



The application of game theory in the real option (bond and convertible bond financing)

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Abstract

In this study an optimal investment policy of a firm which is finance by issuing bond and convertible bond was examined by means of real option framework by using of stopping game. The interaction between bondholder and shareholder was studied and the effect of each bonds on investment timing and optimal bankruptcy, convert and call threshold were investigated. Also the impact of volatility on these thresholds was investigated.

Keywords: bond, convertible bond, stopping game, real option

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1 Introduction

One of the most important topics in firms is the optimal investment strategies. Deciding to investment composes of two parts: when and how much to invest. First part is decision for investment time and second is decision for asset allocation. To decide the investment timing a standard framework called real options approach is used. On the other side financing can done via share and bond or other financial instruments. One of the financial instruments is hybrid security that is a compound of debt and equity. An example this instrument is convertible bonds that embodied the characteristics of both straight bond and equities. The bondholder receives coupons periodically and has right to convert the bonds to previously defined equity[1]. Bonds contract can include put option (for bondholder) and call option (for investor) or without any extra option. Interaction between bondholder and shareholder can affect the value of this bond considerably. In this study financing by bond and convertible bond after investment by means of stopping game was investigated.

2 Model

We consider a firm with an option to invest at any time by paying a fixed investment cost. The firm partially finances the cost of investment with bond and convertible bond. According to feature of convertible bond, issuer and bondholder performance after the

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