is the amount of cash the firm receives, is less than the value of an existing equity share at the exercise date, warrant exercise dilutes the value of the existing shares. See Appendix A for an example of warrant terms.

Warrants have two features that help us in addressing our research question. First, the expiration date is set when the warrant is issued and is several—generally three—years after warrant issuance. Option pricing theory (Cox, Ross, and Rubinstein 1979) establishes that, absent dilutive dividends, call options on a firm's stock—and, thus, warrants—should not be exercised before the expiration date. That is, prior to the expiration date warrant holders should trade rather than exercise their warrants.[5] At the expiration date, holders of ITM warrants should exercise the warrants and holders of OTM warrants should let them expire. Assuming firms cannot predict stock prices years in advance, the multi-year term of warrants allows us to rule out market timing as an explanation for warrant-related share issuance. Second, warrant exercise can result in a substantial increase in the number of shares outstanding. If all warrants for our

[4] The same person could be a shareholder and a warrant holder, especially if the shares and warrants initially are sold as a unit. However, to our knowledge, our sample warrants are detachable and traded separately from the shares. Thus, at the expiration date, which is several years after warrant issuance, the shareholders and warrant holders are unlikely to be the same. Data limitations preclude us from identifying warrant holders and shareholders.
[5] Some sample warrants are so-called European warrants, which can be exercised only at the expiration date. For other warrants, exercise before the expiration date would bias against us finding the return patterns we predict.

sample firms were exercised, shares outstanding would increase, on average, more than 27%. For the IPO firm in Appendix A, which issued warrants bundled with common stock (i.e., a unit offering) warrant exercise would increase shares outstanding by 100%. Thus, the increase in shares associated with warrant exercise can be economically significant, which suggests that firms have incentives to affect exercise.

III. EMPIRICAL PREDICTIONS AND RESEARCH DESIGN

Empirical Predictions

Figure 1 graphically depicts our predictions. Our primary prediction is that the difference between OTM and ITM firms' return patterns around warrant expiration dates (i.e., [OTM firms' post-expiration returns minus pre-expiration returns] minus [ITM firms' post-expiration returns minus pre-expiration returns]) is positive. We focus on return patterns because stock price management may be evident before or after expiration, but not necessarily both. We focus on the difference in return patterns for OTM and ITM firms because we predict their return patterns are opposite in sign. In particular, we predict the return pattern for OTM (ITM) firms is positive (negative). That our predictions for OTM and ITM firms' return patterns are opposite in sign distinguishes our predicted patterns from those of prior share issuance research, and mitigates concern that our findings are attributable to firm characteristics that differ for firms that issue warrants and firms that do not.

Our predictions are based on three assumptions. First, firms possess private information that allows them to estimate the intrinsic value of a share of the firm's equity, V, more accurately than other market participants. Second, V can deviate at least temporarily from the market price of the share, P. Third, at some point before warrant expiration, firms assess whether the warrant exercise price, K, will be above or below V at the expiration date and determine whether warrant

exercise is in the interest of existing shareholders. Warrant exercise is in their interest if the exercise price is greater than the intrinsic value (i.e., K > V) because such warrants are anti-dilutive to existing shareholders. Warrant exercise is not in their interest if the exercise price is less than intrinsic value (i.e., K < V) because such warrants are dilutive. Thus, we predict that firms attempt to manage P, such that warrants result in share issuance (i.e., are ITM) when they are anti-dilutive and do not result in share issuance (i.e., are OTM) when they are dilutive.[6]

To see why this is the case, consider a firm that wants a dilutive warrant to expire OTM. If the firm has bad news, it could strategically accelerate the release of the news, particularly if the stock price currently exceeds the exercise price, such that negative returns are observed before expiration. If the firm has good news, it could strategically delay the release of the news, particularly if the stock price currently is less than the exercise price, such that positive returns are observed after expiration. Thus, stock price management might be evident only before expiration for some OTM firms and evident only after expiration for others. If the firm has both bad and good news, it could accelerate the bad news and delay the good news, depending on the relation between the current stock price and the exercise price. Regardless, for OTM firms the return pattern should be positive because it reflects more positive news after expiration and more negative news before expiration. Analogously, for a firm that wants anti-dilutive warrants to be ITM, the return pattern should be negative because it reflects more negative news after expiration and more positive news before expiration.

[6] The Thomson Reuters' Insider Holdings database reveals that insiders in our sample firms do not hold warrants. They hold only common stock and employee stock options, which share features with warrants but are not tradeable and do not expire on the warrant expiration date. These holdings support our presumption that managers' interests align with those of existing shareholders, but not with those of warrant holders. To the extent our presumption is invalid and managers have incentives different from those of existing shareholders, we would not expect to observe return patterns around warrant expiration dates in the directions we predict.

To illustrate our predictions, consider dilutive warrants, which the firm wants to be OTM. Suppose that K is \$9.00, P is \$9.20, and V is \$10.00. These warrants are dilutive to existing shareholders because the firm would receive \$9.00 for a share the firm believes is worth \$10.00. Thus, the firm has an incentive to decrease P to below K so that the warrant is OTM at expiration, which would result in a negative return before expiration. To achieve this decrease in P, we expect the firm strategically accelerates the release of any bad news it has and delays any good news. After expiration, the return could be flat if the firm did not delay good news or positive if it subsequently releases delayed good news.[7] Regardless, the return pattern (i.e., post-expiration return minus pre-expiration return) would be positive. Now suppose K is \$9.00, P is \$8.00, and V is \$10.00. The warrant also is dilutive because $K < V$ and it is already OTM because $K > P$. Thus, the firm has no incentive to release news before expiration, which would result in flat returns before expiration. However, the firm has an incentive to delay any good news to help prevent an increase in P, which could make the warrant ITM before expiration. The subsequent release of that good news would result in a positive return after expiration. Thus, the return pattern again would be positive.

Next consider anti-dilutive warrants, which the firm wants to be ITM. Suppose K is \$9.00, P is \$8.00, and V is \$8.80. These warrants are anti-dilutive because the firm would receive \$9.00 for a share that it believes is worth \$8.80. Thus, the firm has an incentive to increase P to above K, which would result in positive returns before expiration. To achieve this increase in P, we expect the firm strategically accelerates the release of any good news it has and delays any bad news. After expiration, the return could be flat if the firm did not delay bad news or negative if it subsequently releases delayed bad news. In either case, the return pattern would

[7] Post-expiration returns could be flat even though $P < V$ because convergence of P to V may not occur within the 120-day post-expiration window or V could decrease.

be negative. Suppose instead that K is \$9.00, P is \$9.20, and V is \$8.80. The warrant also is anti-dilutive because K > V and it is already ITM because P > K. Thus, the firm has no incentive to release news before expiration, which would result in flat returns before expiration. However, it has an incentive to delay any bad news to help prevent a decrease in P, which could make the warrant OTM, and the subsequent release of the bad news would result in a negative return after expiration. This return pattern also would be negative.

As Figure 1 makes clear, we do not predict that every OTM firm exhibits both negative pre-expiration returns and positive post-expiration returns, or that every ITM firm exhibits both positive pre-expiration and negative post-expiration returns. Thus, we do not predict the correlation between a firm's pre-expiration and post-expiration returns is necessarily negative.[8]

We focus our predictions on patterns of stock returns because firms can use various mechanisms to manage investor expectations to affect stock prices. Which mechanism a firm uses likely varies for firm-specific reasons. For example, some firms might use voluntary disclosures and others might use earnings management. This variation makes incomplete the consideration of any particular mechanism. Stock return provides a summary measure because stock price, and thus return, reflects the net effect of all mechanisms. Returns also are apposite in the context of warrants because the exercise price and expiration date are fixed and, consequently, firms can affect warrant exercise, and hence share issuance, only by managing

[8] Such a negative correlation could reflect managing stock prices by strategic news release timing (i.e., timing the release of good and bad news around warrant expiration) as we predict. It also could reflect manipulation of stock price by issuing false news. However, because false news artificially increases or decreases stock price, stock prices predicated on false news are more likely to reverse more quickly than stock prices predicated on strategic timing of news releases. We have no basis for predicting how long it takes the market to correct effects of false news. Instead, our predictions are based on short-term incentives to manage stock price (i.e., around warrant expiration). Thus, our predictions include flat, rather than reversing, pre- or post-expiration returns when they are part of a return pattern that is consistent with firms managing, not manipulating, stock prices around warrant expiration. Section IV reports findings from tests of firm-initiated news items and the extent to which pre-expiration returns explain post-expiration returns that support the explanation of strategic news release timing. See also footnote 23.

stock price. Thus, focusing our predictions on returns enables us to base our inferences on the target of firms' expectations management activity.[9]

Our predictions do not imply that warrant holders necessarily are disadvantaged. First, even if firms have incentives to prevent or induce warrant exercise, they might not be successful in affecting expiration status, especially if warrants are very far ITM or OTM. Second, warrant prices, either at issuance or later when the warrants trade publicly, could reflect the possibility of exercise conditions that are unfavorable to warrant holders and, thus, could protect them from effects of the stock price management we predict. Third, exercise is optimal for holders of ITM warrants because the difference between the stock price at expiration, P, and exercise price, K, is positive, even if K exceeds V. Returning to the illustration of the anti-dilutive warrant with K = \$9.00, P = \$9.20, and V = \$8.80, it is beneficial to the warrant holder to exercise the warrant and realize the \$0.20 gain. Assessing whether to hold or sell the share of equity is a separate consideration based on P and the warrant holder's beliefs about V. Regardless, a comprehensive analysis regarding warrant holders' welfare is beyond the scope of this study.

Research Design

Our main analysis comprises four components. First, we test our primary prediction relating to the difference between OTM and ITM firms' return patterns around warrant expiration dates. Second, we assess whether the return patterns for actual warrant firms differ from those of three sets of pseudo warrant firms. Third, we determine whether the return patterns are stronger when altering stock price to affect warrant expiration status is more feasible. Fourth, we examine whether firm-issued news items is a mechanism for stock price management in anticipation of warrant expiration.

[9] Nonetheless, we present evidence supporting firm-issued news items as a mechanism to manage stock price around warrant expiration dates.

Return Patterns around Warrant Expiration Dates

To test our primary predictions, we first must determine whether firms believe warrants are dilutive or anti-dilutive to existing shareholders (i.e., whether K < V or K > V). Because V is not observable, we rely on revealed preference—namely that the firm strategically manages warrant status at expiration as OTM or ITM based on its belief that the warrants are dilutive or anti-dilutive. For example, if a warrant is OTM, we assume the firm intended for it to be OTM because the firm believes warrant exercise would be dilutive to existing shareholders.[10]

To construct return patterns, we calculate returns for warrant firms before and after warrant expiration. The pre-expiration period is the 120 trading days before the warrant expiration date. Using this period assumes that within two quarters of the expiration date firms determine whether warrant exercise will be dilutive or anti-dilutive, and accordingly whether to attempt to manage stock price. The post-expiration period is the 120 trading days after warrant expiration. *RET*[*X, Y*] denotes the firm's buy-and-hold market-adjusted return from day *X* to day *Y* relative to the warrant expiration date, which is day 0. We use market-adjusted returns to isolate changes in stock prices that are more likely to be the result of firm behavior.[11]

To test our primary prediction that the difference between OTM and ITM firms' return patterns is positive, we calculate the difference between post-expiration and pre-expiration returns (i.e., *RET*[1, 120] – *RET*[–120, 0]) for each firm. For example, if an OTM firm has a pre-expiration return of –3% and a post-expiration return of 4%, the difference is $[4\% - (-3\%)] = 7\%$. Because we predict that the return pattern is positive for OTM firms and negative for ITM

[10] Our revealed preference assumption may not be valid if stock price is too far from the exercise price. For example, an anti-dilutive warrant could be so far OTM that it is not feasible for the firm to increase P enough to make the warrant ITM, even if the firm would like to do so. We examine this possibility by testing whether our findings are stronger for warrants for which it is more feasible for the firm to alter expiration status.

[11] We do not winsorize or truncate returns because large stock returns can be economically meaningful (Kothari, Sabino, and Zach 2005; Teoh and Zhang 2011; Leone, Minutti-Meza, and Wasley 2019). The inferences from our primary tests are the same if we winsorize returns at the 1st and 99th percentiles across the full sample.

firms, we test whether the difference in the means of *RET*[1, 120] – *RET*[–120, 0] for OTM and ITM firms is positive. We also test whether the return pattern (i.e., mean *RET*[1, 120] – *RET*[–120, 0]) is positive (negative) for OTM (ITM) firms.

In addition, we test whether the difference between OTM and ITM firms' pre-expiration returns (i.e., OTM firms' mean *RET*[–120, 0] minus ITM firms' mean *RET*[–120, 0]) is negative, and whether pre-expirations returns are negative (positive) for OTM (ITM) firms. We also test whether the difference between OTM and ITM firms' post-expiration returns (i.e., OTM firms' mean *RET*[1, 120] minus ITM firms' mean *RET*[1, 120]) is positive, and whether post-expiration returns are positive (negative) for OTM (ITM) firms. Our tests are joint tests of our predictions and our revealed preference assumption.

Return Patterns for Different Firms, Expiration Dates, and Expiration Status

Classifying firms based on expiration status could result in ITM (OTM) firms being more likely to have positive (negative) pre-expiration returns, which could confound the inferences we draw from our primary tests. Thus, we compare return patterns for our actual warrant firms to those for three sets of "pseudo warrant firms" that we construct by varying firms, dates around which we calculate returns, and dates at which we determine expiration status. We then test whether return patterns of actual warrant firms differ from those of these three pseudo warrant firms in ways that are consistent with our predictions.

The first set of pseudo warrant firms uses non-warrant firms, to which we assign actual warrants. We calculate returns around the expiration dates of the assigned warrants and determine expiration status at the assigned warrant's expiration date. This comparison allows us to determine whether our method of determining expiration status (i.e., whether the firm is OTM or ITM) induces the same return patterns that we find for actual warrant firms. This is because

we use the same method to determine expiration status at the same date for the non-warrant firms that we use for actual warrant firms, but the non-warrant firms have no warrants and, thus, no known incentives to manage stock price at that date.

To construct this set of pseudo warrant firms we proceed in five steps. (i) We randomly select, with replacement, a sample, of the same size as our actual warrant firm sample, of non-warrant firms from CRSP. (ii) We randomly assign to each non-warrant firm a warrant from an actual warrant firm. (iii) We use the terms of the assigned warrant to calculate a pseudo exercise price based on the non-warrant firm's stock price at the assigned warrant's issuance date and the ratio of the actual warrant firm's stock price to exercise price at that date. (iv) We determine the expiration status of the non-warrant firm based on its stock price at the assigned warrant's expiration date and the calculated pseudo exercise price. (v) We calculate $RET[-120, 0]$, $RET[0, 120]$, and differences between them for OTM and ITM pseudo warrant firms. We repeat these steps 1,000 times and compare the distributions of the returns for these pseudo warrant firms to the corresponding returns for actual warrant firms. If the returns for actual warrant firms are in the top (bottom) five percent of the distribution of returns for these pseudo warrant firms when we predict a positive (negative) return, we infer that our method of determining expiration status does not induce our findings for actual warrant firms.

A limitation of the first set of pseudo warrant firms is that returns for non-warrant and warrant firms may not be directly comparable because warrant firms self-select to issue warrants, which means they likely differ from non-warrant firms in unspecified ways. To address this limitation, the second set of pseudo warrant firms uses actual warrant firms, but we calculate returns for these firms around pseudo expiration dates and determine expiration status at these pseudo dates. We set the pseudo expiration date to 360 trading days after each firm's actual

warrant expiration date. We select 360 trading days because we have no reason to believe firms have incentives to manage stock prices at this date, and doing so enables us to conduct the same return tests as in our primary tests while allowing separation between the 120-day return windows in those tests and the corresponding tests based on these pseudo warrant firms.[12]

As in the first comparison, this second comparison allows us to determine whether our method of determining expiration status induces the return patterns we find for actual warrant firms. This is because actual warrant firms have no known incentives to manage stock price at the pseudo expiration dates, but we use the same method to determine expiration status at the pseudo expiration dates that we use at the actual expiration dates in our primary tests. If the returns for actual warrant firms differ significantly in the predicted direction from the corresponding returns for these pseudo warrant firms, we infer that our method of determining expiration status does not induce our findings for actual warrant firms.

The third set of pseudo warrant firms also uses actual warrant firms and calculates returns at the same pseudo expiration dates as used in the second set but determines expiration status at the actual warrant expiration date. This comparison enables us to determine whether the return patterns for actual warrant firms are more consistent with our predictions at actual warrant expiration dates when firms have known incentives for stock price management than at pseudo expiration dates when they do not.

More and Less Feasible Price Change Required to Affect Expiration Status

Some warrants may be so far OTM or ITM before expiration that it is not feasible for the firm to manage stock price to induce or prevent warrant exercise even when it is in the interest of

[12] We do not select more than one pseudo date for a firm because our return windows are 240 days long (day –120 to day 120). Thus, we would need to select pseudo dates from a range of at least 10 years after expiration to have a reasonable number of non-overlapping observations. Requiring return data so many years after the expiration date would impose infeasible restrictions on the sample.

existing shareholders to do so. Infeasibility of affecting expiration status could violate our assumptions in three ways. First, a firm might want to affect expiration status but does not attempt to do so because affecting expiration status is infeasible. Second, a firm might want to affect expiration status and might attempt, but fail, to change expiration status. For example, a firm with dilutive warrants that it wants to be OTM could attempt to manage stock price downwards but, despite its efforts, the warrants could be ITM at the expiration date. Third, a firm may be satisfied with the expiration status. For example, the firm might believe the warrants are anti-dilutive and, fortunately for the firm, the warrants are so far ITM that it is unlikely for their expiration status to change. These examples reveal that when changing expiration status is less feasible pre-expiration returns might be less, or even not, consistent with our predictions. Thus, we expect return patterns that are more consistent with our predictions, particularly pre-expiration returns, for firms requiring more feasible stock price changes to affect warrant expiration status.

We determine feasibility using historical price changes to estimate how much a firm's stock price could change in a 120-day period. Specifically, for each firm, we calculate the absolute price change in each rolling 120-day trading period in the [–1,200, –180] window relative to the firm's warrant expiration date, ΔP, its mean, $\overline{\Delta P}$, and its standard deviation, $\sigma_{\Delta P}$. We classify the firm as requiring more (less) feasible price changes to alter warrant expiration status if the warrant exercise price is within (outside) the range $P_{-120} \pm (\overline{\Delta P} + \sigma_{\Delta P})$, where P_{-120} is stock price at day –120.[13]

Firm-issued News Items as a Mechanism for Stock Price Management

[13] Using historical price changes could underestimate a firm's ability to manage stock price, particularly if the firm takes historically unusual actions to affect warrant expiration status.

Our primary tests rely on stock return patterns to provide evidence of stock price management because stock price determines warrant expiration status and summarizes the effects of all possible mechanisms a firm might use. Nonetheless, we test whether firm-issued news items is one such mechanism by providing evidence on whether the information content of firms' news items during our return windows supports our inference of stock price management.

News item content is the cumulative market-adjusted stock return in the [0, 1] window, where day 0 is the news item announcement date. Because firms have different numbers of news items, we base our tests on a firm's average news item content in each return window relative to warrant expiration (i.e., [–120, 0] or [0, 120]). We require firms to have at least one news item in the [–120, 120] window and set average news item content in a return window to zero if the firm has no news items in that window. Thus, $News[-120, 0]$ ($News[1, 120]$) is the firm's average pre-expiration (post-expiration) news item content and $News[1, 120] - News[-120, 0]$ is the news item content pattern.

If firms manage stock price using news items, then we expect stock return is positively correlated with news item content (i.e., we expect stock returns to reflect news item content). A negative or zero correlation suggests that stock return is related to other factors, which is evidence that the firm is not using news to manage stock price. Because we predict news item content is positively correlated with stock return for OTM and ITM firms, we do not consider them separately. Instead, our tests compare the correlations between stock return and average news item content in each return window for firms requiring more and less feasible stock price changes to affect expiration status. We predict that the correlation is more positive for firms requiring more feasible stock price changes because, as explained in the prior section, we expect those firms to be more active in managing stock price in anticipation of warrant expiration.

IV. SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

Our sample comprises warrants expiring between 1997 and 2012 that are issued by firms from the US and ten other countries.[14] To construct our sample, we use different data sources for US and non-US firms.[15] For US firms, we use StockWarrants.com, which is a discontinued subscription-based investment research website that tracked US equity warrants. The website distributed monthly newsletters to subscribers that described details for several warrants. The website also maintained a spreadsheet that included detailed information on the initial terms of the warrants and any subsequent changes. We obtained access to the spreadsheet and newsletters, which provided data on warrants expiring between 1997 and 2012.[16] For non-US firms, we use Datastream. Our non-US sample ends in 2012 to match the US sample but begins in 2000 because that is the earliest expiration date for warrants in Datastream. Because Datastream does not provide links to the underlying stocks for expired warrants, we obtained these data separately from a Datastream representative. However, Datastream retains these links and information on exercise price and expiration dates for only a subset of expired warrants; to our knowledge we have the complete set.[17]

For US firms we obtain returns from CRSP, and for non-US firms we obtain returns from Datastream. We use the CSRP value-weighted return including dividends as the market return for all firms. We obtain data on news items from Capital IQ's Key Developments database. The

[14] Non-US firms are domiciled in France, Germany, Hong Kong, Indonesia, Italy, Malaysia, Singapore, Switzerland, Thailand, and the United Kingdom.
[15] We use these sources because warrants are not included in standard databases, such as those available on WRDS, and real-time data sources, such as Bloomberg, do not archive information on expired warrants.
[16] We do not know how StockWarrants.com determined which warrants to track. Thus, we cannot account fully for any selection issues. However, the website provided advice on investing in the warrants, rather than in the firm's stock, which is the focus of our analyses. None of the newsletters suggests the return patterns we document. Thus, we have no reason to believe our US sample is selected ex post because it exhibits the return patterns we test.
[17] Our sample includes only call warrants. A few firms issue put warrants, whereby the firm commits to repurchase shares at a given price. However, there are few put warrants on Datastream, and we have data for only three.

initial sample of 1,011 warrants includes all warrants from both data sources with data necessary to perform our primary analyses, such as expiration date, exercise status at expiration, and the issuing firm's pre- and post-expiration returns.

Table 1, Panel A, summarizes our sample selection process. From our initial sample, we eliminate warrants with features that could confound our tests, most of which are US warrants because data on these features primarily are available for US warrants. We eliminate 91 warrants with changed terms. Howe and Wei (1993) and Howe and Su (2001) find that financially constrained firms change warrant terms, such as extending the expiration date and changing the exercise price, to increase the likelihood the warrant is exercised. We eliminate such firms because they are less likely concerned with dilution associated with warrant exercise, which is the basis for our predictions. We eliminate 75 warrants that were called by the firm or were eligible to be called. Called warrants are not outstanding at the original warrant expiration date and, thus, there is no possible share issuance at that time, and we are unsure why firms did not call warrants that are eligible to be called.[18] We eliminate 30 warrants issued as a result of bankruptcy, litigation, or the Troubled Asset Relief Program for which incentives regarding warrant exercise also likely differ from dilution concerns. We also eliminate 127 warrants issued less than one year before expiration to ensure that at the issuance date the firm cannot reasonably predict the expiration-date stock price. These eliminations yield a final sample of 688 warrants, of which 447 (241) are OTM (ITM) and 201 (487) are US (non-US), issued by 619 firms.

Table 1, Panel B, presents the number of warrants expiring in each year and reveals that expiration dates are distributed approximately evenly over the sample period, with a slightly

[18] We designate a callable warrant as eligible to be called if the stock price exceeds the call price within 120 trading days before the expiration date.

larger proportion of warrants expiring between 2009 and 2011. Untabulated statistics reveal that the proportion of OTM and ITM firms is relatively stable over time.

To assess the economic significance of warrant exercise, we calculate the potential percentage increase in shares outstanding resulting from warrant exercise. This increase is the number of warrants issued, multiplied by their conversion ratio into common shares, divided by the number of shares of common stock outstanding as of three months before the warrant expiration date. Information on the number of warrants issued is available for only 174 US warrants. Untabulated statistics reveal that the mean potential increase is 27.3%, which indicates that, on average, shares outstanding would increase by more than 27% if all warrants were exercised, which is economically significant. The mean potential increase is significantly higher for OTM firms, 30.6%, than for ITM firms, 20.4%, (t-stat. = 2.00).[19]

V. FINDINGS

Return Patterns around Warrant Expiration Dates

Our primary prediction is based on the difference between OTM and ITM firms' return patterns. Figure 2 graphs mean pre- and post-expiration returns (i.e., days –120 to 120 relative to warrant expiration) for OTM and ITM firms. It also graphs returns for days 121 to 240 after expiration and includes dotted trend lines to illustrate patterns. Figure 2 reveals that, as predicted, OTM firms exhibit a positive return pattern, which is characterized by negative pre-expiration returns and positive post-expiration returns. In contrast, but also as predicted, ITM firms exhibit a negative return pattern, which is characterized by positive pre-expiration returns

[19] Throughout, we use the term significant to denote statistical significance at a 5% level associated with a well-specified test when we have a signed prediction (i.e., a t-statistic of 1.65 or larger in absolute value). When we have no signed prediction, we use the term when the t-statistic is 1.98 or larger in absolute value.

and flat post-expiration returns. Together, these patterns indicate that, as predicted, the difference between OTM and ITM firms' return patterns is positive.

Interestingly, Figure 2 reveals that cumulative returns from day –120 to day 120 are similar for OTM and ITM firms, and there is no discernable difference in returns between the two groups in the [121, 240] window. These return similarities reveal no apparent economic difference between OTM and ITM firms. However, there is a notable difference between OTM and ITM firms' return patterns around warrant expiration dates.

Table 2 presents results relating to our primary tests, namely whether the return patterns for OTM and ITM firms depicted in Figure 2, and the difference between them, are significant. As a benchmark, Table 2 also presents returns for the full sample in rows labeled "All Firms." Although our tests focus on the 120 days before and after warrant expiration, for descriptive purposes Table 2 presents statistics for four 60-day windows before and after the expiration date.

Table 2, Panel A, presents findings relating to return patterns. It reveals that All Firms' return pattern is significantly positive (t-stat. = 2.02). More importantly for our research question, as predicted, the difference between OTM and ITM firms' return patterns is significantly positive (t-stat. = 4.39), and more than four times that of All Firms (0.215 vs. 0.050). Panel A also reveals, as predicted, that OTM (ITM) firms have a significantly positive (negative) return pattern (t-stats. = 3.86 and –2.44). Thus, the results in Panel A support our predictions relating to stock price management in anticipation of warrant expiration.[20]

[20] To test whether the return patterns are stronger for firms with a larger potential percentage increase in shares outstanding from warrant exercise, we partition the 174 warrants for which we have potential share issuance data based on the sample median potential percentage increase. For the above (below) median group, the mean potential increase is 48.4% (6.3%). We calculate return patterns for OTM and ITM firms in each group. Untabulated findings reveal that the *OTM – ITM* difference in return patterns is 0.298 (0.193) for the above (below) median group (t-stats. = 1.96 and 1.86). Although these results are consistent with stronger return patterns when potential share increases are larger, the difference is insignificant (diff = 0.105, t-stat. = 0.59). However, the below median group includes only 22 ITM firms, which could reduce the power of this test.

Panel B presents findings relating to pre-expiration returns. It reveals that All Firms' pre-expiration returns are insignificant in all windows (t-stats. range from –0.33 to 0.96). More importantly for our research question, as predicted, the difference between OTM and ITM firms' pre-expiration returns is significantly negative (t-stat. = –3.28). Also, as predicted, pre-expiration returns are significantly negative (positive) for OTM (ITM) firms (t-stats. = –2.50 and 2.32). Panel B also reveals that the difference between OTM and ITM firms' pre-expiration returns is significantly negative in the second through fourth quarters prior to warrant expiration (t-stats. range from –1.96 to –2.94).

Panel C presents findings relating to post-expiration returns. It reveals that All Firms' post-expiration returns are significantly positive (t-stat. = 2.38), but the returns are concentrated in the second and fourth quarters after warrant expiration. More importantly for our research question, as predicted, the difference between OTM and ITM firms' post-expiration returns is significantly positive (t-stat. = 3.03), and more than double that of All Firms (0.099 vs. 0.045). In addition, the difference between OTM and ITM firms' post-expiration returns is significantly positive in the two quarters immediately following expiration (t-stats. = 1.86 and 2.12), after which the difference is insignificant. Finding that this difference is significantly positive only in the two quarters immediately after warrant expiration is consistent with stock price management because the predicted returns occur close to warrant expiration. Also as predicted, post-expiration returns are significantly positive for OTM firms (t-stats. = 2.90), and negative for ITM firms, although not significantly so (t-stat. = –1.09).

Taken together, the findings in Table 2 are consistent with the return patterns in Figures 1 and 2 and, thus, are consistent with our predictions relating to stock price management in anticipation of warrant expiration.

Return Patterns for Different Firms, Expiration Dates, and Expiration Status

Table 3 presents findings from comparing the return patterns of actual warrant firms in Table 2 to those for the three sets of pseudo warrant firms. Panel A presents results from comparing return patterns for actual warrant firms to those of non-warrant firms using expiration dates of actual warrants we assign to each non-warrant firm and determining expiration status at the actual warrant's expiration date. We present the 5th and 95th percentiles of the distribution of the pseudo warrant firm mean returns, and p-values associated with where the corresponding actual warrant firm mean returns from Table 2 occur in that distribution. Panel A reveals that the p-value for the difference between OTM and ITM firms' return patterns is 0.06, which means that the difference in return patterns for actual warrant firms is more extreme in the direction we predict than 94 percent of the return patterns for the pseudo warrant firms. Panel A also reveals that although the difference between OTM and ITM firms' pre-expiration returns is not significantly different from that of the pseudo warrant firms (p-value = 0.22), the difference in post-expiration returns is significantly different in the direction we predict (p-value = 0.05).

Panel B presents results from comparing return patterns for actual warrant firms but calculating returns around pseudo expiration dates and determining expiration status at the pseudo expiration date. As Section III explains, we set the pseudo expiration date to 360 trading days after the actual expiration date because we have no reason to believe firms have incentives to manage stock prices at that date. In addition, Table 2, Panel B, reveals that OTM and ITM firms' returns do not differ significantly subsequent to 120 days after warrant expiration. Although requiring return data at the pseudo expiration dates reduces the sample to 638 warrants, the untabulated return patterns for these warrants are nearly identical to those for the full sample of warrants. Panel B reveals that the differences between OTM and ITM firms' return patterns

and pre-expiration returns are significant for these pseudo warrant firms, but the post-expiration returns are not (t-stats. = 1.93, –1.64, and 1.08). It also reveals that the difference between pre-expiration returns for the pseudo warrant firms and those for actual warrant firms is insignificant (t-stat. = –1.08). However, differences in post-expiration returns and return patterns are significantly larger, in the direction we predict, for actual warrant firms (t-stats. = 2.02 and 2.13).

Panel C presents results from comparing return patterns for actual warrant firms to those of actual warrant firms and calculating returns around the same pseudo expiration dates used in Panel B but determining expiration status at the actual warrant expiration date. It reveals that the differences between OTM and ITM firms' return patterns and pre- and post-expiration returns for these pseudo warrant firms are insignificant (t-stats. range from –1.52 to 1.47). More importantly for our research question, all three differences are significantly larger, in the predicted direction, for actual warrant firms (t-stats. = 4.28, –3.05, and 3.07).

Taken together, Table 3 reveals that pseudo warrant firms do not exhibit the return patterns of actual warrant firms. Although determining expiration status based on actual expiration date stock price could explain some of the difference between actual OTM and ITM firms' pre-expiration returns, Table 3 reveals that this is not the case for the difference in post-expiration returns. Thus, Table 3 reveals that the return patterns we document in Table 2 are stronger for actual warrant firms that have incentives to engage in stock price management.

Price Change Required to Affect Expiration Status

We next test whether our findings are stronger when the change in stock price necessary to affect warrant expiration status is more feasible. Untabulated statistics reveal that for firms requiring more (less) feasible price changes, the median price changes required to affect expiration status are 0.94, 1.06, and 0.80 (4.48, 4.75, and 3.62) standard deviations for the full

sample, firms with day –120 stock price below exercise price, and firms with day –120 stock price above exercise price.

Table 4, Panels A and B, presents findings from the tests underlying the findings in Table 2 for firms requiring more and less feasible price changes to affect expiration status. Panel A reveals, as predicted, that for firms requiring more feasible price changes the difference between OTM and ITM firms' return patterns is significantly positive (t-stat. = 4.07). Also as predicted, the difference between OTM and ITM firms' pre-expiration returns is significantly negative (t-stat. = –4.25). The difference between OTM and ITM firms' post-expiration returns is positive, as predicted, but not significantly so (t-stat. = 1.43). Panel B reveals that for firms requiring less feasible price changes to alter expiration status, the difference between OTM and ITM firms' return patterns also is significantly positive (t-stat. = 2.06). The difference between OTM and ITM firms' pre-expiration returns is insignificant (t-stat. = 0.11), but the difference between OTM and ITM firms' post-expiration returns is significantly positive (t-stat. = 2.56). The findings in Panels A and B are consistent with firms requiring more (less) feasible price changes managing pre-expiration stock price to a greater (lesser) extent. The significantly positive post-expiration return for OTM firms requiring less feasible price changes is consistent with such firms delaying good news until after expiration.

Panel C presents tests of differences in the returns in Panels A and B. It reveals that the difference in OTM and ITM firms' pre-expiration returns is significantly negative (t-stat. = –3.64), but the difference in post-expiration returns is not (t-stat. = –0.97). More importantly for our research question, Panel C reveals that the difference in OTM and ITM firms' return patterns is significantly positive (t-stat. = 1.98), which is consistent with the predicted return patterns being stronger when it is more feasible to affect expiration status.

Firm-issued News Items as a Mechanism for Stock Price Management

Next, we provide evidence on whether firm-issued news items is a mechanism for stock price management in anticipation of warrant expiration. For this analysis, we have data for 452 warrants. Untabulated statistics reveal these firms have 98 types of firm-issued disclosures, with the most common being earnings announcements, which comprise 11 percent of all news items.

Table 5 presents the results. Panel A presents correlations between returns and news item content for firms requiring more feasible price changes to affect expiration status. As predicted, the correlation between news item content and return pattern is significantly positive (corr. = 0.34, p-value < 0.01), as are the correlations between news item content and pre- and post-expiration returns (corrs. = 0.14 and 0.26, p-values < 0.05 and < 0.01). Panel B presents correlations for firms requiring less feasible price changes. As expected, these correlations are weaker than those in Panel A and reveal only limited evidence that these firms use news items to manage stock price. The correlation between news item content and return pattern is insignificant, as is the correlation between news item content and pre-expiration returns (corrs. = 0.06 and 0.00, p-values > 0.10). However, the correlation between news item content and post-expiration returns is significantly positive (corr. = 0.20, p-value < 0.01).

Panel C presents Z-scores using Fisher's z transformation to test whether the difference between the Panels A and B correlations between news items content and return pattern is significant. As predicted, Panel C reveals that the correlation for firms that can more feasibly affect expiration status is significantly higher (i.e., 0.34 vs. 0.06; Z = 3.07). Although the differences in correlations between news item content and pre- and post-expiration returns are insignificant (Z = 1.40 and 0.62), both are more positive for firms requiring more feasible price changes (0.14 vs. 0.00 and 0.26 vs 0.20). Taken together, the Table 5 results suggest firms

requiring more feasible price changes use news items to affect stock prices to a greater extent than firms requiring less feasible price changes, which is consistent with firm-issued news items being a mechanism for stock price management in anticipation of warrant expiration.[21]

Additional Analyses

We conduct three additional analyses to support our inferences. First, we test whether pre-expiration returns explain the difference between OTM and ITM firms' post-expiration returns. Second, we test whether US and non-US warrant firms exhibit similar return patterns. Third, we test whether post-expiration returns reflect information revealed by expiration status.

Do Pre-Expiration Returns Explain Post-Expiration Returns?

A potential concern with the inferences we draw from Table 2 is that positive (negative) post-expiration OTM (ITM) firms' returns could be attributable to reversals of negative (positive) pre-expiration returns. Prior research documents that past losers (winners) outperform (underperform) past winners (losers) over the subsequent week or month (Jegadeesh 1990; Lehnman 1990) and over the subsequent three-to-five years (DeBondt and Thaler 1985, 1987; Klein 2001), and concludes returns reverse over the short and long terms. However, other studies find momentum over the intermediate term, by which past losers (winners) continue to underperform (outperform) past winners (losers) over the subsequent three-to-twelve months (Jegadeesh and Titman 1993; Chan, Jegadeesh, and Lakonishok 1996), which more closely aligns with our return windows. The presence of momentum biases against our predictions.

[21] To determine whether news item content fully explains differences between OTM and ITM firms' returns, we estimate a regression of $RET[X,Y]$ on *OTM*, *ITM*, and $News[X,Y]$ for return patterns and pre- and post-expiration returns. For firms requiring more feasible price changes, the untabulated findings reveal that the difference between the *OTM* and *ITM* coefficients is significantly positive (negative), as predicted, for return patterns (pre-expiration returns), but not significant for post-expiration returns. For firms requiring less feasible price changes, none of the three differences between the *OTM* and *ITM* coefficients is significant. These findings suggest that news item content is a mechanism for firms to manage stock prices, but likely not the only mechanism.

Nonetheless, we test whether our inferences regarding post-expiration returns are altered by estimating Equation (1), which includes controls for pre-expiration returns.

$$RET[1,120]_i = \beta_1 OTM_i + \beta_2 ITM_i + \beta_3 RET[A,0]_i + \varepsilon_i \quad (1)$$

We estimate two versions of Equation (1): one in which $RET[A,0]_i$ is $RET[-120,0]_i$ and one in which it is $RET[-240,0]_i$. We use two pre-expiration return windows as controls for shorter- and longer-term return reversals. We predict $\beta_1 - \beta_2 > 0$ because we predict OTM firms have more positive post-expiration returns than ITM firms. Finding $\beta_1 - \beta_2 > 0$ indicates that our inferences relating to post-expiration returns are not fully explained by pre-expiration returns. We also predict β_1 (β_2) is positive (negative) because we predict OTM (ITM) firms have positive (negative) post-expiration returns. We present t-statistics for tests of coefficient differences to facilitate comparison with Table 2.[22]

Table 6 presents summary statistics from estimating Equation (1). It reveals that pre-expiration returns do not explain the post-expiration returns in Table 2. For $RET[-120,0]$, the difference between the OTM and ITM coefficients is significantly positive, the OTM coefficient is significantly positive, and the ITM coefficient is negative, but insignificantly so (t-stats. = 2.94, 2.54, and –1.09). The table reveals the same inferences for $RET[-240,0]$.[23]

[22] Equation (1) residuals likely are correlated for warrants expiring on the same date. Even though our 688 warrants expire on 577 dates, we construct t-statistics using standard errors clustered by expiration date.

[23] Untabulated statistics reveal no significant correlation between $RET[-120,0]$ and $RET[0,120]$ for OTM or ITM firms, which support our assumption that firms need not manage stock price before and after expiration (see Figure 1). The statistics do reveal a significantly negative correlation for ITM firms for which affecting stock price is more feasible. As footnote 8 explains, firms could manage stock prices by strategic news release timing or by issuing false news. Because false news artificially changes stock price, negatively correlated pre- and post-expiration returns are more likely. Thus, finding that pre-expiration returns do not explain post-expiration returns provides indirect evidence that strategic news release timing is the more likely explanation for the return patterns in Table 2. However, distinguishing strategic timing of news release from manipulation is not the objective of our study.

Are Return Patterns for US and non-US Firms Similar?

To test whether US and non-US warrant firms exhibit similar differences between OTM and ITM firms' return patterns, Table 7 presents return patterns separately for each set of firms. Panel A reveals that the difference between OTM and ITM firms' pre-expiration (post-expiration) returns is significantly negative (insignificant) for US firms (t-stats. = –4.06 and 0.47), and Panel B reveals that the difference is insignificant (significantly positive) for non-US firms (t-stats. = –1.44 and 3.28). Both are consistent with our predictions in Figure 1. Most importantly for our research question, Table 7 reveals that the positive difference between OTM and ITM firms' return patterns in Table 2 applies to both US and non-US firms (t-stats. = 3.37 and 3.11), and Panel C reveals the difference between US and non-US return patterns is not significant (t-stat. = 1.03).[24]

Do Post-Expiration Returns Reflect Information Revealed by Expiration Status?

Our prediction of a positive difference between OTM and ITM post-expiration returns is based on OTM (ITM) firms delaying good (bad) news until after warrant expiration. However, such returns also could result from investors interpreting expiration status as a signal the firm managed stock price to prevent (induce) the exercise of dilutive (anti-dilutive) warrants. Both explanations are consistent with firms managing stock price in anticipation of warrant expiration because expiration status is uninformative in the absence of firms managing stock price.

Untabulated analyses provide evidence regarding which explanation is more likely. Because we expect stock price to reflect any information revealed by expiration status shortly

[24] 33 US firms declare dividends the year before or after warrant expiration. These dividends could make it optimal for warrant holders to exercise warrants before expiration, which would weaken incentives for stock price management in anticipation of expiration. Consistent with this possibility, untabulated statistics reveal that excluding these firms yields more significant return differences between OTM and ITM firms in Table 7, Panel A (t-stats. = 4.01, –4.21, and 1.22 vs. 3.37, –4.06, and 0.47).

after investors observe it, we partition post-expiration returns into short and long windows, [1, 10] and [11, 120]. Because some investors might assess expiration status on day 0, we also consider the [0, 1] window. The findings reveal that the difference between OTM and ITM firms' returns is significantly positive only in the [11, 120] window (t-stat. = 2.73). The differences are insignificant in both short windows, [0, 1] and [1, 10] (t-stats. = –1.51 and 1.16). Thus, we infer that signaling is less likely than delayed release of news as the explanation for the difference in post-expiration returns in Table 2.[25]

VI. CONCLUSION

The question we address is whether firms manage stock price in anticipation of share issuance. To address this question, we examine return patterns around warrant expiration dates (i.e., post-expiration returns minus pre-expiration returns). That these dates are fixed several years in advance rules out market timing as an explanation for the return patterns we document. We predict return patterns of opposite signs depending on whether the warrants are anti-dilutive or dilutive to existing shareholders. Because the intrinsic value of equity—and, thus, potential dilution—is unobservable, we assume the status of the warrant on its expiration date (i.e., OTM or ITM) reveals the firm's belief regarding dilution. Because we expect OTM (ITM) firms to have a positive (negative) return pattern, our primary prediction is that the difference between OTM and ITM firms' return patterns is positive.

As predicted, we find that the difference between OTM and ITM firms' return patterns is significantly positive, which we interpret as evidence that firms engage in stock price management in anticipation of share issuance. We also find that OTM (ITM) firms' return

[25] To test whether our findings differ over time, we partition our sample period into warrants expiring from 1997 to 2004 and from 2005 to 2012. Untabulated statistics reveal no significant differences between subperiods in differences between OTM and ITM return patterns, pre-expiration returns, or post-expiration returns.

pattern is significantly positive (negative). Next, we compare return patterns for actual warrant firms to those for three sets of pseudo warrant firms that we construct by varying firms, warrant expiration dates around which we calculate returns, and dates at which we determine expiration status. We find that basing return patterns on these pseudo warrant firms does not fully explain the return patterns we find for actual warrant firms.

We also find that return patterns are stronger for firms requiring more feasible stock price changes to affect warrant expiration status, and that firm-issued news items is a mechanism for stock price management in anticipation of warrant expiration. The news items findings are consistent with firms managing stock price by accelerating (delaying) bad news or delaying (accelerating) good news to prevent (induce) warrant exercise when exercise would be dilutive (anti-dilutive) to existing shareholders. Additional analyses reveal that OTM and ITM firms' post-expiration returns are not attributable to return reversal, US and non-US warrant firms' return patterns are similar, and post-expiration returns are less likely to result from information in expiration status itself than from delayed release of news.

Taken together, our study provides evidence that firms manage investor expectations and, thereby, stock price, in anticipation of share issuance. Thus, our findings support expectations management as an additional explanation for the negative post-equity issuance returns that prior research typically attributes to market timing. Although it is possible that firms time the market in some share issuance settings, market timing is ruled out in our setting. Thus, our findings provide evidence that firms engage in stock price management in anticipation of share issuance.

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Appendix A: Warrant Example

Integrated Technology USA engaged in an IPO and began filing prospectuses on EDGAR on August 7, 1996, with the final version dated October 1, 1996 and filed on October 3, 1996.[26] In the prospectus, the firm offers 3 million units consisting of one share of stock at $6.00 and one warrant at $0.10. The shares and warrants must be purchased together for $6.10, but are separable immediately thereafter, and trade on AMEX as ITH and ITH.W. The warrants are exercisable at a price of $9.00 per share, beginning one year after the prospectus date and expiring five years after the prospectus date.

The following features of the ITH warrants are illustrative of warrants. First, the warrant expiration date of October 1, 2001 is set in the October 1, 1996 final prospectus (i.e., five years in advance).[27] Second, the warrants are publicly traded. Thus, immediately after the IPO, warrants can be sold to other investors and the shareholders will not necessarily own the warrants. Even though the warrants become exercisable prior to expiration—in the case of the ITH warrants, one year after the prospectus date—option pricing theory suggests that to benefit from the warrants' time value, warrant holders will trade, rather than exercise, the warrants, absent dilutive dividends. This results in a large number of outstanding warrants at the expiration date, at which time the holders would exercise the warrants if they are in-the-money. Third, given that the number of warrants in this example is equal to the number of shares originally issued—3 million—the number of shares that could be issued upon exercise of the warrants represents a substantial share of firm ownership, with potentially substantial

[26] See http://www.sec.gov/Archives/edgar/data/1019272/0000889812-96-001411-index.html for the final prospectus.

[27] Previous versions of the prospectus set the expiration date at five years from the date of the final prospectus, whatever it ended up being. Therefore, the expiration date is set somewhat randomly, based on when the SEC approves the final prospectus, rather than on a specific date selected by the firm.

consequences to the existing shareholders' equity value. Fourth, the exercise price, $9.00 per share, is set higher than the stock price at issuance, $6.00 per share. This is typical of most warrant contracts we have examined. Therefore, a warrant expiring out-of-the-money, i.e. OTM, does not necessarily have negative stock returns between issuance and expiration.

Below are excerpts from the final prospectus.[28]

General Information

> This Prospectus relates to the offering (the 'Offering') of 3,000,000 shares of common stock, par value $.01 per share ('Common Stock'), and 3,000,000 Redeemable Common Stock Purchase Warrants ('Warrants'), of Integrated Technology USA, Inc. (the 'Company'). Such shares of Common Stock and Warrants are sometimes hereinafter collectively referred to as the 'Securities.' The shares of Common Stock and the Warrants offered hereby may only be purchased in the Offering together, on the basis of one share of Common Stock and one Warrant, but are separately transferable immediately upon issuance. Each Warrant entitles the registered holder thereof to purchase one share of Common Stock at an initial exercise price of $9.00 per share at any time during the four-year period commencing one year after the date of this Prospectus. The Warrant exercise price is subject to adjustment under certain circumstances. Commencing 18 months after the date of this Prospectus, the Warrants are subject to redemption by the Company, in whole but not in part, at $0.01 per Warrant on 30 days' prior written notice to the warrantholders if the average closing bid price of the Common Stock as reported on the American Stock Exchange equals or exceeds $15.00 per share for any 20 trading days within a period of 30 consecutive trading days ending on the fifth trading day prior to the notice of redemption. See 'Description of Securities.'
>
> Prior to the Offering, there has been no public market for the Securities, and there can be no assurance that such a market will develop after completion of the Offering or, if developed, that it will be sustained. For information regarding the factors considered in determining the initial public offering prices of the Securities and the terms of the Warrants, see 'Underwriting.' The Common Stock and the Warrants have been approved for listing on the American Stock Exchange ('AMEX') under the symbols ITH and ITH.WS, respectively.

Description of Securities – Warrants (excerpts)

> **Exercise Price and Terms**. Each Warrant entitles the registered holder thereof to purchase, at any time during the four year period commencing one year after the date of this Prospectus, one share of Common Stock at a price of $9.00 per share, subject to adjustment in accordance with the anti-dilution and other provisions referred to below. The holder of any Warrant may exercise such Warrant by surrendering the certificate representing the Warrant to the Warrant Agent, with the subscription form thereon properly completed and executed, together with payment of the exercise price. Commencing one year after the date of this Prospectus, the Warrants may be

[28] See the final agreement at: http://www.sec.gov/Archives/edgar/data/1019272/0000889812-96-001411-index.html.

exercised at any time in whole or in part at the applicable exercise price until expiration of the Warrants. No fractional shares will be issued upon the exercise of the Warrants.

Adjustments. The exercise price and the number of shares of Common Stock purchasable upon the exercise of the Warrants are subject to adjustment upon the occurrence of certain events, including stock dividends, stock splits, combinations or reclassifications of the Common Stock. Additionally, an adjustment would be made in the case of a reclassification or exchange of Common Stock, consolidation or merger of the Company with or into another corporation (other than a consolidation or merger in which the Company is the surviving corporation) or sale of all or substantially all of the assets of the Company, to enable Warrant holders to acquire the kind and number of shares of stock or other securities or property receivable in such event by a holder of the number of shares of Common Stock that might have been purchased upon the exercise of the Warrant.

Warrantholder Not a Stockholder. The Warrants do not confer upon holders thereof any voting, dividends, or other rights as stockholders of the Company.

FIGURE 1
Illustration of Predicted Return Patterns Around Warrant Expiration Dates

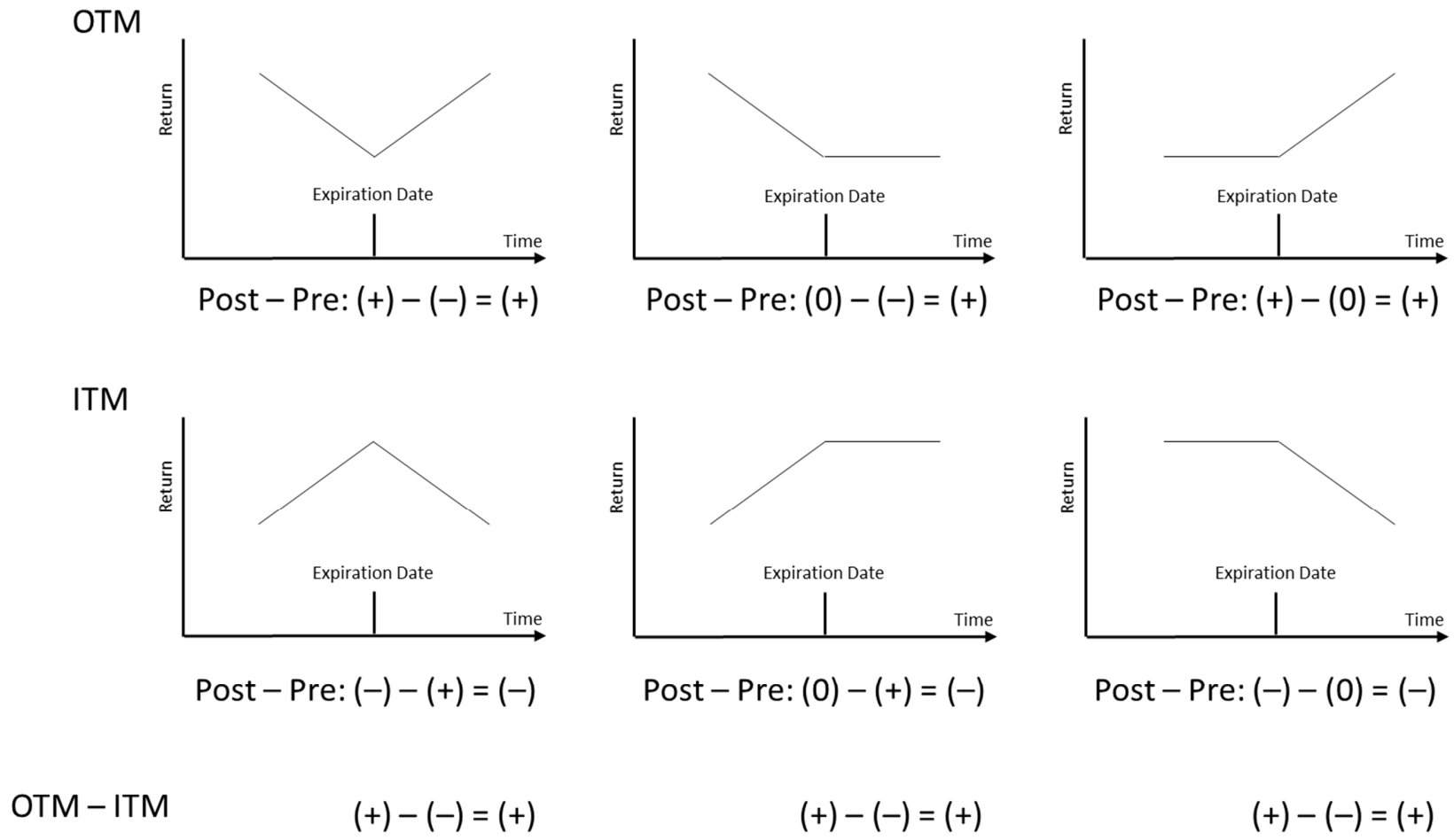
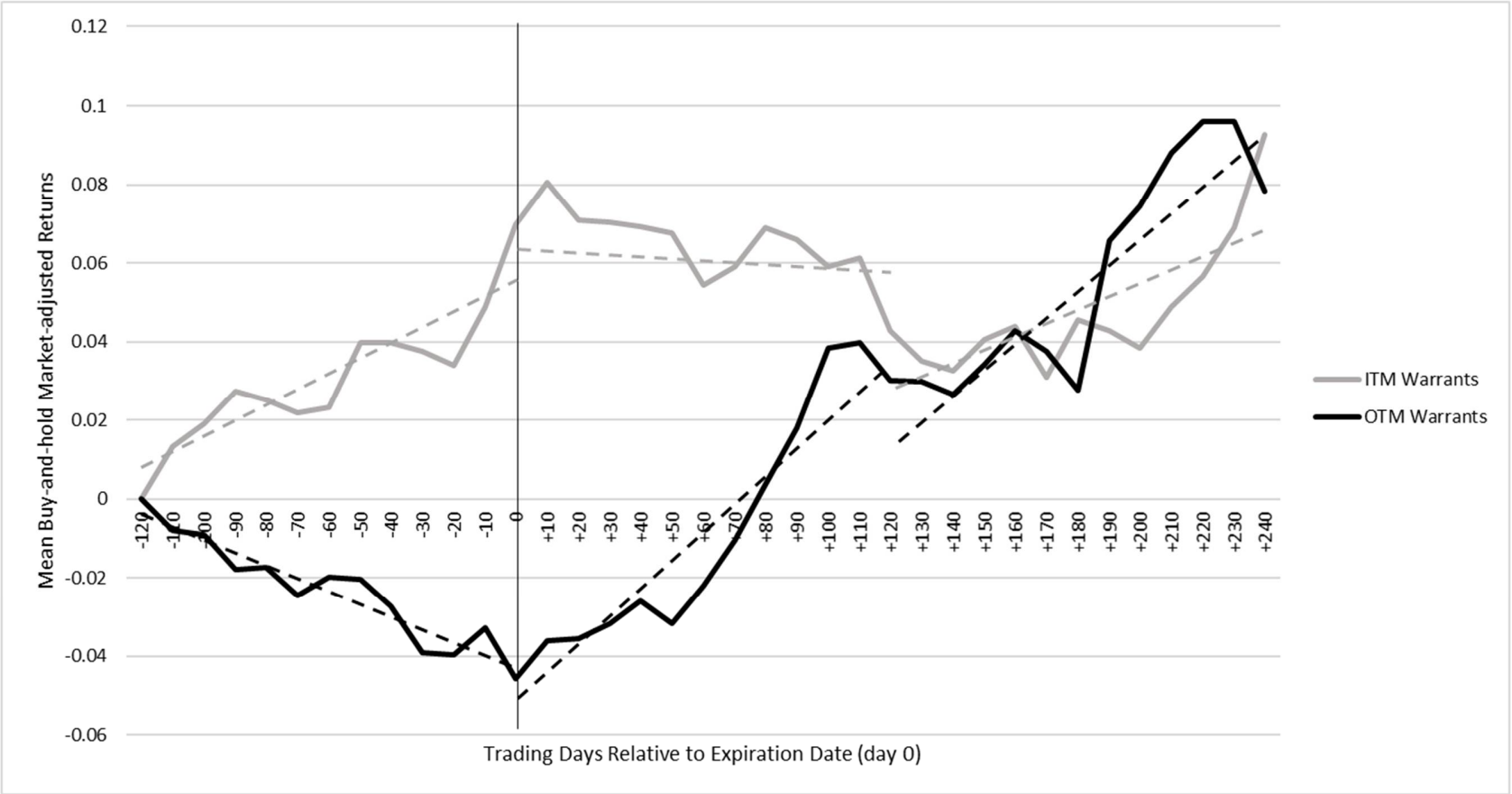


FIGURE 2
Return Patterns Around Warrant Expiration Dates



This figure presents market-adjusted buy-and-hold returns beginning on day –120 (two quarters before warrant expiration) through day 240 (four quarters after expiration). OTM (ITM) refers to firms with warrants that expired (would have expired) out-of-the-money (in-the-money). Trend lines for each 120-day period are presented as dotted lines. Sample of 688 warrants expiring from 1997 to 2012, of which 447 (241) are OTM (ITM).

TABLE 1
Sample Composition

Panel A: Warrants

	Number of Warrants
Warrants with sufficient data for analyses	1,011
Exercise price or expiration date changed	(91)
Warrants called or eligible to be called for redemption	(75)
Warrants issued because of TARP, bankruptcy, or litigation	(30)
Warrants issued less than one year prior to expiration	(127)
Final Sample	688
OTM	447
ITM	241

Panel B: Sample Period

Expiration Year	Number of Warrants	Percent
1997	14	2.0
1998	22	3.2
1999	29	4.2
2000	15	2.2
2001	24	3.5
2002	24	3.5
2003	24	3.5
2004	25	3.6
2005	35	5.1
2006	50	7.3
2007	47	6.8
2008	42	6.1
2009	122	17.7
2010	100	14.5
2011	83	12.1
2012	32	4.7
	688	100.0

This table presents statistics on sample composition. Panel A presents sample selection criteria. Panel B presents statistics on the sample period. OTM (ITM) refers to firms with warrants that expired (would have expired) out-of-the-money (in-the-money). Sample of 688 warrants expiring from 1997 to 2012.

TABLE 2
Returns Around Warrant Expiration Dates

Panel A: Return Patterns

		RET[*1, 120*] – *RET*[*–120, 0*]	
	Pred.	Mean	t-stat.
All Firms (N = 688)	?	0.050	2.02
OTM (N = 447)	+	0.126	3.86
ITM (N = 241)	–	–0.089	–2.44
OTM – ITM	+	0.215	4.39

Panel B: Pre-expiration Returns

		RET[*–120, 0*]		*RET*[*–60, 0*]		*RET*[*–120, –61*]		*RET*[*–180, –121*]		*RET*[*–240, –181*]	
	Pred.	Mean	t-stat.	Mean	t-stat.	Mean	t-stat.	Mean	t-stat.	Mean	t-stat.
All Firms	?	–0.005	–0.33	0.005	0.38	–0.002	–0.19	0.011	0.96	0.008	0.59
OTM	–	–0.046	–2.50	–0.010	–0.62	–0.018	–1.10	–0.012	–0.80	–0.021	–1.26
ITM	+	0.070	2.32	0.034	1.42	0.027	1.68	0.054	2.74	0.061	2.76
OTM – ITM	–	–0.116	–3.28	–0.044	–1.54	–0.045	–1.96	–0.065	–2.67	–0.081	–2.94

Panel C: Post-expiration Returns

		RET[*1, 120*]		*RET*[*1, 60*]		*RET*[*61, 120*]		*RET*[*121, 180*]		*RET*[*181, 240*]	
	Pred.	Mean	t-stat.	Mean	t-stat.	Mean	t-stat.	Mean	t-stat.	Mean	t-stat.
All Firms	?	0.045	2.38	0.017	1.56	0.021	1.79	0.015	1.27	0.049	2.80
OTM	+	0.080	2.90	0.030	2.07	0.037	2.14	0.026	1.60	0.060	2.40
ITM	–	–0.019	–1.09	–0.008	–0.56	–0.008	–0.63	–0.006	–0.40	0.028	1.55
OTM – ITM	+	0.099	3.03	0.039	1.86	0.045	2.12	0.032	1.46	0.031	1.02

This table presents tests of our return patterns predictions. *RET*[*X,Y*] is the buy-and-hold return calculated from *X* to *Y* with the warrant expiration date as day 0. Panel A presents tests of return patterns (i.e., post-expiration minus pre-expiration return), Panel B (Panel C) presents tests of pre-expiration (post-expiration) returns. t-statistics are associated with whether the mean return equals zero. The t-statistic associated with the difference between OTM and ITM firms' mean returns is from a two-sample test for differences in means. OTM (ITM) refers to firms with warrants that expired (would have expired) out-of-the-money (in-the-money). Sample of 688 warrants expiring from 1997 to 2012.

TABLE 3
Return Patterns for Warrant Firms Compared to Patterns for Three Sets of Pseudo Warrant Firms

Panel A: Non-Warrant Firms' Returns Calculated Around, and Determining Expiration Status at, Expiration Dates of Actual Warrants

	***RET*[*1, 120*] – ***RET*[*–120, 0*]**			***RET*[*–120, 0*]**			***RET*[*1, 120*]**		
	5th Pctl.	95th Pctl.	p-value: Table 2 Mean	5th Pctl.	95th Pctl.	p-value: Table 2 Mean	5th Pctl.	95th Pctl.	p-value: Table 2 Mean
OTM (N = 447)	0.001	0.117	0.04	–0.042	0.025	0.02	0.014	0.100	0.13
ITM (N = 241)	–0.133	–0.021	0.30	0.040	0.128	0.64	–0.022	0.039	0.07
OTM – ITM	0.065	0.219	0.06	–0.147	–0.039	0.22	–0.006	0.098	0.05

Panel B: Warrant Firms' Returns Calculated Around, and Determining Expiration Status at, Pseudo Expiration Dates

	***RET*[*1, 120*] – ***RET*[*–120, 0*]**			***RET*[*–120, 0*]**			***RET*[*1, 120*]**		
	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.
OTM (N = 388)	?	–0.018	–0.56	?	0.012	0.51	?	–0.006	–0.30
ITM (N = 250)	?	–0.096	–3.72	?	0.061	3.12	?	–0.035	–2.00
OTM – ITM	?	0.078	1.93	?	–0.049	–1.64	?	0.029	1.08

	***RET*[*1, 120*] – ***RET*[*–120, 0*]**			***RET*[*–120, 0*]**			***RET*[*1, 120*]**		
Tests of Differences from Means for Actual Warrant Firms	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.
OTM	+	0.143	3.07	–	–0.046	–1.54	+	0.098	2.73
ITM	–	0.005	0.11	+	0.005	0.14	–	0.010	0.4
OTM – ITM	+	0.139	2.13	–	–0.051	–1.08	+	0.088	2.02

TABLE 3 (continued)
Return Patterns for Warrant Firms Compared to Patterns of Three Sets of Pseudo Warrant Firms

Panel C: Warrants Firms' Returns Calculated Around Pseudo Expiration Dates and Determining Expiration Status at Expiration Dates of Actual Warrants

	***RET*[*1, 120*] – ***RET*[*–120, 0*]**			***RET*[*–120, 0*]**			***RET*[*1, 120*]**		
	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.
OTM (N = 409)	?	–0.071	–2.37	?	0.047	2.14	?	–0.024	–1.24
ITM (N = 229)	?	–0.009	–0.31	?	0.002	0.11	?	–0.006	–0.31
OTM – ITM	?	–0.062	–1.52	?	0.045	1.47	?	–0.018	–0.64

Tests of Differences from Means for Actual Warrant Firms	***RET*[*1, 120*] – ***RET*[*–120, 0*]**			***RET*[*–120, 0*]**			***RET*[*1, 120*]**		
	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.
OTM	+	0.197	4.29	–	–0.081	–2.79	+	0.115	3.29
ITM	–	–0.083	–1.77	+	0.063	1.69	–	–0.019	–0.73
OTM – ITM	+	0.279	4.28	–	–0.145	–3.05	+	0.134	3.07

This table presents the results of tests comparing returns of actual warrant firms to those of three sets of pseudo warrant firms. OTM (ITM) refers to firms with warrants that expired (would have expired) out-of-the-money (in-the-money). Panel A compares the distribution of return patterns from 1,000 iterations of randomly selected non-warrant firms calculated around expiration dates of actual warrants and determining expiration status based on the actual expiration date to the mean returns of actual warrant firms in Table 2. p-values are associated with where in pseudo distribution the mean returns in Table 2 appear. Panel B (Panel C) compares the return patterns of actual warrant firms but calculated around pseudo expiration dates and determining expiration status at the pseudo (actual) expiration dates. In Panels B and C, we set the pseudo expiration date to 360 trading days after the actual expiration date. Missing returns around the pseudo expiration date results in a sample of 638 warrants. Thus, in Panels B and C we report the difference in mean return patterns for the 638 actual warrant firms and the two sets of pseudo-warrant firms. t-statistics are from two-sample tests for differences in means. Based on sample of warrants expiring from 1997 to 2012.

TABLE 4
Return Patterns for Firms Requiring More and Less Feasible Price Changes to Affect Expiration Status

Panel A: More Feasible Price Changes

	***RET*[*1, 120*] – ***RET*[*–120, 0*]**			***RET*[*–120, 0*]**			***RET*[*1, 120*]**		
	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.
OTM (N = 176)	+	0.130	3.17	–	–0.101	–3.89	+	0.029	0.90
ITM (N = 132)	–	–0.169	–2.78	+	0.139	2.78	–	–0.030	–1.16
OTM – ITM	+	0.299	4.07	–	–0.240	–4.25	+	0.059	1.43

Panel B: Less Feasible Price Changes

	***RET*[*1, 120*] – ***RET*[*–120, 0*]**			***RET*[*–120, 0*]**			***RET*[*1, 120*]**		
	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.
OTM (N = 271)	?	0.123	2.63	?	–0.010	–0.41	?	0.113	2.81
ITM (N = 109)	?	0.007	0.24	?	–0.014	–0.54	?	–0.007	–0.28
OTM – ITM	?	0.116	2.06	?	0.004	0.11	?	0.119	2.56

Panel C: Tests of Differences Between More and Less Feasible Price Changes

	***RET*[*1, 120*] – ***RET*[*–120, 0*]**			***RET*[*–120, 0*]**			***RET*[*1, 120*]**		
	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.
OTM	+	0.007	0.11	–	–0.090	–2.52	+	–0.084	–1.62
ITM	–	–0.176	–2.58	+	0.153	2.72	–	–0.023	–0.65
OTM – ITM	+	0.183	1.98	–	–0.244	–3.64	+	–0.060	–0.97

This table presents tests of returns patterns based on the price changes required to affect warrant expiration status. Panel A (Panel B) includes firms for which the price changes required to change expiration status are more (less) feasible. The sample in Panel A (Panel B) consists of 308 (380) warrants expiring from 1997 to 2012. OTM (ITM) refers to firms with warrants that expired (would have expired) out-of-the-money (in-the-money). t-statistics are associated with whether the mean return equals zero. In each panel, the t-statistic associated with the difference in mean returns between OTM and ITM firms is from a two-sample test for differences in means.

TABLE 5
Is Firm-issued News Items a Mechanism for Stock Price Management?

Panel A: Correlations for Firms Requiring More Feasible Price Changes to Affect Expiration Status

	***NEWS*[*1, 120*] – *NEWS*[*–120, 0*]**	***NEWS*[*–120, 0*]**	***NEWS*[*1, 120*]**
RET[*1, 120*] – *RET*[*–120, 0*]	0.34*		
RET[*–120, 0*]		0.14*	
RET[*1, 120*]			0.26*

Panel B: Correlations for Firms Requiring Less Feasible Price Changes to Affect Expiration Status

	***NEWS*[*1, 120*] – *NEWS*[*–120, 0*]**	***NEWS*[*–120, 0*]**	***NEWS*[*1, 120*]**
RET[*1, 120*] – *RET*[*–120, 0*]	0.06		
RET[*–120, 0*]		0.00	
RET[*1, 120*]			0.20*

Panel C: Z-Scores for Tests of Differences Between Correlations Between More and Less Feasible Price Changes

	***NEWS*[*1, 120*] – *NEWS*[*–120, 0*]**	***NEWS*[*–120, 0*]**	***NEWS*[*1, 120*]**
RET[*1, 120*] – *RET*[*–120, 0*]	3.07		
RET[*–120, 0*]		1.40	
RET[*1, 120*]			0.62

This table presents tests of news item content. *NEWS*[*–120, 0*] (*NEWS*[*1, 120*]) is a firm's average news item content over the 120-trading day window before (after) warrant expiration. News item content is the cumulative market-adjusted return over days in the [0, 1] window surrounding the firm's news items, where the news item date is day 0. Panel A (Panel B) presents Pearson correlations between stock returns and news item content for warrants for which more (less) feasible price changes are required to affect the expiration status. The sample in Panel A (Panel B) comprises 207 (245) warrants expiring from 1997 to 2012. "*" denotes the correlation is significantly different from zero at the 5% level. Panel C presents Z-scores from tests of the difference in correlations between Panels A and B.

TABLE 6
Do Pre-Expiration Returns Explain Post-Expiration Returns?

$$RET[1{,}120]_i = \beta_1 OTM_i + \beta_2 ITM_i + \beta_3 RET[A, 0]_i + \varepsilon_i \qquad (1)$$

		***RET*[*1, 120*]**		***RET*[*1, 120*]**	
Variable	Pred.	Coeff.	t-stat.	Coeff.	t-stat.
OTM	+	0.080	2.54	0.078	2.48
ITM	–	–0.019	–1.09	–0.014	–0.80
RET[*–120, 0*]	?	–0.001	–0.02		
RET[*–240, 0*]	?			–0.024	–1.02
N		688		688	
Adj. R^2		1.3%		1.4%	
Test of Coefficient Differences					
OTM – ITM	+	0.099		0.092	
t-stat.		2.94		2.80	

This table presents the results of estimating Equation (1). *OTM* (*ITM*) is an indicator variable that equals one for firms with warrants that expired (would have expired) out of- (in-) the money, and zero otherwise. Equation (1) has no intercept because it would be collinear with *OTM* and *ITM*. Standard errors are clustered by warrant expiration date. We present t-statistics for tests of coefficient differences to facilitate comparison with the tests in Table 2 and because we have signed predictions regarding the coefficient differences. Sample of 688 warrants expiring from 1997 to 2012.

TABLE 7
Are Return Patterns for US and non-US Firms Similar?

Panel A: US Firms

	RET*[*1, 120*] – ***RET [*–120, 0*]**			***RET*** [*–120, 0*]**			***RET*** [*1, 120*]**		
	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.
OTM (N = 138)	+	0.123	2.44	–	–0.094	–2.69	+	0.029	0.64
ITM (N = 63)	–	–0.169	–2.61	+	0.170	2.92	–	0.001	0.02
OTM – ITM	+	0.292	3.37	–	–0.264	–4.06	+	0.029	0.47

Panel B: Non-US Firms

	RET [*1, 120*] – ***RET*** [*–120, 0*]**			***RET*** [*–120, 0*]**			***RET*** [*1, 120*]**		
	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.
OTM (N = 309)	+	0.127	3.07	–	–0.024	–1.14	+	0.102	2.99
ITM (N = 178)	–	–0.061	–1.39	+	0.035	0.99	–	–0.026	–1.36
OTM – ITM	+	0.188	3.11	–	–0.059	–1.44	+	0.129	3.28

Panel C: Tests of Differences between US and non-US Firms

	RET [*1, 120*] – ***RET*** [*–120, 0*]**			***RET*** [*–120, 0*]**			***RET*** [*1, 120*]**		
	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.	Pred.	Mean	t-stat.
OTM	?	–0.004	–0.06	?	–0.069	–1.70	?	–0.073	–1.29
ITM	?	–0.109	–1.39	?	0.135	1.99	?	0.027	0.60
OTM – ITM	?	0.105	1.03	?	–0.205	–2.58	?	–0.100	–1.39

This table presents tests of returns patterns separately based on whether the firm is domiciled in the US or outside the US in Panel A (Panel B). The sample in Panel A (Panel B) consists of 201 (487) warrants expiring from 1997 to 2012 (2000 to 2012). t-statistics are associated with whether the mean return is equal to zero. In each panel, the "OTM – ITM" row presents the difference in mean returns between OTM and ITM firms and the associated t-statistic is from a two-sample test for differences in means. Panel C presents the difference in return patterns between Panels A and B and the associated t-statistics are from two-sample tests for differences in means.