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THE OPTIMAL CALL POLICY FOR CONVERTIBLE BONDS: IS THERE A MARKET MEMORY EFFECT?

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Abstract

This paper examines the market memory effect in convertible bond markets. We look at the pricing of convertible bonds issued after the original issuer redeemed previous issues without giving an opportunity for investors to benefit from bond value appreciation. We find evidence that the market underprices new convertible bond issues of firms that called their previous convertible bonds early compared to new convertibles bonds of firms that called their previous convertibles late.

I. Introduction

Convertible bonds often contain a call provision which gives the issuer the right to redeem the bond before maturity. Ingersoll (1977a) demonstrates that the firm's optimal call policy is to call the convertible bond as soon as the value of the uncalled bond is equal to the call price. In contrast to this theoretically optimal call policy, Ingersoll (1977b) finds that the median company waits until the conversion value is 43.9% higher than the call price before calling convertibles. Several studies have tried to explain this puzzle. Constantinides and Grundy (1986) argue that it is optimal to delay a call if the present value of the future dividends exceeds the after-tax interest cost on the convertible. Asquith (1995) and Butler (2002) explain the late calls from the existence of a call notice period.

In this paper we study the market memory explanation for delayed calls of convertible bonds as suggested by Weston and Copeland (1986). They argue that in case of successive issues of convertibles, the market will form an expectation of the company's call policies by its past behaviour. Companies that called convertibles "in time" will be punished when they issue new convertibles, because investors will remember that in the past they were denied the possibility to substantially profit from their conversion option. New issues of convertible bonds by companies that called previous issues early, and thus unfavourably for investors, will be priced lower than similar issues by companies that called previous issues late. This explanation is in line with practices of convertible bond issuers in Japan that do not call their bonds in order to avoid upsetting investors (see Woodson (2002, page 28)). We test this market memory hypothesis using a sample of US and Canadian firms that had previously redeemed convertibles and that had new convertibles issued afterwards. Our empirical analysis supports the proposition that the new convertibles of the early-call firms are underpriced by the market.

These results are sensitive to the threshold that is used to separate the early-called bonds from the late-called bonds in the sense that we only find underpricing for the highest threshold (30%).

II. Data and methodology

We select a sample of firms that have previously called at least one convertible and issued one or more convertible afterwards. We separate this sample in two parts. The first subsample consists of “late calling” firms. These are firms that called their convertibles when the convertible bond value exceeded the call threshold. The second subsample consists of “early calling” firms. These are firms that called their convertibles before the convertible bond price exceeded the threshold value.

We test the existence of market memory by studying whether investors paid lower prices for subsequent issues of convertibles by “early calling firms” compared to “late calling firms”. We identify the date of the first call for every firm in our sample and then look at the pricing of the convertible bonds issued after the call date. We calculate the theoretical prices for each convertible in both sub-samples and compare them to the market prices. This leads to the market memory hypothesis: “Subsequent issues of convertible bonds by early callers are priced lower than subsequent issues by late callers”. To calculate the theoretical values of the convertibles in our study we use the model of Tsiveriotis and Fernandes (1998) (from now on called TF-model).

In order to estimate theoretical values of convertible bond prices for the TF-model we need to know the following characteristics of the convertible bond: coupon rate and frequency, conversion ratio, maturity date, underlying stock volatility, underlying stock price, call schedule specifying call dates and prices, and credit spread. Underlying stock volatility is calculated as the annualized standard deviation of the underlying stock returns over the two-year period preceding the issue date. Credit spreads are calculated as the average spreads for convertible bonds with similar credit rating.

We searched Bloomberg and found 400 convertible bond calls in Canada and the US in the period from January 1, 1994 to January 1, 2009. Since we are only interested in companies that called convertibles and then issued new convertibles during the sample period, we are left with a final sample of 38 firms (36 in the US and 2 in Canada). Nine convertible bond issues in the sample were called late after the bond value exceeded the call price by more than 10%; six issues were called after the bond value exceeded the call price by more than 20%; and three issues were called only after the bond value exceeded the call price by more than 30%.

We obtain convertible bond and underlying stock prices from Datastream and the Canadian Financial Markets Research Centre (CFMRC) databases; redemption dates from Lexis-Nexis; credit spreads from Bloomberg; conversion prices, maturity dates, coupon payments, call schedule, and call prices from the convertible bond prospectuses.

III. Results

We explain the difference between the theoretical prices and the market prices (ΔP) using the following regression model:

$$\Delta P = c + \alpha_1 TMAT + \alpha_2 COUPON + \alpha_3 S / K + \alpha_4 VOLAT + \alpha_5 D$$

D is a dummy variable that takes the value of 1 if the bond was issued after the previous convertible issue of the same firm was called early and 0 otherwise. We hypothesize that the subsequent convertible issues of firms that called bonds early will be underpriced as investors realize that if the firm called bonds early in the past they will more likely call the new issue early. Thus, we expect the sign of the coefficient α_5 to be negative. The remaining variables are control variables: S/K is the ratio of the current stock price to the conversion price, TMAT is the time remaining to maturity, COUPON is the coupon rate paid on the convertible bond, and VOLAT is the annualized standard deviation of underlying stock returns.

We estimate the regression coefficients by running a pooled OLS regression with heteroskedasticity and autocorrelation corrected errors as in Newey and West (1987). The results of the regression analysis are presented in Table I.

[Please insert Table I here]

The regression results in Table I show that the value of the early-call dummy variable coefficient α_5 (D) depends on the threshold that is used to define an early call. The value of the coefficient is positive and significant if threshold of 110% is used; the coefficient is not statistically significant at the 5%-level for thresholds of 115% to 125% and is negative and significant if a threshold of 130% is used. This finding confirms the market memory hypothesis that firms that call their convertibles early have their new convertible issues underpriced by the market. However, this finding is valid only if the higher 130% threshold is used for defining an early call. For this case, the values of coefficient α_5 (D) tell us that on average new convertibles of the early calling firms are underpriced by \$1.66 or by 1.52% of the bond price. This finding is possibly caused by the fact that an increase in the threshold for late calls leads to more bonds ending up in the subsample of early-call bonds. Contrary to our hypotheses, the coefficient α_5 (D) is positive and significant if the lowest 110% is used. However, using such low threshold will cause all bonds called just after the bond value exceeded the call price by 10% to fall in the late-call category. However, Brigham (1966) reports that the most frequent threshold used by financial managers of companies is 20%.

The R^2s in these panel regressions range from 0.11 to 0.12. These results provide evidence that the variation in the early-call dummies values together with variation in coupon rates, volatility, time to maturity, and degree of moneyness explain a large amount of variation of the pricing errors.

IV. Conclusion

This paper tests a new explanation for the convertible bond call puzzle. We find some evidence that companies that call convertible bonds early are "punished" by the market with lower prices for their subsequent issues of convertible bonds. This "market memory" hypothesis may explain the reluctance of companies to call the convertible bonds when in theory it is optimal to do so.

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Table I: Estimation and Underpricing of Convertible Bonds Issued by Firms Calling Early

This table reports results of panel regressions of convertible bond pricing errors on early call dummy variable and control variables. Model prices are calculated using the model of Tsiveriotis and Fernandes (1998). The pricing error is defined as the difference between the market and the model price and is expressed either as a percentage of the market price of the convertible bond or in dollar terms. The table reports coefficient values with *t*-statistics in brackets. TMAT is the time to maturity, COUPON is the convertible bond coupon rate, S/K is the convertible bond moneyness ratio calculated as stock price divided by conversion price, VOLAT is the annualized historical volatility of the underlying stock calculated over the 2-year period preceding the issue date of the convertible bond. D is a dummy variable that takes a value of 1 if the issuing firm has previously called its convertible bonds early and a value of 0 otherwise. Early calls happen when the firm voluntarily calls its convertible bonds as soon as the convertible bond value exceeds 110% (alternatively 115%, 120%, 125%, or 130%) of the call price. The coefficients in bold are significant at the 5% level.

	Error, $					Error, %				
	110	**115**	**120**	**125**	**130**	**110**	**115**	**120**	**125**	**130**
Intercept	**3.54**	**4.03**	**4.03**	**4.29**	**5.81**	**2.53**	**2.83**	**2.83**	**2.92**	**4.55**
	(11.09)	(12.16)	(12.16)	(12.15)	(15.27)	(7.46)	(8.01)	(8.01)	(7.76)	(11.22)
TMAT	0.00	0.01	0.01	0.01	0.02	**0.05**	**0.06**	**0.06**	**0.06**	**0.06**
	(0.30)	(1.11)	(1.11)	(1.16)	(1.81)	(5.25)	(5.91)	(5.91)	(6.00)	(6.51)
Coupon	**-0.91**	**-0.93**	**-0.93**	**-0.92**	**-0.96**	**-0.98**	**-0.99**	**-0.99**	**-0.98**	**-1.01**
	(-26.91)	(-27.28)	(-27.28)	(-27.24)	(-27.93)	(-27.03)	(-27.38)	(-27.38)	(-27.29)	(-27.85)
S/K	0.31	0.18	0.18	0.15	0.25	**0.89**	**0.79**	**0.79**	**0.79**	**0.85**
	(1.63)	(0.95)	(0.95)	(0.80)	(1.35)	(4.44)	(3.99)	(3.99)	(3.96)	(4.29)
Volatility	**-4.75**	**-4.62**	**-4.62**	**-4.65**	**-4.69**	**-4.87**	**-4.75**	**-4.75**	**-4.78**	**-4.82**
	(-13.23)	(-12.85)	(-12.85)	(-12.94)	(-13.07)	(-12.72)	(-12.39)	(-12.39)	(-12.48)	(-12.61)
D	**0.88**	0.27	0.27	-0.01	**-1.66**	**0.72**	0.35	0.35	0.22	**-1.52**
	(5.50)	(1.54)	(1.54)	(-0.07)	(-6.16)	(4.27)	(1.87)	(1.87)	(1.06)	(-5.29)
R^2	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.11	0.12