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The Valuation Effects of Warrant Extensions

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ABSTRACT

In this paper, we examine the warrant price and stock price reactions to the announcement of warrant life extensions. As predicted by option-pricing theory, warrant prices increase in response to an extension. Our principal finding is that the stocks of firms making the extension announcements experience positive abnormal returns on average. We interpret the evidence as supportive of an anticipation hypothesis in which the market perceives the decision to extend the warrants' expiration date as a favorable indication for the stock price before the subsequent expiration.

THIS PAPER EXAMINES THE decision to extend the lives of outstanding warrants beyond their original expiration date. Specifically, we assess the warrant price and stock price reactions to the first announcement of warrant life extension and investigate potential determinants of cross-sectional differences in the stock price reactions. This research is the first empirical examination of extendible warrants, although extendible options have been studied theoretically by Longstaff (1990). He derives closed form expressions for holder-extendible and writer-extendible options and demonstrates that the partial derivative of warrant price with respect to time to maturity is unambiguously positive.

In a perfect market, an extension of warrant life will not change firm value. This "extension irrelevance" follows because the extension is a financing decision equivalent to allowing the warrants to expire and then giving away new warrants to the old warrantholders. Absent market imperfections, it is operating cash flows, not financing decisions, that determine firm value. Because the longer maturity will increase the value of the warrants, warrant extension will diminish the value of other claims to the firm's cash flows. Shareholders in particular are likely to incur a wealth loss. The "expropriation hypothesis" predicts a negative stock price reaction to the extension announcement.

For warrants that expired out-of-the-money prior to July 18, 1984, the initial price of the warrants was treated as taxable income to the corporation in the year of the expiration. The potential tax liability is postponed when the

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life of the warrant is extended and is avoided entirely if the warrants are ultimately exercised. The benefit of this tax postponement/avoidance would accrue primarily to shareholders. Thus, the "tax hypothesis" predicts a positive stock price reaction to warrant extensions prior to July 1984 and a zero stock price reaction thereafter.

It appears that firms view warrant exercise as an important source of capital. For example, Schultz (1993) finds that firms force exercise by calling warrants with minimal delay. A warrant extension has the benefit of maintaining access to future equity financing through warrant exercise, which is important for firms that may lack alternative avenues for raising capital. Further, warrant exercise involves lower transaction costs than new equity issues. However, these benefits are realized only if the stock price exceeds the exercise price before the warrants ultimately expire. There are also costs associated with a warrant extension. As argued above, the extension may expropriate wealth from shareholders. Further, it may be difficult to issue additional equity when warrants are outstanding.

If management acts on behalf of shareholders, an extension will be undertaken only if the expected benefit exceeds the expected cost. Thus, when an extension is announced, the market may reassess the probability that the stock price will rise above the exercise price. This (partial) anticipation of a price increase would lead to a positive stock price reaction. The "anticipation hypothesis" has two additional implications. First, holding all else constant, the further out-of-the-money is the warrant, the more positive will be the stock price reaction. That is, the further the stock price is below the exercise price, the greater is the increase in stock price necessary to induce exercise. Second, the shorter the extension, the more positive will be the stock price reaction, ceteris paribus; i.e., a shorter extension means that the requisite stock price increase must occur more quickly in order to realize the benefits of the extension.

The central null hypothesis investigated in this study is:

H_0: *There is no stock price reaction to the announcement of warrant life extension.*

The alternative is two sided, reflecting the three hypotheses described above. The hypotheses are not mutually exclusive.

We also conduct additional empirical tests in order to understand more fully the consequences of warrant life extension and to test the two implications of the anticipation hypothesis. We analyze the return behavior of the warrants themselves in the period surrounding the extension announcement. Option-pricing theory suggests the value of the warrants will increase because of the increased time to maturity. Additionally, we investigate possible determinants of cross-sectional differences in the reaction of the stocks of extending firms.

The remainder of the paper is organized as follows. The next section describes the data and reviews the methodology. The results are presented in Section II. The paper ends with a summary and conclusions.

I. Data and Methodology

A. Data

To identify the sample of warrant extensions, we examined every issue of the *Daily Stock Price Record* from July 1972 to December 1990 for the New York Stock Exchange (NYSE), the American Stock Exchange (ASE), and the over-the-counter (OTC) market. Of the more than 1500 warrants traded in these markets over this time period, 346 exhibited changes in the stated expiration date to a later date. Extensions accompanied by other changes in warrant terms (e.g., reduction of exercise price) are excluded from consideration. For events prior to June 1979, the *Wall Street Journal (WSJ)* announcement date serves as day 0; thereafter, we use the *Dow Jones News Retrieval (DJNR)* wire date as the event date. One hundred forty-eight of the extending companies have announcements in either the *WSJ* (40) or on the *DJNR* wire (127) or both (19). Typically, the wire date is one day before the *WSJ* date.

One hundred thirty-six of the 148 companies have data available on either the CRSP NYSE/ASE or the CRSP NASDAQ tape. We obtained exercise prices from the Moody's manuals and from the text of the *DJNR* releases. Thirty-five companies are eliminated either because the exercise price of the warrants is unavailable (4) or because the warrants are in-the-money at the time of extension (31). Of the 101 companies in the sample, 23 have stock traded on either the NYSE or ASE, 78 in the NASDAQ market. Seventeen of the warrants trade on an exchange and 84 in the OTC market. Warrant data are collected from the *Daily Stock Price Record*. Warrant returns are calculated from the midpoint of the bid and ask prices when closing prices are not available.

Table I provides some statistics about the chronology of initial extension announcements. Warrant extensions are most frequent in the years 1985 and 1986. Approximately 60 percent of the extensions occur in the post-July 18, 1984 period, suggesting that tax considerations are not the primary motivation for warrant extensions.

B. Methodology

The analysis involves a standard event study of the price reaction of the warrants and of the abnormal returns of the sample firms' common stock. We use the raw (unadjusted) returns of the warrants. Abnormal common stock returns (AR_{it}) are calculated using the market model:

$$AR_{it} = R_{it} - (a_i + b_i R_{mt}) \tag{1}$$

where

R_{it} = the return of stock i on day t.
R_{mt} = the return of the CRSP value-weighted NASDAQ index on day t. For exchange-listed stocks the NYSE/ASE value-weighted index is used.

Table I
Chronological Distribution of First Extension Announcements

The distribution by year of 101 announcements of initial warrant extensions.

1974	10
1975	2
1976	4
1977	0
1978	1
1979	1
1980	0
1981	0
1982	9
1983	9
1984	11
1985	13
1986	13
1987	6
1988	9
1989	8
1990	5
Total	101

a_i, b_i = intercept and slope coefficients of stock i.

The estimation period runs from day -120 through day -21 relative to the event day. Because many of the NASDAQ companies are thinly traded, the model coefficients are estimated using the Scholes-Williams (1975) technique. We also calculate market-adjusted abnormal returns, with similar results. The significance of the common stock abnormal returns is assessed using t-statistics described in Brown and Warner (1985, pp. 28–29).

We then explore the determinants of the cross-sectional variation in stock price response to announcements of extensions. We conduct a multivariate regression with the two-day cumulative abnormal return (CAR) from days -1 and 0 as the dependent variable. The explanatory variables are as follows. The market value of equity (MKTV) is included to capture any firm size effects. The length of the extension (EXT) is predicted by the anticipation hypothesis to be negatively related to the stock price reaction. A 0,1 time variable (TAX) identifies the period when a warrant extension has potential tax implications; the tax hypothesis suggests that higher abnormal returns will occur in the earlier time period. The metric %OUT is defined as $(X - P)/P$, where X = the exercise price and P = the stock price five days prior to the announcement, and measures the percentage increase in stock price required to make the warrant at-the-money. A positive relation between %OUT and CAR$(-1, 0)$ would be consistent with the anticipation hypothesis. Finally, ISSUE is the size of the equity issue that would result if the

warrants were exercised. The transaction costs saved increase with the size of the issue; hence, the larger the issue size, the greater the potential benefits from extending.

II. Empirical Results

A. Warrant Prices

Average returns and cumulative average returns for the sample warrants are contained in Table II. t-Statistics for assessing the significance of the returns are calculated using the cross-sectional standard error of the mean for each day. From day -20 through day -2, the warrants exhibit a significant cumulative return of more than 16 percent, perhaps reflecting partial anticipation of the extension. Because the warrant returns are, in most cases, calculated from bid-ask midpoints, these returns are not attributable to a shift in closing prices from bid prices to ask prices.

The average return is largest on day 0, over 11 percent, which is statistically significant at the 1 percent level. Day -1 also has a large average return, 2.41 percent. These data demonstrate that extension announcements have a pronounced positive effect on warrant prices, as predicted by option theory. Over the entire 41-day period, the warrants increase in value by almost 46 percent. The 16 percent increase from day $+1$ through day $+20$ is not exploitable because of large bid-ask spreads: for the 75 warrants for which the bid and ask prices are available, the average relative spread on day 0 is about 84 percent and the median is 50 percent.

B. Stock Prices

Table III reports the abnormal stock returns over the examination period. From day -20 through day -2, no daily average abnormal return is significant at the 5 percent level and the cumulative abnormal return (CAR) is 1.82 percent. The abnormal return on day -1 is 0.75 percent and is 0.74 percent on day 0. Although neither is significant at conventional levels individually, the two-day CAR of 1.49 percent is significant at the 5 percent level (t-value $= 1.99$). Sixty-three percent of the abnormal returns on day zero are positive, a proportion significantly greater than 50 percent.[1]

The analysis is repeated with the subsample of 92 "clean" announcements, those without other announcements in the $[-2, +1]$ window. The day -1 and day 0 average abnormal returns for this sample are 1.03 percent and 0.67 percent respectively. Neither is significant, but the two-day CAR of 1.70 percent is similar in magnitude to that of the complete sample and is also significant at the 5 percent level. Sixty-two and 63 percent of the abnormal returns measures are positive on days -1 and 0, respectively, for this sample. Each proportion is significantly greater than 50 percent at the 95

[1] When the equally weighted market index is used, CAR$(-1, 0)$ equals 1.79 percent ($t = 2.31$). Use of market-adjusted returns results in two-day abnormal returns of 1.10 percent (value-weighted index, $t = 1.86$) and 1.13 percent (equally weighted index, $t = 1.90$).

Table II

Warrant Returns—First Extension Announcements

Unadjusted average returns and cumulative average returns of 101 warrants in the period surrounding the initial extension announcement.

Day	Average Return	Cumulative Avg. Return
−20	0.0036	0.0036
−19	−0.0016	0.0020
−18	0.0134	0.0154
−17	0.0080	0.0234
−16	0.0332*	0.0566
−15	0.0299	0.0865*
−14	0.0026	0.0891*
−13	−0.0087	0.0805*
−12	0.0188	0.0993**
−11	0.0018	0.1011**
−10	0.0076	0.1087*
−9	−0.0093	0.0994*
−8	0.0066	0.1060*
−7	−0.0069	0.0991*
−6	0.0513*	0.1503**
−5	0.0103	0.1606**
−4	−0.0036	0.1570*
−3	−0.0053	0.1517*
−2	0.0117	0.1634*
−1	0.0241	0.1875**
0	0.1115**	0.2989**
+1	0.0531*	0.3520**
+2	0.0073	0.3594**
+3	0.0348*	0.3942**
+4	−0.0072	0.3869**
+5	0.0020	0.3889**
+6	0.0037	0.3926**
+7	0.0069	0.3996**
+8	0.0263	0.4258**
+9	0.0204	0.4463**
+10	−0.0092	0.4370**
+11	−0.0107	0.4263**
+12	−0.0024	0.4239**
+13	0.0042	0.4280**
+14	0.0105	0.4385**
+15	0.0083	0.4468**
+16	0.0069	0.4537**
+17	−0.0040	0.4497**
+18	0.0086	0.4583**
+19	−0.0137	0.4446**
+20	0.0143	0.4589**

* Significant at the 5% level (two-tailed test).
** Significant at the 1% level (two-tailed test).

Table III

Abnormal Common Stock Returns—First Extension Announcements

Risk-adjusted average abnormal returns (AR) and cumulative average abnormal returns (CAR) of 101 firms' common stock in the period surrounding the initial extension announcement. Market model parameters are estimated using the Scholes-Williams (1975) technique.

Day	Average Abnormal Return (AR)	Percent Positive	Cumulative Abnormal Return (CAR)
−20	0.0054	47	0.0054
−19	−0.0085	47	−0.0031
−18	−0.0006	57	−0.0037
−17	0.0060	55	0.0023
−16	0.0070	51	0.0093
−15	−0.0018	48	0.0075
−14	0.0057	56	0.0132
−13	0.0029	53	0.0160
−12	0.0089	55	0.0249
−11	0.0029	42	0.0278
−10	0.0082	51	0.0360
−9	−0.0053	45	0.0307
−8	0.0026	54	0.0333
−7	−0.0060	47	0.0273
−6	−0.0027	47	0.0246
−5	−0.0058	48	0.0188
−4	−0.0002	51	0.0186
−3	−0.0020	49	0.0166
−2	0.0017	59	0.0182
−1	0.0075	59	0.0257
0	0.0074	63*	0.0331
+1	−0.0016	46	0.0316
+2	−0.0009	49	0.0307
+3	−0.0062	47	0.0245
+4	−0.0086	42	0.0159
+5	−0.0092	51	0.0067
+6	0.0039	58	0.0106
+7	−0.0048	53	0.0058
+8	−0.0005	49	0.0052
+9	0.0030	53	0.0083
+10	−0.0052	49	0.0031
+11	−0.0046	52	−0.0015
+12	−0.0005	54	−0.0019
+13	−0.0050	49	−0.0069
+14	−0.0044	49	−0.0113
+15	−0.0075	54	−0.0188
+16	−0.0064	49	−0.0253
+17	0.0016	56	−0.0237
+18	0.0062	54	−0.0175
+19	−0.0042	50	−0.0217
+20	−0.0104	40*	−0.0321

* Significant at the 5% level (two-tailed test).

percent confidence level. Use of the clean sample for the cross-sectional analysis discussed in the next section does not alter any finding; we report the complete sample results.

We interpret the data as evidence of a positive stock price reaction to announcements of warrant extensions.[2] This finding is inconsistent with expropriation of shareholder wealth being the dominant consequence of warrant extension. Further evidence on the tax and anticipation hypotheses is presented in the next section.

C. Cross-Sectional Analysis

Statistics descriptive of the variables are given in Panel A of Table IV. Two observations deserve brief explanation. First, there is a one-day extension in the sample; no reason for this extension was given in the company's announcement. Second, there are two at-the-money warrants in the sample

[2] Twenty of the 101 firms subsequently extended their warrants' lives a second time. Second extensions are associated with abnormal returns that are not significantly different from zero.

Table IV

Cross-Sectional Analysis—First Extension Announcements

Descriptive statistics (Panel A) and Pearson correlation coefficients (Panel B) for 101 announcements of initial extensions. The variables are defined as follows: CAR(−1, 0) = risk-adjusted cumulative abnormal common stock return over days −1 and 0; MKTV = market value of common stock equity; EXT = length of extension, in trading days; TAX = 0 if announcement is after July 18, 1984, 1 otherwise; %OUT = $(X - P)/P$ where P = stock price and X = exercise price; and ISSUE = the size of the equity issue that would result if the warrants were exercised.

Panel A. Descriptive Statistics

Variable	Mean	Median	Minimum	Maximum
CAR(−1, 0)	0.0149	0.0101	−0.1652	0.2388
MKTV ($000)	38,235	10,532	1,823	713,684
EXT	359.6	252.0	1.0	1722.0
%OUT	1.6748	0.9394	0.0000	9.5000
ISSUE ($000)	10,064	3855	88	99,875

Panel B. Pearson Correlation Coefficients

	CAR	MKTV	EXT	TAX	%OUT	ISSUE
CAR	1.00	−0.10	−0.07	−0.17	−0.09	−0.06
MKTV		1.00	0.11	0.15	−0.16	0.62**
EXT			1.00	0.30**	0.04	0.28**
TAX				1.00	0.10	0.41**
%OUT					1.00	0.03
ISSUE						1.00

** Significant at the 1% level (two-tailed test).

(stock price exactly equals exercise price). The variable %OUT for these warrants is thus zero.

The regression analysis of the cross-sectional variation in price responses is shown below (t-values in parentheses):

$$\begin{aligned} \text{CAR}(-1,0) = {} & 0.289 - 0.0000 * \text{MKTV} - 0.0000 * \text{EXT} \\ & \quad (2.78) \qquad (-1.30) \qquad\quad (-0.03) \\ & -0.0266 * \text{TAX} - 0.0031 * \%\text{OUT} + 0.0000 * \text{ISSUE} \\ & \quad (-1.78) \qquad (-1.00) \qquad\quad (0.95) \end{aligned} \tag{2}$$

None of the coefficients is significant at the 5 percent level, the F-value for the regression is 1.117 (p-value = 0.36), and the adjusted R^2 is less than 1 percent. Consistent with the chronological distribution of extensions, there is no evidence in the regression in support of the tax hypothesis. (Because TAX takes a value of 0 in the period after July 18, 1984, its predicted sign is positive.) The implications of the anticipation hypothesis concerning EXT (the length of extension) and %OUT (the degree to which the warrant is out of the money) receive no support. Nor does the potential issue size exhibit any relation to the stock price response.

Panel B of Table IV contains the Pearson correlation coefficients. Consistent with the regression results, no variable is significantly correlated with CAR(−1, 0). Other findings are as follows. Longer extensions tend to have occurred in the earlier sample years and are associated with larger issue sizes. Because longer extensions increase the probability that the warrants will be exercised, the latter finding is consistent with the notion that larger issue sizes represent greater potential transaction costs savings. Issue size is also positively correlated with larger firms and the earlier time period.

III. Summary and Conclusions

In this paper, we examine the valuation effects of the announcement of the extension of warrant life beyond the original expiration date. The warrants themselves undergo a positive revaluation. Our principal finding is that the stocks of firms making the announcements experience positive abnormal returns on average. Expropriation of shareholder wealth is not the dominant effect of warrant extension. We also provide evidence inconsistent with a tax motivation for extensions.

Empirically, the extension of warrant life is one of the few financing decisions associated with positive abnormal common stock returns. We interpret the evidence as supportive of an anticipation hypothesis in which the market perceives the decision to extend the warrants' expiration date as a favorable indication for the stock price before the subsequent expiration. However, other implications of the anticipation hypothesis find little support in the data.

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