Journal of Business Research 62 (2009) 1358–1363

Contents lists available at ScienceDirect

Journal of Business Research

The signaling effects associated with convertible debt design

Mookwon Jung [a], Michael J. Sullivan [b,*]

[a] School of Business Administration, Kookmin University, Seoul, Republic of Korea
[b] College of Business, University of Nevada Las Vegas, Las Vegas, NV 89154-6008, United States

ARTICLE INFO

Article history:
Received 15 February 2008
Accepted 5 November 2008

Jel classifications:
G14
G32

Keywords:
Market efficiency
Convertible debt
Asymmetric information
Signaling

ABSTRACT

In this paper we investigate whether the terms used in the design of a convertible debt issue act as a signal of the issuing firm's future growth prospects. Our general premise is that convertible debt design terms are interrelated and arranged in a manner that signals asymmetric information to market participants. Empirical tests support our hypothesis, even after controlling for risk, firm size, time-to-maturity, and industry effects. Firms issuing convertible debt that arrange terms to take advantage of relatively better future growth prospects are found to have a relatively lower negative price reaction around the announcement of the offer.

Managers raise funds through issues of debt, equity, and through hybrid securities, such as, convertible debt. As such, managers of some firms find that issuing convertible debt is a more efficient means of raising funds (Green, 1984; Hoffmeister et al., 1987; Stein, 1992; Mayers, 1998). Brennan and Schwartz (1981), Kim (1990), and Mann et al. (1999) demonstrate that due to the risk-neutralizing effect of convertible debt and its role in reducing the under-investment problem, convertible debt is an especially useful financing tool for high-risk, high-growth firms. Empirically, it has been shown that investors react negatively to the announcement of an issue of convertible debt, but that this market reaction may vary based on an accompanying signal of asymmetric information (Dann and Mikkelson, 1984; Myers and Majluf, 1984; Eckbo, 1986; Mikkelson and Partch, 1986; Hansen and Crutchley, 1990; Marciukaityte and Varma, 2007). Lewis et al. (2003) and Davidson et al. (1995) demonstrate that announcement period returns depend on the design of a convertible debt issue and argue that convertible debt issues that are more 'equity-like' suffer greater negative announcement market reactions.

Our paper is based on this argument that design features of a convertible debt issue signal information about the issuing firm, specifically regarding future growth prospects. Davidson et al. (1995) create a model to estimate the expected time for a convertible bond to be at-the-money that is based on the conversion price and a priori growth expectations. In a similar manner, we derive a proxy of growth prospects that is based on the design terms of an announced convertible debt issue. Therefore, whereas Davidson et al. (1995) assume a growth rate to estimate the time for a convertible bond to be at-the-money, we make an assumption of at-the-money time to estimate growth. We argue that the pertinent signal provided the market through the terms of an announced convertible issue pertains to growth, which our model estimates directly.

Therefore, if managers arrange terms of a convertible debt issue predicated on their asymmetric information of a firm's future growth prospects, and investors can discern this information, this information will be reflected in the stock price reaction at the offer announcement. Our findings offer support for this argument. Higher growth firms are found to have significantly less negative announcement returns than relatively lower growth firms. In addition, we find our growth estimate is robust across various assumed times for the issue to be at-the-money. A robustness check using analysts' long-term growth forecasts to proxy for future growth also supports our findings.

The rest of this paper is organized as follows. We describe our growth proxy measure and primary hypothesis in Section 1. Section 2 describes the sample selection and provides descriptive statistics. Section 3 describes how we calculate our growth proxy, which we refer to as unanticipated growth. Section 4 demonstrates the signaling role of this unanticipated growth through an investigation of its relationship to the market reaction around the convertible debt issue announcement. Our conclusions are presented in Section 5.

* Corresponding author. Tel.: +1 702 895 4669.
E-mail addresses: mjung@kookmin.co.kr (M. Jung), sullivan@ccmail.nevada.edu (M.J. Sullivan).

0148-2963/$ – see front matter © 2008 Elsevier Inc. All rights reserved.
doi:10.1016/j.jbusres.2008.11.002

1. Growth proxy

Convertible debt design involves various terms, such as, issue size, maturity, coupon rate, call features, conversion premium, and the conversion ratio. If there is an interrelationship between convertible debt offer terms and these terms are set considering the firm's future growth prospects, asymmetric information regarding these future growth prospects may be signaled to the market. Therefore, drawing from the work of Green (1984), Kim (1990), Stein (1992), Davidson et al. (1995), Munro (1996), Mayers (1998), and Lewis et al. (1998, 1999, 2003), we utilize design terms of convertible debt issues to derive a measure of implied growth. Specifically, our implied growth measure incorporates yield advantage, conversion premium, and an assumed time for a convertible debt issue to be at-the-money. The question we aim to answer using this growth proxy is whether convertible debt design signals asymmetric information regarding a firm's future growth prospects.

Similar to Lewis et al. (1998, 2003) we also use the design terms of a convertible debt offer, but instead of sorting convertible debt offers into types, we use these terms to derive a proxy of an issuer's growth prospects. Our proxy for growth incorporates yield advantage, conversion premium, and an assumed time for the issue to be at-the-money. We define yield advantage as the difference between a firm's convertible debt yield and the yield of a comparable issue of straight debt, and conversion premium as the percentage by which the conversion price is higher than the stock price at the convertible debt offer date. Both yield advantage and conversion premium depend directly on growth prospects. Therefore, if we set the time for a convertible bond to be at-the-money, an estimated growth rate can be estimated and interpreted as the adjusted conversion premium where the adjustment is by yield advantage. We then estimate the change in growth prospects, which we refer to as unanticipated growth, by taking our measure of the implied future growth relative to a benchmark historic growth rate. This brings us to our primary hypothesis, that investors will reassess a firm's growth prospects based on information gleaned from design terms of a convertible bond offer. Therefore, we hypothesize that firms perceived to have higher (lower) growth prospects will be subject to a better (worse) price reaction at the announcement of the convertible debt issue.

2. Sample selection and descriptive statistics

Data for our sample of convertible debt issues and a matched set of straight debt issues are obtained from the Thomson Financial Securities Database and the Fixed Income Securities Database provided by LJS Global Information Services Incorporated (The Fixed Income Securities Database data was obtained through the Fixed Income Research Program at the University of Houston, Bauer College of Business). We confirm all announcement dates using the Wall Street Journal. From the analysis we exclude American depositary receipts, foreign companies, asset-backed securities, warrants, firms without the necessary information on the CRSP Datatapes, and issues where information on conversion premium and yield-to-maturity are not available. The remaining sample includes 790 convertible debt issues from the 1985–2003 period.

Table 1 provides summary statistics describing our sample. Compared to a sample of convertible debt issues studied by Lewis et al. (1998, 2003) for the period 1978 to 1992, our sample averages a larger issue size and longer maturity. We attribute these differences to the time periods studied. Otherwise, the samples are comparable. Announcement period returns are calculated for the three-day period ending on the announcement date for the convertible debt offerings using the Brown and Warner (1985) methodology (We use a three-day announcement window because of a possible one-day lag between the issue decision and the formal announcement and because the issue announcement may occur after the market close). We find these announcement period returns average −2.49% (t-statistic = −8.73). This announcement effect is similar in size and scale to that found by Dann and Mikkelson (1984), Mikkelson and Partch (1986), Hansen and Crutchley (1990), Pilotte (1992), Davidson et al. (1995), Datta and Iskandar-Datta (1996), Jen et al. (1997), and Lewis et al. (1998, 1999, 2003).

Table 1
Summary Statistics for 790 Convertible Debt Issues from 1985-2003.

Description	Mean	Median	Obs
Issue size ($ Mil)	182.54	100.00	790
Relative issue value	0.43	0.24	527
Relative issue amount	0.22	0.12	527
Conversion premium	24.12	22.83	790
Call protection	3.16	3.00	718
Bond maturity (years)	15.12	14.98	790
Debt ratio before offering	0.22	0.17	520
Debt ratio after offering	0.36	0.33	520
Three-day cumulative abnormal return (%)	−2.49	−1.97	770

Issue size is stated in millions of dollars. Relative issue value is defined as the issue size divided by the market value of firm's common stock for the fiscal year-end prior to the issue announcement date. Relative issue amount is defined as the number of shares that can be issued upon conversion divided by the number of shares outstanding for the fiscal year-end prior to the issue announcement date. The conversion premium is the conversion price divided by the market price of common stock the day prior to the issue announcement date. Call protection is the number of years before the convertible issue can first be called. Bond maturity is stated in years. Debt ratio before offering is calculated as the book value of debt divided by the sum of the book value of debt plus the market value of common stock, where the debt ratio after offering is measured at the time of offering as if conversion is assumed to occur at that time. The three-day cumulative abnormal return is from day −2 to 0 relative to the first public announcement and is significantly different from zero at a 1% level (t-statistic = −8.73).

In Table 2 we present distributional characteristics of our sample of convertible debt issues for yield-to-maturity (YTM), time-to-maturity, and conversion premium categorized by bond rating category. We categorize by bond rating since it is often used as a proxy to measure a company's risk of financial distress (Feinberg et al., 2004). To measure bond rating we use the average of the bond ratings assigned by the three leading rating agencies, Standard & Poors, Moody's, and Fitch. Of our total sample of 790 convertible bonds, 554 are rated. We find that 377 or 68% can be categorized as having a speculative rating, defined in Standard & Poors terminology as having a rating below BBB-, and 177 or 32.0% as investment grade. This split is similar to that found by Davidson et al. (1995) and Lewis et al. (1998), and is consistent with conclusions of Brennan and Schwartz (1988) who argue that convertible debt issues are most likely issued by companies perceived to be of higher risk and higher growth. Therefore, bond rating may be an important factor considered by market participants at the announcement of a convertible debt issue. For example, Mikkelson and Partch (1986) and Jen et al. (1997) find an inverse relationship between the market's response to the announcement of a convertible debt issue and the firm's bond rating. Their findings suggest that high risk issues are viewed more positively by market participants, perhaps due to this belief of corresponding growth opportunities.

As expected YTM increases with bond rating, such that, investors are compensated for taking greater risks. Time-to-maturity appears somewhat uniform across bond rating categories, confirming that the rising YTM is due primarily to bond rating and not maturity. There does not appear to be a discernable pattern of conversion premiums across these bond rating categories. This suggests either that the conversion premium taken alone does not provide information of a firm's growth opportunities or that potential growth opportunities are not related to bond ratings.

3. Estimating unanticipated growth

As described earlier, our measure of unanticipated growth is calculated as the difference between the implied future growth rate and a one-year pre-event growth rate (Alternatively, we substitute analysts' forecasts of long-term growth for the one-year pre-event