

A Reexamination of Price Behavior Surrounding Option Introduction

Li-Chin Jennifer Ho
University of Texas at Arlington

Chao-Shin Liu
University of Notre Dame

This paper examines the return behavior surrounding option introduction for a sample of 331 firms with option listings from 1983 to 1990. Using a longer test window and a sample that comprises exclusively post-1980 listings, our tests are better able to capture the information environment effect of option trading. In contrast to prior studies, this paper shows a significant reversal in price behavior surrounding option introduction. In particular, our results indicate that positive cumulative excess returns begin at least 100 days prior to the option introduction day. Starting from day -3 relative to introduction, however, the price behavior is dominated by a series of negative excess returns. The cumulative excess returns continue to drift downward for at least 100 days after the introduction day. In addition, the price effect is accompanied by an increase in trading volume.

INTRODUCTION

This study reexamines the return behavior around option introduction using a different set of option listing data and provides new evidence on the price effect associated with option introduction. Prior studies concerning the price effect of option trading primarily use samples of option listings before 1980. Firms listed before 1980 are typically larger firms with call-only options at initial introduction. Given that trading on put options provides an even cheaper alternative of shorting stock and that large and small firms are associated with different information environments (see, e.g., Atiase, 1980 and 1985), will the price effects of option introduction documented in prior studies occur for firms with option listings after 1980? In contrast to prior studies (e.g., Conrad, 1989; Kim and Young, 1991), this study uses a longer window around option introduction to examine price effects. Because prior research suggests that option trading leads to an overall improvement in the information environment and changes in the information environment are likely to occur on a gradual basis, using a long test window may better capture the association between option trading and informational effects. Thus, the purpose

of this paper is to investigate the generality of previous research regarding the price behavior around option introduction using a longer test window and a sample of post-1980 option listings.

Based on a sample of 331 firms with option listings between 1983 and 1990 we find that the price performance is significantly different before and after option introduction. In particular, positive cumulative excess returns begin at least 100 days before the introduction day, and significant excess returns are found in intervals $(-23, -14)$ and $(-13, -4)$ relative to introduction. Starting from day -3 relative to introduction the price behavior is dominated by a series of negative excess returns. The cumulative excess returns continue to drift downward for at least 100 days after the introduction day. Our results indicate that if an investor had taken a short position in the underlying security immediately after the introduction day, excess returns of approximately 3 percent could have been earned during the 100 day interval after introduction. This evidence may suggest a trading strategy that can be created with option listing. The price effect is accompanied by an increase in trading volume after option introduction. Both return variance and systematic risk of the underlying stocks, however, do not appear to be affected by option introduction.

The negative price effect documented in this study is consistent with research by Miller (1977) and Figlewski (1981). They both suggest that circumventing short sales barriers by option trading would enable traders with pessimistic information to incorporate their beliefs into security prices, which could drive down the prices of underlying securities. On the other hand, the positive excess returns observed prior to option introduction are consistent with the following scenario: Prior research (see, e.g., Black, 1975; Cox and Rubinstein, 1985) suggests that option markets may increase investors' incentives for private information acquisition. Market participants are likely to know what options will be listed before the listing day (e.g., *The Wall Street Journal* may announce this information several days before options are introduced). As a result, a greater amount of private information could be produced and revealed in the market prior to option introduction. Although the new information itself should not cause a systematic price effect, good news would more easily be impounded into security prices before options are traded. Investors with bad news may not be able to trade on their negative private information immediately due to short selling restrictions that exist before the trading of options. This may explain why a positive price effect is observed prior to option introduction.¹

BACKGROUND AND MOTIVATION THEORETICAL LITERATURE

Prior research suggests several possible effects of option listing on the price behavior of underlying securities. First, option listing may be associated with a positive price effect because the presence of options is likely to increase investors' trading opportunities beyond those available in the stock alone. Black (1975) and Cox and Rubinstein (1985) indicate that options offer particular advantages to informed traders because of additional leverage, smaller margin requirements, and fewer trading restrictions in option markets.

¹ Conrad (1989) also suggests that, under certain conditions, a positive price effect may be associated with the new information impounded into the market.

Research by Ross (1976), Merton *et al.* (1978), and Hakansson (1978, 1982) suggests that options may expand the returns space and allow the capital market to become complete. Option markets also provide additional dimensions of information beyond those provided by stock markets. Grossman (1989) argues that the option price serves as an additional observable statistic through which uninformed traders may infer the private information of informed traders. Jennings and Starks (1986), Skinner (1990), and Ho (1993) provide empirical evidence consistent with the argument that the availability of options increases incentives for private information acquisition. Thus, option trading may lead to an overall improvement in the information environment where the welfare of previously restricted traders (especially informed traders) would be improved.

Second, there are arguments that option trading may lead to a decline in the price of the underlying security. One set of these arguments is drawn from the short selling literature. Miller (1977) argues that asset prices are biased upward by imposing short selling restrictions. Once short selling restrictions are imposed, less negative information is impounded into prices because investors with relatively pessimistic price expectations are constrained to trade on their information. Jarrow (1980) extends Miller's argument and shows that with homogeneous beliefs for the covariance matrix of future prices, short sale constraints will increase asset prices. In related work Figlewski (1981) finds empirical evidence suggesting that asset prices are too high relative to a market with no short selling restrictions. As the availability of options results in a reduction of short sale constraints in the stock market, the Miller-Jarrow-Figlewski analysis suggests that option introduction will be associated with a price decline. After options are traded in the market, more pessimistic information would be impounded into the security price and, therefore, the price would fall.

Finally, Diamond and Verrecchia (1987) predict no price effect associated with easing short sale restrictions via option introduction. Under their rational expectations model, although option trading may reduce short selling costs, investors would consider trading constraints in forming their expectations and correctly estimate the relatively pessimistic information before option introduction. Therefore, there would be no systematic price effect associated with option introduction.

EMPIRICAL EVIDENCE

Previous empirical research on the price behavior around option listing has produced mixed results. Branch and Finnerty (1981) document a positive price effect in the 47 weeks prior to the option listing announcement and a further price increase during the first five weeks after the announcement. Both Whiteside *et al.* (1981) and Conrad (1986, 1989), however, find no evidence of predictable price performance during the announcement period. While finding no significant price effect associated with announcement of option trading, Conrad (1986, 1989) indicates that positive excess returns are observed in the five days around introduction of option listing and that cumulative excess returns remain for at least 30 trading days after introduction. Conrad (1989) indicates that her evidence is consistent with "the net increase in demand occurring only at introduction due to an inventory buildup on the part of (hedging) dealers and floor traders." Kim and Young (1991) indicate that the cumulative excess returns rise 1.4 percent in the ten days around the introduction of call options, but find no evidence of significant price reaction to put

trading commencement. DeTemple and Jorion (1990) also find a significant price increase in the two weeks surrounding the option listing date.

Prior empirical research also examines whether option trading is associated with changes in stock price volatility and firms' systematic risk. Klemkosky and Maness (1980) find no significant changes in beta and total risk of underlying securities from the pre- to postlisting period. Whiteside *et al.* (1983) show evidence of a slight decrease in equity beta after option listing. On the other hand, Skinner (1989), Conrad (1989), and DeTemple and Jorion (1990), employing a larger sample from a relatively longer period, indicate that return variance declines with option introduction but that systematic risk (beta) is unchanged. Evidence regarding the impact of option listing on trading volume is also mixed. Whiteside *et al.* (1983) find no significant change while Hayes and Tennenbaum (1979), Bansal *et al.* (1989), and Skinner (1989) document an increase in volume.

MOTIVATION OF CURRENT STUDY

The current study reexamines the price behavior around option introduction using a longer test window and a different set of option listing data. The extant evidence is inconclusive because most prior studies use samples of option listings before 1980 and because prior studies primarily employ a short window when testing the price effect surrounding option introduction.² Different price effects may be observed using a longer test period and post-1980 options. First, prior research suggests that option trading creates additional incentives for investors to collect private information, which in turn leads to an overall improvement in the information environment. This improvement is likely to occur on a gradual basis. For example, although we predict that firms will be followed more closely after option trading, we do not expect the number of financial analysts and/or institutional investors to suddenly increase at the time of announcement or introduction. It would be more likely to see that number increasing gradually. Therefore, we believe that a longer test window is better able to capture the association between option trading and changes in the information environment.³

Second, firms with option listings after 1980 are relatively smaller firms. Prior research (see, e.g., Atiase, 1980 and 1985; Freeman, 1987; Collins *et al.*, 1987) suggests that large and small firms are associated with different information environments. Consequently, the potential information effects (either positive or negative) associated with option trading for large firms may be different from those for small firms. In

² Branch and Finnerty (1981) examine option listings from 1973 to 1977. Whiteside *et al.* (1981) randomly select 35 stocks with option listings between 1973 and 1977. Klemkosky and Maness (1980) examine 103 securities with options listed on the Chicago Board of Options Exchange (CBOE) and the American Stock Exchange (AMEX) from 1973 to 1975. Conrad (1986) examines the issue using a sample of 96 firms listed on either the CBOE or the AMEX between 1974 and 1980. Although Conrad's sample includes options listed in 1980 and her results indicate no difference in price behavior for the pre-1980 and 1980-only samples, only 15 firms are included in her 1980-only sample. Kim and Young (1991) use the post-1980 option listing data; however, their results are based on a much shorter test window. (They look at a 20 day window centered on option introduction.)

³ Many prior studies concerning the relationship between option trading and changes in the information environment also employ a long window test. For example, Skinner (1990) finds that the number of analysts following firms increases after option listing by examining the period extending 12 months before listing to 12 months after listing. In a related study, Ho, Hassell, and Swidler (1995) look at an 11 month window surrounding option introduction to examine the accuracy of analysts' forecasts before and after option trading.

addition, both Stoll and Whaley (1983) and Amihud and Mendelson (1986) find that the costs of transacting in small firm stocks are relatively higher. If short selling costs are also negatively related to firm size, the price effect associated with option introduction (resulting from the reduction of short sale restrictions) may be more significant for firms listed after 1980.

Finally, the post-1980 listings have both put and call options, while the pre-1980 listings are largely call-only listings. As indicated in Conrad (1986), "it is possible that the cost of shorting through writing calls is not significantly cheaper than shorting the stock itself. However, it would be difficult to argue that buying a put is equally as costly as shorting the stock, as the only margin requirement is the cost of the put." Thus, the costs of shorting the underlying stock would decline more significantly after option trading if both puts and calls are available. This implies that the price effect associated with option introduction may be more pronounced for the firms with option listings after 1980.

It remains an open empirical question whether the results observed in prior studies may be extended to post-1980 option firms if we focus on a long window test.⁴

DATA, SAMPLE, AND METHODOLOGY

To examine the return behavior around option introduction, we define the introduction event period as the five day window (-3, +1) where day 0 is the option introduction day.⁵ To better capture the information environment effect, we examine return behavior up to 100 days before and after the event period. Return performance is measured using daily raw returns, daily market-adjusted returns, and daily excess returns. Market-adjusted returns are computed by subtracting equally weighted market returns from raw returns. Excess returns are obtained from the CRSP excess return file.⁶

We construct a sample of firms that had initial listings on the CBOE, AMEX, NYSE, Pacific Stock Exchange, and Philadelphia Stock Exchange from 1983 to 1990. The sample includes 679 firms initially. Several selection criteria are imposed to yield the final sample: (1) 226 firms are eliminated due to the lack of returns information on CRSP daily return files; (2) 21 firms are deleted because of no precise introduction dates; (3) 101 firms are dropped because they do not have complete daily returns available during the 205 day return cumulation period. Our final sample contains 331 firms.

We also examine whether the variance of security returns changes after option introduction, whether firms' systematic risk changes after introduction, and whether trading volume changes after introduction. For the variance test, we first compare the mean and median of the standard deviation of daily raw returns before and after the option introduction date. Because Skinner (1989) points out that any observed change in variance sur-

⁴ Our option sample differs from those in prior studies in another respect. The sample firms included in prior studies are primarily those firms with options listed on CBOE and AMEX. Our sample, however, comprises firms listed on the CBOE, AMEX, NYSE, Pacific Stock Exchange, and Philadelphia Stock Exchange. There is no *a priori* reason that option trading price effects would differ for different option exchanges.

⁵ Because Conrad (1989) finds a positive effect during the five day interval (-3, +1), we employ this interval as the introduction event window to enhance comparisons with her studies.

⁶ The excess returns from the CRSP excess return file are residual returns from the one factor market model. Specifically, each firm is assigned to a group of firms with similar market-model betas. The portfolio beta is then used for all the firms in the same portfolio to compute the residuals.

rounding option introduction may be explained by contemporaneous changes in market volatility, we also compute a market-adjusted variance measure by dividing the standard deviation of raw returns by the standard deviation of the equally weighted market returns. For the systematic risk test, the market-model beta is estimated over each 100 day period (before versus after the introduction event window) using daily raw returns. Finally, we compare percentage trading volume before versus after option introduction. The percentage trading volume is calculated as the average daily number of shares traded divided by the average number of shares outstanding. The average number of shares outstanding is the average across the beginning and ending option introduction year. The information regarding the number of shares traded (outstanding) is obtained from the CRSP (Compustat) tape. There are four cases in which both the beginning and ending number of shares outstanding cannot be identified from the Compustat tape.⁷ As a result, the sample size is reduced to 327 firms in the trading volume test.

EMPIRICAL RESULTS

Panel A of Table 1 presents the results of return performance before and after option introduction. The mean excess return across sample firms for the 100 day interval before introduction is 4.1 percent versus -3.4 percent for the 100 day interval after introduction; the difference is statistically significant at the 0.01 level with a two tailed t-test. The difference in median excess return is also significant at the 0.01 level using a Wilcoxon test (5.1 percent before introduction versus -1.8 percent after introduction). The results based on market-adjusted returns portray similar patterns. The mean market-adjusted return declines from 4.9 percent before listing to -3.1 percent after listing, a difference that is significant at the 0.01 level. The difference in median market-adjusted return is also significant at the 0.01 level. The test using raw returns exhibits similar results. Thus, the results indicate that the price performance is significantly different before and after option introduction. The price decline after option introduction is consistent with the Miller-Jarrow argument—easing short selling constraints by introducing options on underlying securities allows more traders with negative private information to impound their information into the security price, which in turn causes the price to decline.

Panel B of Table 1 reports the results of the variance test. The mean (median) standard deviation of daily raw returns before listing is .0224 (.0206), and the mean (median) standard deviation of daily raw returns after listing is .0235 (.0207). The difference in mean is weakly significant at the 10 percent level, but the difference in median is not significant at any conventional level. Panel B also indicates that the standard deviation of daily excess return is the same before and after option listing (mean of .0202 versus .0207; median of .0186 versus .0191).⁸ The mean market-adjusted variance slightly increases from 3.708 before listing to 3.726 after listing, although the median variance slightly declines from 3.552 before listing to 3.344 after listing. None of these differences

⁷ If the beginning or ending data are missing, only one data item is used as the average.

⁸ We also consider the residual variance from the estimated market model. The results show no decline in the variance after option listing.

Table 1—Comparison of Return Performance, Return Variance, Beta, and Trading Volume for the 100 Day Interval Before and After Option Introduction Event Window

	Mean		Median		Significance Tests for Difference	
	Before	After	Before	After	P-Value for t-test	P-Value for Wilcoxon Z
Panel A: Return Performance						
Excess Return	.041	-.034	.051	-.018	0.01	0.01
Market-Adjusted Return	.049	-.031	.050	-.006	0.01	0.01
Raw Return	.103	.002	.095	.039	0.01	0.01
Panel B: Return Variance						
Std. of Daily Raw Return	.0224	.0235	.0206	.0207	0.08	0.50
Std. of Daily Excess Return	.0202	.0207	.0186	.0191	0.25	0.62
Market-Adjusted Variance	3.708	3.726	3.552	3.344	0.85	0.87
Panel C: Systematic Risk						
Market Model Beta	1.435	1.434	1.417	1.345	0.97	0.76
Panel D: Trading Volume						
Percentage Trading Volume	.0037	.0044	.0029	.0031	0.01	0.01
Std. of Trading Volume	.0039	.0042	.0026	.0027	0.20	0.40

The introduction event window is defined as (-3, +1), where the day 0 is the introduction day. The periods before and after the introduction event window contain 100 trading days each. The excess return is from the CRSP excess return file. The market-adjusted return is the daily raw return minus the daily equally weighted market return from the CRSP daily return file. The market-adjusted variance is the standard deviation of the raw return divided by the standard deviation of the equally weighted market return of the same period. The beta is estimated using a one factor market model with 100 daily returns and the equally weighted market index from the CRSP file. The percentage trading volume is the average daily number of shares traded divided by the average (across the beginning and end of the period) number of shares outstanding.

is, however, significant at any conventional level. Thus, the volatility of security returns does not change with option listing.

Panel C of Table 1 reports sample firms' beta coefficients for the 100 day interval before and after the introduction event period. The results indicate that both the t- and Wilcoxon tests fail to reject the null hypothesis of no difference in betas before and after option listing. The mean (median) OLS beta before listing is 1.435 (1.417), while after listing it is 1.434 (1.345). This evidence is consistent with both Skinner (1989) and Conrad (1989), although they employ different procedures to estimate beta.⁹

Panel D of Table 1 reports the percentage trading volume surrounding option listing for the 327 sample firms with volume data available. The results indicate that the mean daily percentage trading volume is .37 percent before listing versus .44 percent after listing, an increase of 19 percent that is significant at the 0.01 level with a two tailed t-test. The increase in median is also significant at the 0.01 level using a Wilcoxon test. This evidence is consistent with Skinner (1989). Although trading volume increases after listing, panel D provides no evidence of a significant increase in volatility of trading volume after listing.

⁹ Conrad (1989) estimates betas using the Scholes and Williams (1977) technique, while Skinner (1989) employs the method used in Fowler and Rorke (1983).

Table 2—Comparison of Return Performance Before and After Option Introduction Using Ten Day Intervals

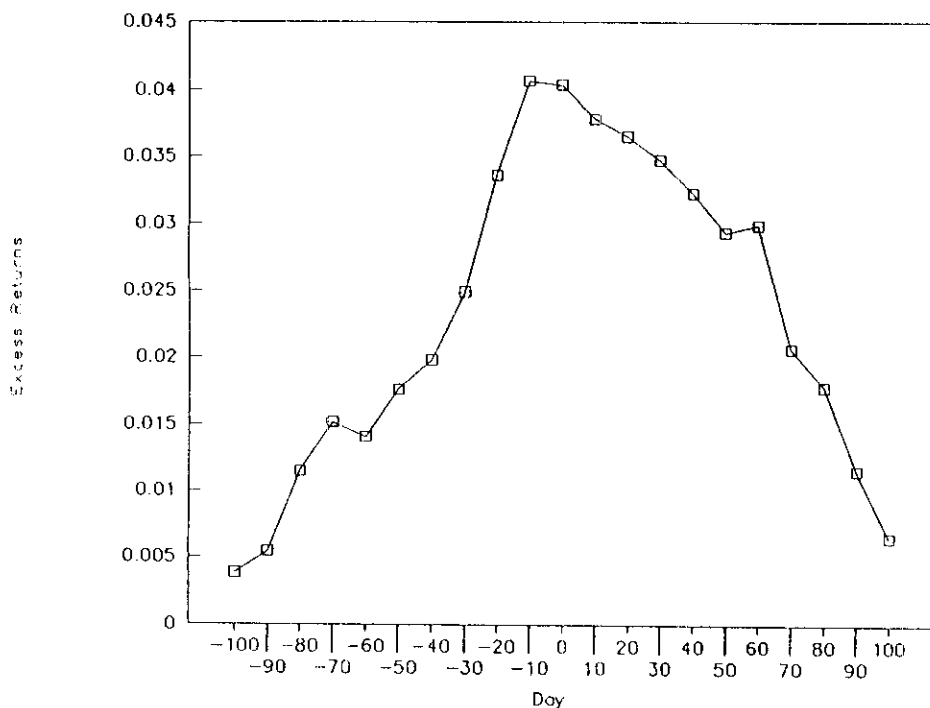
	Excess Return		Cumulative Excess Return	
	Mean	Median	Mean	Median
Panel A: Before Listing Period				
(-103, -94)	.00385	.00629#	.00385	.00629#
(-93, -84)	.00159	-.00188	.00545	.00621#
(-83, -74)	.00602*	-.00108	.01147**	.01127##
(-73, -64)	.00370	-.00334	.01517**	.01264###
(-63, -54)	-.00110	-.00728	.01407*	.00787#
(-53, -44)	.00358	.00120	.01765**	.01697##
(-43, -34)	.00220	-.00165	.01985**	.01738##
(-33, -24)	.00506	-.00083	.02491**	.01126###
(-23, -14)	.00876**	.00733##	.03366***	.03187###
(-13, -4)	.00702*	.00678#	.04069***	.05118###
Panel B: After Listing Period				
(+2, +11)	-.00255	-.00686	-.00255	-.00686
(+12, +21)	-.00130	-.00432	-.00385	-.00824
(+22, +31)	-.00175	-.00319	-.00560	-.01203
(+32, +41)	-.00247	-.00136	-.00807	-.00899#
(+42, +51)	-.00295	-.00107	-.01102	-.01438##
(+52, +61)	-.00647	-.00928	-.01749**	-.01648##
(+62, +71)	-.00225	.00016	-.01974**	-.01585##
(+72, +81)	-.00282	-.00542	-.02556**	-.02139##
(+82, +91)	-.00630*	-.00647#	-.02887***	-.01579##
(+92, +101)	-.00504	-.00227	-.03391***	-.01784##

* ** *** (# ## ###) indicate significance at the 10 percent, 5 percent, and 1 percent levels for a two tailed t-test (Wilcoxon test)

To further examine the return performance surrounding option introduction, Table 2 reports cumulative excess returns using ten day intervals. Because similar results are observed for three measures of return performance (i.e., raw returns, CRSP excess returns, and market-adjusted returns), we only report the results using CRSP excess returns. Panel A of Table 2 provides the results for the period before option listing. The results indicate that nine of the ten day intervals have positive excess returns before listing for mean excess returns. Only the two intervals close to the introduction day (-23, -14 and -13, -4) and the (-83, -74) interval, however, are significant. The median excess return is less consistent across the ten intervals, but the positive excess returns for the (-23, -14) and (-13, -4) intervals are also significant.¹⁰ Results of the cumulative excess return depict a pattern of significantly positive return performance before option introduction. The mean cumula-

¹⁰ It is possible that the significant excess returns found in intervals (-23, -14) and (-13, -4) are related to the announcement of option listing. According to Conrad (1989), the median number of days between announcement and introduction of options is eight for the entire sample. For the firms listed in 1980 the minimum number of trading days between announcement and introduction is 13. We attempted to identify option announcement dates for our sample firms using *The Wall Street Journal Index*. Only 83 of 331 firms (about 25 percent) have such information on *The Wall Street Journal Index*. For these 83 firms the mean (median) number of days between announcement and introduction of options is five (zero). Thirty-six firms had announcement dates preceded by introduction dates. For example, Block H&R Inc. commenced trading on May 9, 1988 with the announcement date of June 10, 1988.

To test for the announcement effect for these 83 firms we examine the return behavior for the interval (-23, +11) relative to the announcement day. No consistent pattern is observed. The mean (median) excess returns for the intervals (-23, -14), (-13, -4), (-3, +1), and (+2, +11) are -0.203 percent (-0.306 percent), -0.243 percent (-0.078 percent), -0.245 percent (0.494 percent), and -0.030 percent (-0.351 percent), respectively. None of these returns is significant at any conventional level in either a t-test or Wilcoxon test.

Figure 1—Excess Returns Around Option Listing

tive excess return over the 100 day interval (-103, -4) is 4.07 percent with a *t*-value of 3.64. The median cumulative excess return over the same interval is 5.12 percent, which is statistically significant at the 0.01 level under a two tailed Wilcoxon test.

The results for the (-3, +1) event window (not reported in Table 2) indicate that the five day cumulative excess return is negative. The mean and median cumulative excess returns are -.03 percent and -.14 percent, but they are not significant at any conventional level. This result is inconsistent with Conrad (1989) who documents significant positive excess returns from day -3 to day +1 relative to introduction.

Panel B of Table 2 presents the results of ten day intervals for the period after listing. Each of the ten intervals exhibit negative excess returns for mean excess returns. In addition, the mean cumulative excess return for the 100 day interval after listing is -3.39 percent, which is associated with a *t*-value of -2.89. If an investor had taken a short position in the underlying security immediately after the introduction day, excess returns of more than 3 percent would have been earned within the 100 days after introduction. The results based on median excess returns exhibit similar patterns.

The return performance over the 100 day intervals before and after introduction is further demonstrated in Figure 1. For the period before introduction the cumulative excess returns move upward to approximately 4 percent from day -100 to day 0. The cumulative excess returns, however, decline significantly from day 0 to day +100. Again, this result

is inconsistent with Conrad (1989). She finds that positive cumulative excess returns remain for at least 30 days after introduction. The price decline after option introduction seems to suggest that more pessimistic information is impounded into the price after the trading of options, as investors with bad news are less constrained to trade on such information. The positive price performance observed before introduction may be explained as follows (sic): The existence of options is associated with a greater amount of private information available in the market. Prior to the trading of options, however, investors with bad news may not be able to trade on their negative private information immediately due to short selling constraints. Traders with good news would be more able to incorporate their beliefs into the security price before option introduction, which causes the price to move upward.

CONCLUSIONS

This study reexamines the return behavior surrounding option introduction for a sample of 331 firms with option listings from 1983 to 1990. We find evidence of a price increase on the underlying security beginning at least 100 days prior to the option introduction date. Starting from day -3 relative to introduction most of the previous positive excess returns disappear, and the price behavior is dominated by a series of negative excess returns. The negative cumulative excess returns remain for at least 100 days after the introduction day. The price effect is accompanied by an increase in trading volume after option introduction. No significant changes in the return variance and systematic risk of the underlying stocks are observed around option introduction, however.

The price effect of option introduction found in this study has not been documented in prior research. In contrast to prior studies, this paper shows a significant reversal in price behavior surrounding option introduction. The negative price effect suggests that bad news would be impounded more easily into prices after the trading of options, as traders with negative private information are less constrained to trade on such information. The positive excess returns observed prior to introduction seem to indicate that option listing is associated with an overall improvement in the information environment, and the timing of the positive effect may be explained by the asymmetries in the process through which good and bad news become impounded into stock prices prior to the trading of options.

REFERENCES

1. Amihud, Y., and H. Mendelson, "Asset Pricing and the Bid-Ask Spread," *Journal of Financial Economics*, 17 (July 1986), pp. 223-249.
2. Atiase, R., "Predisclosure Information Asymmetries, Firm Capitalization, Financial Reports, and Security Price Behavior," Ph.D. dissertation, University of California, Berkeley (1980).
3. Atiase, R., "Predisclosure Information, Firm Capitalization, and Security Price Behavior Around Earnings Announcements," *Journal of Accounting Research*, 23 (Spring 1985), pp. 21-36.
4. Bansal, V., S. Pruitt, and K.C. Wei, "An Empirical Reexamination of the Impact of CBOE Option Initiation on the Volatility and Trading Volume of the Underlying Equities: 1973-1986," *The Financial Review*, 24 (February 1989), pp. 19-29.
5. Black, F., "Fact and Fantasy in the Use of Options," *Financial Analysts Journal*, 31 (July/August 1975), pp. 36-41 and 61-72.

6. Branch, B., and J. Finnerty, "The Impact of Option Listing on the Price and Volume of the Underlying Stock," *Financial Review*, 16 (Spring, 1981), pp. 1-15.
7. Collins, D., S. Kothari, and J. Rayburn, "Firm Size and the Information Content of Prices With Respect to Earnings," *Journal of Accounting and Economics*, 9 (July, 1987), pp. 111-138.
8. Conrad, J., "The Price Effect of Short Sales Restrictions: Some Empirical Evidence." Ph.D. dissertation, University of Chicago, (1986).
9. Conrad, J., "The Price Effect of Option Introduction," *Journal of Finance* (June 1989), pp. 487-498.
10. Cox, J. C., and M. Rubinstein., *Options Markets* (Englewood Cliffs, NJ: Prentice Hall, 1985).
11. DeTemple, J., and P. Jorion., "Option Listing and Stock Returns," *Journal of Banking and Finance*, 14 (1990), pp. 781-801.
12. Diamond, D., and R. Verrecchia, "Constraints on Short-Selling and Asset Price Adjustment to Private Information," *Journal of Financial Economics*, 18 (June 1987), pp. 277-311.
13. Figlewski, S., "The Informational Effects of Restrictions on Short Sales: Some Empirical Evidence," *Journal of Financial and Quantitative Analysis*, 16 (November 1981), pp. 463-476.
14. Fowler, D., and C. Rorke., "Risk Measurement When Shares are Subject to Infrequent Trading: Comment," *Journal of Financial Economics*, 12 (1983), pp. 279-283.
15. Freeman, R., "The Association Between Accounting Earnings and Security Returns for Large and Small Firms," *Journal of Accounting and Economics*, 9 (July, 1987), pp. 195-228.
16. Grossman, S., *The Informational Role of Prices* (Cambridge, Massachusetts: The MIT Press, 1989).
17. Hakansson, N., "Welfare Aspects of Options and Supershares," *Journal of Finance*, 33 (June 1978), pp. 759-776.
18. Hakansson, N., "Changes in the Financial Market: Welfare and Price Effects and the Basic Theorems of Value Conservation," *Journal of Finance*, 37 (September 1982), pp. 977-1004.
19. Hayes, S., and M. Tennenbaum., "The Impact of Listed Options on the Underlying Shares," *Financial Management*, 8 (Winter 1979), pp. 72-76.
20. Ho, L., "Option Trading and the Relation Between Price and Earnings: A Cross Sectional Analysis," *The Accounting Review*, 68 (April, 1993), pp. 368-384.
21. Ho L., J. Hassell, and S. Swidler., "An Empirical Examination of the Dispersion and Accuracy of Analyst Forecasts Surrounding Option Listing," *Review of Financial Economics*, 4, no. 2 (1995), pp. 171-185.
22. Jarrow, R., "Heterogeneous Expectations, Restrictions on Short Sales, and Equilibrium Asset Prices," *Journal of Finance*, 35 (December 1980), pp. 1105-1113.
23. Jennings, R., and L. Starks., "Earnings Announcements, Stock Price Adjustment, and the Existence of Option Markets," *Journal of Finance*, 41 (March 1986), pp. 107-125.
24. Kim, W., and C. Young., "The Effect of Traded Option Introduction on Shareholder Wealth," *Journal of Financial Research*, 14 (Summer 1991), pp. 141-151.
25. Klemkosky R., and T. Maness., "The Impact of Options on the Underlying Securities," *Journal of Portfolio Management*, 7 (Winter 1980), pp. 12-18.
26. Merton, R., M. Scholes, and M. Gladstein., "The Returns and Risk of Alternative Call Option Portfolio Investment Strategies," *Journal of Business*, 51 (April 1978), pp. 183-242.
27. Miller, E., "Risk, Uncertainty, and Divergence of Opinion," *Journal of Finance*, 32 (September 1977), pp. 1151-1168.

28. Ross, S., "Options and Efficiency," *Quarterly Journal of Economics*, 90 (February 1976), pp. 75-89.
29. Scholes, M., and J. Williams., "Estimating Betas from Non-Synchronous Data," *Journal of Financial Economics*, 5 (December 1977), pp. 309-327.
30. Skinner, D., "Options Markets and Stock Return Volatility," *Journal of Financial Economics*, 23 (June 1989), pp. 61-78.
31. Skinner, D., "Options Markets and the Information Content of Accounting Earnings Releases," *Journal of Accounting and Economics*, 13 (September 1990), pp. 191-211.
32. Stoll, H., and R. Whaley., "Transaction Costs and the Small Firm Effect," *Journal of Financial Economics*, 12 (1983), pp. 57-79.
33. Whiteside, M., W. Dukes, and P. Dunne., "Announcement Impact on Securities of Future Option Trading," *Nebraska Journal of Economics and Business* (Spring 1981), pp. 63-72.
34. Whiteside, M., W. Dukes, and P. Dunne., "Short Term Impact of Option Trading on Underlying Securities," *Journal of Financial Research*, 6 (Winter 1983), pp. 313-321.

Copyright of Quarterly Journal of Business & Economics is the property of College of Business Administration/Nebraska and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.