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Is the Put Option in U.S. Structured Bonds Good News for Both Bondholders and Stockholders?

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Abstract

The recent financial crisis has brought into spotlight various financially engineered products, their design parameters, and the impact of these design parameters on the bondholders and the common stockholders. We analyze the common stock performance of 134 firms issuing the callable-puttable bonds, a structured derivative security, issued between 1977 and 2005. We focus our study on the common stock performance of the issuing firms around the issue date and the put date. We use the Fama French (1993) four factor regression model to estimate the common stock performance of the issuing firms two years before and after the issue and the put date. We find that these firms underperform the market throughout. The firms perform worse after the issue date but improve their performance as we get closer to the put date. We find strong evidence that the presence of the put option in these securities provides protection to the bondholders as well as improved returns to the common stockholders. The deferred put option can mitigate the agency[1] problem between the stockholders and the bondholders.

Keywords: Bonds, Callable, Puttable, Performance, Common stock, Long run, Event Study.
JEL Classification Codes: G14, G32.

1. Introduction

The financial crisis of 2008-2009 brought into focus a wide variety of structured derivative securities engineered in the recent past. Finnerty (1992) and Finnerty and Emery (2002) exhibit the types of securities issued in the recent past to meet a variety of corporate financing objectives.

While the range of securities issued to meet the diverse financing objectives is varied, a vast majority of these securities can be summarized into a single class with a prudent choice of parameters,

[1] The conflict between the stockholders and the bondholders is referred to as the "agency problem", as explained by Jensen and Meckling (1996).

specifically, callable, convertible, and puttable[2] fixed income securities (either bonds or preferred stocks) with a prudent choice of call, conversion and put parameters. While engineering a security design, a manager's choice of security parameters spans five dimensions: the conversion feature, call feature, put feature, deferred[3]-call feature and the deferred-put feature. Some examples of these types of bonds are: callable bonds, callable-convertible bonds, puttable bonds, callable - puttable bonds, and callable – puttable - convertible bonds. In addition, the coupon rate associated with these bonds such as fixed, variable, and zero coupons add another dimension. Given such a wide range of securities with diverse parameters, it will be appropriate to select one type of security at a time for analyses purposes.

In this paper we examine the performance of the firms issuing callable-puttable fixed coupon bonds with single deferred put dates. There were 134 of these securities issued in the U.S. between 1977 and 2005. The importance of these securities to the firms can be gauged by the large principal amount[4] associated with them.

Unlike the call feature in the bonds, the put option has remained largely unexplored. The put option provides the holders of these securities the opportunity to put the security back on the firm at a predetermined price. Just like the call option the put option may also be deferred. The obvious potential use of the put option is that it has the potential to protect the security holder from the rising interest rates or the falling equity values.

We intend to determine the effectiveness of the deferred put option design in providing the protection to the bondholders as well as its effect on the returns to the common stockholders. Recently, the financial innovation on the Wall Street has come under intense scrutiny and we continue the trend by examining the effect of these specially designed securities on the stakeholders.

The remainder of the paper is organized into five sections. Section 2 discusses the literature review. Section 3 describes the testable hypotheses. Section 4 describes the sample selection and the characteristics. Section 5 describes the research method. Section 6 discusses the results. The concluding remarks are contained in the section 7.

2. Literature Review

2.1. The Call Option

The call feature in the bonds has drawn significant attention in the field of research. The reasons given for the inclusion of the call option in the bonds have been varied. Kish and Livingston (1992) find a positive relationship between the level of interest rates and the call feature usage in the bonds. Barnea et al. (1980) contend that the maturity structure of the debt and the call option on the debt are alternative solutions to the specific agency problems. Chen et al. (2007) contend that an inclusion of the call option feature in the bonds solves the risk-shifting problem studied by Jensen and Meckling (1976). Robbins and Schatzberg (1986) show that the quality of a project can be signaled by attaching call option to the bonds. Ederington and Stock (2002) also find that the market can interpret inclusion of the call feature as a reliable indicator of the future firm investment and strong performance thus reducing the required yields. Parrino and Weisbach (1999) argue that an inclusion of a call option is perceived by the bondholders as a protection against risky investing. Affleck-Graves and Miller (2003) examine the long run performance of the common stock of the firms following calls of both the straight and convertible debt and find the evidence of overperformance over the period 5 year following the call.

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[2] There are three put different options associated with the bonds: single put dates, multiple put dates, and a "change of control put". The "change of control" put is a contract feature which enables the bonds to become puttable under specific circumstances and not on a specific date specified in the contract.

[3] Deferred feature enables security to be called or put at some distant point in future.

[4] In 64 instances the firms raised largest capital through these securities as compared all the other securities (commons stock, preferred stock, and debt) they had issued in the past two years.

2.2. The Put Option

The research on the put option in the bonds has been very limited. Chatfield and Moyer (1986) argue that the put option in the bonds is perceived by the bond investors as a way of reducing the default risk. Firms, on the other hand, would like to avoid the put option from being exercised since they will have to incur an extra cost associated with the refunding transaction cost. Mauer (1993) finds that the refunding transactions costs cause the firm to delay calling a bond when its market value first reaches the call price. Bayless and Diltz (1994) find that the transaction cost is an important determinant for the firms in their choice of the securities. As far as the debt issues are concerned, Spiess and Affleck-Graves (1999) find substantial post issue underperformance by the firms making straight and convertible debt offerings.

3. Hypotheses

On the basis of the above discussion on the put option, we form the hypothesis that in the long run the firms issuing these securities should perform worse after the issue date and the performance should improve as we move closer to the put date. The performance should deteriorate after the put date has passed.

There are three testable hypotheses:

H1: The common stock of the firms issuing the callable-puttable bonds performs worse after the issue date as compared to the period before the issue date.

H2: The performance of the common stock of the firms issuing callable-puttable bonds improve as the time approaches the put date thereby, benefiting both the common stockholders and the bondholders.

H3: The common stock of the firms issuing callable-puttable bonds performs worse after the put date as compared to the period before the put date.

4. Sample Selection and Characteristics

4.1. Sample Selection

We collected the sample of the firms issuing the callable-puttable fixed coupon bonds with a single put date from the Securities Data Company (SDC) platinum database. We further refined the sample for the issuing firms that were listed and searchable on the Center for Research in Security Prices (CRSP) database on Wharton Research Data Services (WRDS).

The final sample consists of 134 issues of the callable - puttable bonds with a single specific put date. For the firm's with multiple issues of the callable - puttable bond, if the issue date or the put date of more than one issue is included in the event period, the return on this firm would be included more than once in some of the monthly average returns. This violates the independence assumption implicit in most of our statistical tests. Hence, for those instances only one issue from that firm is considered in the regression analysis and we classify that as an independent sample.

The tables 2 and 3 depict the full and the independent sample of the issuing firms according to their issue date and the put date respectively. The monthly stock price data for the sample firms was obtained from the CRSP database on WRDS.

4.2. Issuer Characteristics

A distribution of the firms by their 2 digit SIC[5] code is depicted in table 1. Firms in utilities, finance, and manufacturing were the highest issuers. Upon further investigation of the characteristics of the firm issuing these securities, we find that the average debt to equity ratio of the issuing firms was 1.26

[5] Standard Industrial Classification.

(standard deviation = 0.62). Also, their average issue size[6] was 7.8% (standard deviation = 2.81). These numbers reveal that the firms with relatively large debt in their capital structure used these debt securities to raise large principal amount. Out of a total of 134 issues, 85 times the firm cited the reason for raising the capital as, "refinance existing debt". In rest of the instances the firms cited reasons such as, "payment on borrowing"(29 times), and "other reasons"(20 times).

Table 1: Distribution of Firms According to Industry Issuing Callable-Puttable Bonds for the Full Sample

Industry (2 Digit SIC Code)	Number of issues (Full Sample)
Agriculture	1
Communication	3
Finance	23
Insurance	6
Manufacturing	21
Mineral	6
Real Estate	7
Retail	11
Services	7
Transportation	3
Utilities	46
Total	134

Number of issuing firms distributed by their two digit SIC code obtained from SDC Platinum Database.

4.3. Sample Characteristics

The call profile of these securities is such that once the call protection expires these bonds remain callable anytime at the price listed until maturity, unlike the put protection which allows the investors to exercise the put only on a specific date.

The average maturity of these securities is 18.7 years with a standard deviation of 9.14 years. These securities are designed in such a way that on an average the first put date occurs before the first call date. The average first put date of the sample is 4.61 years with a standard deviation of 3.1 years while the average first call date of the sample is 5.6 years with a standard deviation of 3.09 years.

Over the entire sample there are only seven instances where the security is issued on an exchange (NYSE[7] and AMEX[8]) in rest of the cases (127) it is an over the counter transaction (OTC).

We find that there was a high number (69) of the callable-puttable bonds issued in the year 1998 (Table 2). Crabbe and Nikoulis (1997) observe that the puttable bond issuances increase when the yield curve is flat. They also argue that since $46.6 billion of the corporate bonds become callable in the period 2001 to 2003, the demand for the bonds puttable in this time period should go up in order to hedge the negative convexity in the corporate debt portfolio. Our finding that 41 out of 69 of these securities were puttable in the period 2001 to 2003, is in conjunction with their observation and might explain the reason for a high number of the callable-puttable bonds issued in 1998.

Table 2: The Sample Distribution of the Callable - Puttable Bonds (Single Put Date) by Issue Date

Issue Year	Full Sample	Independent Offerings
1977	2	2
1978	4	4
1979	6	6
1980	2	1
1981	4	4
1982	8	6
1983	3	3
1984	6	5

[6] Issue size (%) = Net proceeds from the callable-puttable bonds/ (market value of equity + book value of total debt + book value of preferred stock).

[7] NYSE: New York Stock Exchange.

[8] AMEX: American Stock Exchange.

1986	4	4
1987	2	2
1988	3	3
1989	4	3
1992	2	2
1995	1	1
1996	1	1
1997	1	1
1998	69	59
1999	2	2
2000	5	5
2001	3	3
2002	0	0
2003	1	1
2004	0	0
2005	1	1
Total	**134**	**119**

The sample includes all the callable - puttable bond offerings obtained from the SDC platinum database over the period 1977 - 2005: (1) the firm should be listed on the CRSP database on WRDS at the time of the issue; (2) only the issues with a single put date are included. Independent offerings are those for which the firm has not made any other callable – puttable debt issue(s) during the period two years before and after the issue date.

Table 3: Sample Distribution of the Callable - Puttable Bonds (Single Put Date) by the Put Date

Year of Put date	Full Sample	Independent Offerings
1978	1	1
1979	1	1
1980	3	3
1981	5	5
1982	2	1
1983	5	4
1984	7	4
1985	5	4
1986	1	1
1987	0	0
1988	3	3
1989	2	2
1990	1	1
1991	1	1
1992	1	1
1993	3	3
1994	3	3
1995	1	1
1996	0	0
1997	1	1
1998	2	2
1999	3	2
2000	6	6
2001	18	17
2002	10	6
2003	21	21
2004	1	1
2005	9	9
2006	1	1
Total	**120**	**108**

The sample includes all the callable - puttable offerings obtained from the SDC platinum database over the period 1977 - 2005: (1) the firm should be listed on the CRSP database on WRDS at the time of the issue; (2) only the issues with a single put date are included. Independent offerings are those for which a firm does not have overlapping put dates during the period two years before and after the put date. There were no issues with put dates in 2007. Twelve (12) issues with put dates in 2008 were not included since they hadn't completed the period 2 years after the put date at the time of this analysis. There were also two (2) issues with impending put dates in 2015.

5. Research Method

There have been several studies that have documented the long run abnormal returns in response to different events and the actions taken by the firms. Ritter (1991) and Loughran (1993) measure the long run performance of the firms going public through an IPO in comparison to non-IPO firms and find that the IPO firms significantly underperform for a period up to five years. Loughran and Ritter (1995) find that the firms offering seasoned equity also underperform. Ikenberry et al. (1995) find significant positive abnormal returns in the four year period following stock repurchase.

We use Fama French (1993) three factor regression method to examine the long run performance of the common stock of the issuing firms. Fama French suggest three factor model for the stock returns. We also add a fourth factor known as the momentum factor (Brav, Geczy, and Gompers (2000)). We add the momentum factor in our analysis to account for any momentum in the stock prices leading up to the issue date and the put date.

5.1. Event Study

We examine the common stock performance for the periods:

1. From issue date to two years before the issue date.
2. From issue date to two years after the issue date.
3. The period between the issue date and the put date: This period was chosen because the average time period for the sample between issue date and the put date is 4.61 years and there are a few observations with interval less than 4 years.
4. Two years before the put date.
5. Two years after the put date.

We individually perform the regression for each of the five periods and compare the results using the following Fama French four factor model.

$$(Rpt-Rft)=\alpha+\beta(Rmt-Rft)+s\ SMBt+h\ HMLt+u.UMDt+\varepsilon t \quad (1)$$

Where,

Rpt is the return on the portfolio of sample firms in month *t*.

Rmt is the return on the value-weighted index of NYSE, AMEX, and NASDAQ stocks in month *t*.

Rft is the 1-month T-bill yield in month *t*.

SMBt is the return on small firms minus the return on large firms in month *t*.

HMLt is the return on high book-to-market stocks minus the return on low book-to-market stocks in month *t*.

UMDt is the momentum factor.

SMB, HML, UMD, Rm−Rf, and *Rf* are obtained from the Web site of Ken French (MBA.Tuck.Dartmouth.edu/pages/faculty/ken.French/Data_Library.html). This site provides additional details on the construction of these factors.

The intercept term α in regression provides a measure of the abnormal return per month and is the parameter of primary interest in event-type studies.

Rpt is computed using the calendar time average method described in Mitchell and Stafford (2000). If the stock is delisted before the end of the event period, the returns are used for whatever period they are available on the CRSP. For each month in the study, *Rpt* is the average of the monthly return on all stocks over the event period. Thus, *Rpt* represents the return on a portfolio strategy of buying stock in every company that falls in the event period. Investment is made at the end of the month in the particular event period and continues for the entire event period.

Loughran and Ritter (2000) contend that two important decisions must be made in using the Fama and French model for the study of long-term performance. The first decision relates to the choice of equally or monthly weighting the calendar periods. Equally weighting the periods implies the same investment each period and should provide an indication of returns available to a portfolio approach applied over time. Monthly weighting implies performing weighted least squares (WLS) where each

month's average returns are weighted according to the number of firms represented in that month. We report the results for both equally weighted and monthly weighted calendar periods.

The second decision relates to the choice of equal or value weighting the portfolio of stocks under study. Equal weighting implies calculating average return across the firms in a specific month in an event period. Value weighting implies calculating weighted average of the returns across the months in an event period weighted by the firm value. Firm value is measured as the sample firms' market capitalization immediately prior to the debt offering.

Table 4: Results from Fama-French 4-Factor Model

Event Period	α	β	s	h	u	AdjR²
Panel A: 2 - Years Before the Issue Date						
(1) EW portfolio/OLS	-0.60 (-2.61)*	0.68 (11.51)	0.13 (1.58)	0.22 (2.88)	0.003 (0.08)	0.34
(2) VW portfolio/OLS	-0.33 (-0.68)	0.56 (8.62)	0.18 (1.72)	0.01 (0.02)	0.20 (0.44)	0.33
(3) EW Monthly Weighed portfolio/WLS	-0.68 (-2.81)*	0.79 (12.17)	0.14 (2.28)	0.46 (3.98)	0.23 (0.84)	0.46
(4) VW Monthly Weighed portfolio/WLS	-0.46 (-0.92)	0.87 (9.89)	0.09 (2.31)	0.11 (0.03)	-0.52 (-0.62)	0.34
Panel B: 2 - Years After the Issue Date						
(1) EW portfolio/OLS	-1.38 (-4.57)*	0.97 (12.01)	0.20 (2.01)	0.72 (6.22)	-0.09 (-0.13)	0.36
(2) VW portfolio/OLS	-1.21 (-3.32)*	0.98 (10.68)	-0.02 (-0.17)	0.59 (2.99)	0.61 (0.88)	0.40
(3) EW Monthly Weighed portfolio/WLS	-1.42 (-5.22)*	1.34 (8.08)	0.11 (0.72)	1.01 (5.75)	0.43 (2.56)	0.38
(4) VW Monthly Weighed portfolio/WLS	-1.18 (-3.77)*	0.91 (9.62)	-0.38 (-3.71)	0.22 (2.39)	0.02 (0.68)	0.37
Panel C: 2 - Years Before the Put Date						
(1) EW portfolio/OLS	-0.80 (-3.56)*	0.80 (14.03)	-0.23 (-1.79)	0.35 (3.73)	-0.16 (-1.12)	0.38
(2) VW portfolio/OLS	-0.51 (-1.86)**	0.96 (11.91)	-0.41 (-3.88)	-0.04 (-0.33)	0.01 (0.19)	0.40
(3) EW Monthly Weighed portfolio/WLS	-1.09 (-4.60)*	0.79 (15.71)	-0.09 (-1.32)	0.59 (6.61)	-0.19 (-1.05)	0.51
(4) VW Monthly Weighed portfolio/WLS	-0.53 (-1.88)**	0.98 (14.80)	-0.43 (-6.06)	0.06 (0.37)	0.07 (0.53)	0.46
Panel D: 2 - Years After the Put Date						
(1) EW portfolio/OLS	-1.01 (-3.18)*	0.67 (9.56)	0.05 (0.80)	0.47 (3.28)	-0.59 (-2.07)	0.23
(2) VW portfolio/OLS	-1.13 (-3.08)*	1.00 (10.31)	-0.21 (-0.98)	0.32 (2.51)	0.49 (2.31)	0.26
(3) EW Monthly Weighed portfolio/WLS	-1.16 (-3.82)*	1.03 (11.62)	0.19 (1.42)	0.61 (5.62)	-0.26 (-2.31)	0.47
(4) VW Monthly Weighed portfolio/WLS	-1.09 (-3.22)*	1.09 (13.91)	-0.11 (-1.31)	0.68 (3.91)	0.39 (1.86)	0.46
Panel E: After issue but before put date						
(1) EW portfolio/OLS	-1.07 (-4.66)*	0.89 (14.17)	0.20 (2.22)	0.56 (6.71)	-0.11 (-0.61)	0.38
(2) VW portfolio/OLS	-0.71 (-3.42)*	1.12 (14.78)	-0.09 (-1.33)	0.62 (5.23)	0.52 (2.16)	0.42
(3) EW Monthly Weighed portfolio/WLS	-1.24 (-5.21)*	0.87 (14.02)	0.14 (2.18)	0.84 (10.29)	-0.20 (-1.28)	0.53
(4) VW Monthly Weighed portfolio/WLS	-1.09 (-3.62)*	0.91 (14.40)	-0.14 (-1.89)	0.68 (6.59)	0.54 (1.81)	0.52

Regression (1) in each panel use equally weighted (EW) returns and are estimated using ordinary least squares (OLS), regression (2) use value-weighted (VW) returns and are estimated using ordinary least squares (OLS), regressions (3) in each panel use monthly weighed (EW) returns and are estimated using weighted least squares (WLS), and regressions (4) use monthly weighed (VW) returns and are estimated using weighted least squares (WLS).Parameter estimates are presented with *t*-statistics in parentheses. All *t*-statistics are calculated using White's method (White, 1980). * indicates significance at 1% level, ** indicates significance at 5% level.

6. Results

Table 4 summarizes the results from the Fama and French four-factor regression model with the momentum factor for the sample of the callable - puttable bonds. Results are provided for both the value-weighted and the equally weighted portfolios over the event periods listed in the panels above. According to Fama (1998), the value weighting method captures the aggregate wealth effects. According to Loughran and Ritter (2000), if the relevant perspective is to measure the abnormal returns of a typical firm undergoing a particular event, then equally weighting is appropriate. We concentrate most of the following discussion on the equally weighted results (EW/OLS) and make note of any difference we encounter between the equally weighed and the value weighed results.

6.1. Results of Testing H1

The intercept estimate in Panel A (2 years before the issue date) shows an abnormal return of -0.60% per month, which is significantly lower than zero at the 1% level (t-value = -2.61). This is consistent with EW/WLS results. VW/OLS and VW/WLS also show underperformance but are not statistically significant. The intercept estimate for the Panel B (2 years after the issue date) shows abnormal returns of -1.38% per month, which is also statistically significant (t-value = -4.57). This is consistent with EW/WLS results. VW/OLS and VW/WLS also show underperformance and are statistically significant at 1% level. The comparison between the results from Panel A and Panel B shows strong evidence that the firms underperform much more in the period two years after the issue date.

6.2. Results of Testing H2

The intercept estimate in Panel B (2 years after the issue date) shows an abnormal return of -1.38% per month, which is significantly lower than zero at the 1% level (t-value = -4.57). This is consistent with EW/WLS results. VW/OLS and VW/WLS also show underperformance and are statistically significant at 1% level. The intercept estimate for the Panel C (2 years before the put date) shows abnormal returns of -0.80% per month, which is also statistically significant (t-value = -3.56). This is consistent with EW/WLS results. VW/OLS and VW/WLS also show underperformance but are statistically significant at 5% level. The comparison between the results from the Panel B and Panel C shows strong evidence that although the firms underperform in both cases; their performance improves in the period two before the put date.

The intercept estimate in Panel E (After the issue date but before the put date) shows an abnormal return of -1.07% per month, which is significantly lower than zero at the 1% level (t-value = -4.66). This is consistent with EW/WLS results. VW/OLS and VW/WLS also show underperformance and are statistically significant at 1% level. The intercept estimate for the Panel C (2 years before the put date) shows abnormal returns of -0.80% per month, which is also statistically significant (t-value = -3.56). This is consistent with EW/WLS results. VW/OLS and VW/WLS also show underperformance but are statistically significant at 5% level. The comparison between the results from the Panel E and Panel C also shows strong evidence that the firms' performance improves as the time approaches the put date.

6.3. Results of Testing H3

The intercept estimate in Panel C (2 years before the put date) shows an abnormal return of -0.80% per month, which is significantly lower than zero at the 1% level (t-value = -3.56). This is consistent with EW/WLS results. VW/OLS and VW/WLS also show underperformance but are statistically significant at 5% level. The intercept estimate for the Panel D (2 years after the put date) shows abnormal returns of -1.01% per month, which is also statistically significant (t-value = -3.18). This is consistent with EW/WLS results. VW/OLS and VW/WLS also show underperformance and are statistically significant at 1% level. The comparison between the results from the Panel C and Panel D shows strong evidence that the firms' performance deteriorate once the put protection expires.

7. Conclusion

The parameters incorporated in the financial derivative instruments are designed to provide potential benefits to the stakeholders. The potential purpose of these design parameters is unique to each type of the security. We study the effectiveness of the deferred put option in the callable-puttable bonds with a fixed coupon rate, in providing benefit to the bondholders and the common stockholders

These bonds were issued by the firms to raise substantially large capital. We observe that although the firms' performance deteriorates after the issue date, their performance improves considerably as the time approaches the put date. The results from our analysis suggest that the deferred put option incorporated in these securities acts as an effective mechanism in providing downside protection to the bondholders. The firms' performance deteriorates upon the expiration of the put date highlighting the importance of put date as an important calendar event for these firms.

The literature in finance is rich with the discussion of agency problem between the common stock holders and the bond holders. We find strong evidence that the put option in these securities mitigates the agency problem since it provides the benefit to both bondholders and common stockholders.

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