Review of European Studies; Vol. 8, No. 4; 2016
ISSN 1918-7173 E-ISSN 1918-7181
Published by Canadian Center of Science and Education

The Effect of Put Option Issuing on Risk Adjusted Return

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Received: June 23, 2016 Accepted: July 28, 2016 Online Published: September 2, 2016

doi:10.5539/res.v8n4p11 URL: http://dx.doi.org/10.5539/res.v8n4p11

Abstract

This research investigates the relation between put option issuing and risk adjusted return in Iran capital market for the period 2002-2016. Because data were not available before 2002, data from the period 2002 to 2016 were studied. All data gathered from Tehran Stock Exchange database the sample include 36 issuing events. The Event Study method was implied for 5 days. The empirical result shows that there is a significant relation between issuing options and abnormal return for the company stock, furthermore there is an approved relation between that abnormal return and stock liquidity, but the relation between option volume and that rerun was not approved.

Keywords: option, embedded put option, risk adjusted return

1. Introduction

Stock put option is one of financial derivatives that stock holders may use it for hedging strategy so their stock return can be safe in down ward market and by the mean time help the company to protect its stock price in market and protect it from overselling.

Since issuing new financial instrument may change investor’s opinion about the future of company and its performance (and by its turn change the stock price), it is important to investigate the effect of issuing financial instrument on stock price volatility.

In Iran capital market the put options have been issued for several time since 2012 in Tehran Stock Exchange (TSE) listed companies.

This research is the first one to investigate the effect of option issuing on risk adjusted return for TSE listed companies.

This section is followed by section 2, literatures review and in section 3, data and analysis and finally by section 4, the conclusion.

1.1 Literature Review

Conventional put option: this type of derivatives is one of the most applied financial modern instruments.

In contrast to Future and Forward contracts (in which both sides are required to perform the contract) this instrument give the holder, the right (not obligation) to exercise the contract. The difference between a right and an obligation is that a right needs to be exercised if it is in the interest of the holder, and it need not be exercised if it is not beneficial for him. An obligation, on the other hand, mandates him to take the required action, irrespective of whether or not he stands to benefit (Parameswaran, 2011, p. 343).

There are two types of option. A call option gives the holder the right to buy the underlying asset by a certain date for a certain price. A put option gives the holder the right to sell the underlying asset by a certain date for a certain price. The price in the contract is known as the exercise price or strike price; the date in the contract is known as the expiration date or maturity. American options can be exercised at any time up to the expiration date. European options can be exercised only on the expiration date itself. Most of the options that are traded on exchanges are American. In the exchange-traded equity option market, one contract is usually an agreement to buy or sell 100 shares. European options are generally easier to analyze than American options, and some of the properties of an American option are frequently deduced from those of its European counterpart (Hull, 2015, p. 9).

Potentially, however, a market participant may be happy to accept a higher price for an asset he or she is selling, but wants to avoid the possibility of lower prices. Alternatively, a purchaser of oil may be quite happy with lower prices, but wants to avoid higher prices. Both of these possibilities can be catered for with option contracts, which typically convey the right but not the obligation to buy (or sell) an asset at a pre-specified strike price K at some known time in the future (Clark, 2014, p. 44).

Iranian Put Option (Tabaee Put Option): this contract is a kind of embedded put option which in accordance to regulations governing defined as an option by which the put option of a specified number of underlying shares at the "exercise price" determined in the "Issuing Announcement" at the exercise date is given to its buyer. Since it can't be exercise before the exercise date, it is a kind of European put option this type of options doesn't have a secondary market and the buyer shall not be allowed to buy the embedded put option bonds in excess of the number of underlying shares in his possession. Thus, the number of valid embedded put option bonds at the end of each trading day shall add up to a maximum equivalent of the shareholder's asset in the underlying shares. If the number of embedded put option bonds owned by the shareholder exceeds the number of underlying shares possessed by him, the surplus embedded put option bonds shall be cancelled whilst the issuer shall be under no obligation thereupon (SEO Board of Directors, 2014).

TSE first option issuing experience occurred in 2012.

And till now there were 45 option issuing.

1.2 Previous Studies

The CBOE study suggested that option trading decreases the price volatility of the common shares, apparently because option positions are hedged with opposite positions in the related equity (and vice versa). Hayes and Tennenbaum study indicated that the presence of option contract activity increases the trading volume of the underlying common shares (Hayes & Tennenbaum, 1979).

Jennings and Starks examined the stock price adjustment to the release of quarterly earnings using samples of firms with and without listed options. They found the two samples exhibit different adjustment processes, with the non-option firms requiring substantially more time to adjust (Jennings & Starks, 1986).

Skinner examined the variance of returns on common stocks around the time exchange-traded options were listed on these stocks. The evidence indicated that stock return variance declined after options listing. In addition, stock market trading volume increased, on average, after options were listed on firms' stocks (Skinner, 1989).

Conrad examined the price effect of option introduction from 1974 to 1980. She found that the introduction of individual options causes a permanent price increase in the underlying security, beginning approximately three days before introduction (Conrad, 1989).

Ho and Liu research results indicated 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 (Ho & Liu, 1997).

Kumar and Sarin find that option listings were associated with a decrease in the variance of the pricing error, and an increase in the relative weight placed by the specialist on public information in revising prices for the underlying stocks. They also found that there was a decrease in the transaction size after option listings. Overall, their results suggested that option listings improved the market quality of the underlying stocks (Kumar, Sarin, & Shastri, 1998).

Sorescu in a research "The Effect of Options on Stock Prices" found that there is a positive abnormal returns for options listed during 1973 to 1980. By contrast, he found negative abnormal returns for options listed in 1981 and later (Sorescu, 2000).

Based on the asymmetric information and complete market hypotheses, Chena and Changb attempted to explain the impact of listing stock options on the abnormal return, volatility, trading volume and market depth of the underlying securities in Taiwan. The empirical results found that positive abnormal returns existed, the degree of volatility decreased, trading volume increased and market depth also increased following the introduction of the stock options (Chena & Changb, 2008).

Yu et al. concluded that option introduction still has significant beneficial effects on stocks' trading and informational environment, even in a world where the great majority of large stocks have already been optioned (Yu, Tandon, & Webb, 2010).

Jneter et al. in a research "security issue timing: what do managers know, and when do they know it" found that in the 100 days following put option issues, there is roughly a 5% abnormal stock return (Jenter, Lewellen, & Warner, 2011).

Because of tax materiality, it is common for firms to issue or purchase options on the firm's own stock (McDonald, 2004).

Companies have collected billions in premiums from privately sold put options written on their own stock, yet almost all of these puts expired worthless and their owners lost money as a result. Although these losses seem puzzling, Gyoshev et al. model how by offering to buy put options from better informed parties, investment banks receive private information about the issuing company. Empirically, they find a 12% increase in the stock prices and a 40% increase in the trading volumes around the put sales (Gyoshev, Kaplan, Szew, & Tsetsekos, 2016).

2. Methods

2.1 Research Hypotheses

Research main Hypothesis: Embedded put option issuing has a significant relation with stock risk adjusted return.

Research first subsidiary Hypothesis: The abnormal risk adjusted return (after the event of the put option issuing) has a significant relation with stock liquidity.

Research second subsidiary Hypothesis: The abnormal risk adjusted return (after the event of the put option issuing) has a significant relation with the volume of the put option issuing.

2.2 Research Variables

Independent variables: to test the main Hypothesis, this variable is the put option issuing which is considered as an event. To test the first subsidiary Hypothesis this variable is the stock liquidity which is released quarterly by the Securities and Exchange Organization in Iran and finally to test the second subsidiary Hypothesis this variable is the valium of put option issuing to calculate this figure, the minimum volume which the issuer committed to issue is divided by total share number of the relevant company.

Dependent variables: for all Hypotheses the dependent variable is the abnormal risk adjusted return after issuing the put option.

2.3 Sample

Among all 45 events (issuing embedded put option), the sample is chosen in accordance to below conditions:

1) The data of stock's return must be available for 500 trading day before the issuing (in addition, to do robustness test, 200 trading day is considered).

2) The stock return must have a significant relation with the market return (β coefficient must be statistically accepted in at least 95% confidence level).

3) The stock must be traded throw 5 day Event Window (for robustness test, 9 day Event Window is considered).

By considering these conditions 34 events have been chosen as the sample.

2.4 Research Process

Expected Return($R_{E,t}$) Calculation: to calculate expected return, first: β coefficient is calculated for each share by regressing 500 daily stock return ($R_{i,t}$) on market return, prior to the event (model 2).

Model 1: calculation of daily returns ($R_{i,t}$):

$$R_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}}$$

$P_{i,t}$: Stock i price (and to calculate $R_{m,t}$, $P_{i,t}$ is the market index value) in day t.

Model 2: calculation of stock's beta coefficient (β_i):

$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_i$

$R_{m,t}$: Market daily return in day t.

After calculating the beta coefficient and getting risk free rate of return (R_{fr}: which is announced yearly by central bank of Iran), by using model 3, the expected return is calculated for Event Window include 5 days (one day before the event which is referred by N1, the event day which is referred by Z and 3 days after the event which are referred by P1 to P3).

Model 3: calculation of stock I expected return ($R_{iE,t}$):

$R_{iE,t} = R_{fr} + \beta_i R_{m,t}$

Abnormal Risk Adjusted Return ($AR_{i,t}$) Calculation: this figure is calculated by using the model 4.

Model 4: calculation of stock's Abnormal Risk Adjusted Return ($AR_{i,t}$):

$AR_{i,t} = R_{iR,t} - R_{iE,t}$

$R_{iR,t}$: Stock i real return in day t (calculated by model 1).

Accumulated Abnormal Risk Adjusted Return ($AR_{i,t}$) Calculation: Finally by using model 5 the accumulated abnormal return is calculated.

Model 5: calculation of stock i accumulated Abnormal Return ($AAR_{i,t}$):

$AAR_{i,t} = AAR_{i,t-1} + AR_{i,t}$

For the first day the AAR_t is equal to AR_t

3. Results and Findings

3.1 Descriptive Statistic

The descriptive statistic for calculated accumulated abnormal return is given is Table 1.

Table 1. Accumulated abnormal return descriptive statistic for 5 days

Even Window Day	Number	Mean	Standard deviation
p3	34	-0.01401	0.03145
p2	34	-0.01567	0.03765
p1	34	-0.0112	0.03713
z	34	-0.0085	0.02814
n1	34	-0.00267	0.01855

In Table 2, the descriptive statistic for accumulated abnormal return (at the end or event window) and stock liquidity and volume is presented.

Table 2. A ccumulated abnormal return, liquidity and volume

Variable	number	min	max	mean	Standard deviation
AAR_t	34	-0.0807	0.0746	-0.0140	0.0314
Liquidity	34	0.0014	0.0661	0.0123	0.0143
Volume	34	0.0400	0.7000	0.2201	0.1391

3.2 Empirical Tests

Research main Hypothesis test: to test this hypothesis, one sample t-test is used. This technic makes inference about a population mean based on a single sample. The basic null hypothesis (statistic hypothesis) is that the population mean is equal to a hypothesized value, with the common alternative hypotheses (statistic hypothesis) that the population mean is not equal to the hypothesized value. For this research the hypothesized value is equal to zero, so:

$$\begin{cases} H_0 \mid \mu = 0 & \text{: the reseach main hypothesis would be rejected.} \\ H_1 \mid \mu \neq 0 & \text{: the reseach main hypothesis would be accepted.} \end{cases}$$

To decide about statistic hypothesis acceptance, T value and its relevant Sig must be calculated then Sig will be compared with Significance Level (since, at this research Confidence Interval of the Difference is 95%, so the Significance Level is equal to 5%).

If Sig will be equal or less than Significance Level, statistic null hypothesis (H_0) would be rejected and the alternative hypothesis (H_0) would be accepted; if so, it means that the research main hypothesis would be accepted by the other word embedded put option issuing has a significant relation with stock risk adjusted return.

If Sig will be more than Significance Level, decision about hypothesis, would be reversed.

The test output is showed in Table 3.

Table 3. One-sample t-test result to test the main hypothesis

Window Days	Mean Difference	T	Sig.
p3	-0.01401	-2.598	0.014***
p2	-0.01567	-2.428	0.021
p1	-0.01120	-1.760	0.088
z	-0.00850	-1.762	0.087
n1	-0.00267	-0.841	0.407

***: Accepted by 99% confidence.

According to the result, for 5 days Event Window, T value is equal to -2.598 and its relevant Sig is 0.014, so, H_0 would be rejected and the research main hypothesis is accepted.

The negative relation may exist because of low market experience about this financial instrument or others investors' behavioral factors in down ward market.

Research first and second subsidiary Hypotheses: to test these hypotheses, the below regression model (model 6) will be run in which the dependent variable figure is accumulated abnormal return at the end of window (day P3).

Model 6: regression model to test the subsidiary Hypotheses

$$AAR_i = \alpha_0 + \beta_1 X_{1,i} + \beta_2 X_{2,i}$$

$X_{1,i}$: Put option issuing volume.

$X_{2,i}$: Stock liquidity for the year prior to issuing.

The basic null hypothesis (statistic hypothesis) is that the coefficient is equal to a hypothesized value, with the common alternative hypotheses (statistic hypothesis) that the population mean is not equal to the hypothesized value. For this research the hypothesized value is equal to zero, so:

$$\begin{cases} H_0 \mid \beta_i = 0 & \text{: the reseach subsidiary hypothesis would be rejected.} \\ H_1 \mid \beta_i \neq 0 & \text{: the reseach subsidiary hypothesis would be accepted.} \end{cases}$$

To decide about statistic hypothesis acceptance, T value and its relevant Sig must be calculated then Sig will be compared with Significance Level (since, at this research Confidence Interval of the Difference is 95%, so the Significance Level is equal to 5%).

If Sig will be equal or less than Significance Level, statistic null hypothesis (H_0) would be rejected and the alternative hypothesis (H_0) would be accepted; if so, it means that the research subsidiary hypothesis would be accepted by the other word there is a significant relation between the dependent (stock abnormal return after the issuing) and independent variables (issuing volume/stock liquidity).

If Sig will be more than Significance Level, decision about hypothesis, would be reversed. The regression result is presented in Table 4.

Table 4. Result of regression

Variable	Coefficient	S.E.	T value	Sig.
Volume ratio	-0.2787	0.3548	-0.7855	0.4379
Liquidity ratio	-0.0542	0.0257	-2.1097	0.0428**

DW: 2.2 **: Accepted by 95% confidence.

According to the result, for first variable, T value is equal to -.7855 and its relevant Sig is 0.4379 and for the second variable, T value is equal to -2.1097 and its relevant Sig is 0.0428; so, for the first Hypotheses H_0 would be accepted and for the second one it would be rejected. By the other word, research first subsidiary hypothesis would be rejected and the second one would be accepted.

3.3 Robustness Test

In previous section to test the research main hypothesis, data from 500 trading days was used in an Event Window including 5 days. In this section the result of one sample T-test is presented again but in Table 5 data from 200 trading day (for calculation stock's beta) in an Event Window including 5 days and in Table 6 data from 500 trading day in an Event Window including 9 days is used.

Table 5. One-sample T-test result by using 200 trading day data

Window Days	Mean Difference	T	Sig.
p3	-0.01076	-2.172	0.037**
p2	-0.01381	-2.414	0.021
p1	-0.0098	-1.8	0.081
z	-0.0076	-1.89	0.066
n1	-.00171914	-.551	0.585

**: Accepted by 95% confidence.

According to the result, for 5 days Event Window, T value is equal to -2.172 and its relevant Sig is 0.037, so, H_0 would be rejected and the research main hypothesis is accepted again but the confidence level is decreased from 99% to 95%.

Table 6. One-sample T-test result with the 9 day window

Window Days	Mean Difference	T	Sig.
P5	0.01538-	1.707-	0.098
P4	0.01737-	2.110-	0.048
p3	0.01993-	2.182-	0.037
p2	0.02025-	1.928-	0.063

p1	0.01622-	1.491-	0.146
z	0.01385-	1.405-	0.170
n1	0.00879-	1.012-	0.319
N2	0.00788-	1.246-	0.222
N3	0.00563-	1.344-	0.189

**: Accepted by 95% confidence.

According to the result, for 9 days Event Window (including 3 trading day prior to issuing day, issuing day and 5 trading day after issuing), T value is equal to -1.707 and its relevant Sig is 0.098, so, in 95% confidence H_0 would be accepted and the research main hypothesis is rejected but if the confidence level is decreased from 95% to 90%, H_0 would be rejected and the research main hypothesis is accepted again.

4. Discussion and Conclusions

This research investigated the relation between Iranian embedded put option issuing and stock's abnormal return as the main research hypothesis. The result finds that there is a significant negative effect of the issuing on the return. As it mentioned this effect exist because of investors behavioral factor in a down ward market another possible reason would be that these financial instruments are in their fancy age in the Tehran stock market.

As subsidiary hypotheses, the relation between the volume ratio of the put option issuing and stock liquidity ratio (as independent variable) and that abnormal return was investigated. The finding showed that there is no significant relation between issuing volume ratio and that abnormal return but there is a significant relation between stock liquidity and that abnormal return.

For future study the relation between the put option expiration and stock return is suggested.

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