Realized Tax Benefit on Structural Models with Optimal Capital Structural Consideration

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Abstract

The structural model is a credit risk model that simulates the evolution of firm's asset value and specifies the conditions leading to default. By merging the structural model with the trade-off theory, the effect of tax benefits and bankruptcy costs on credit risk and the optimal capital structure are analyzed widely in the academic literature. But the role of the realized tax benefit, defined as tax shelter benefit realized by a firm by paying coupons, is not clearly discussed. If the realized tax benefit is retained by the firm due to the restriction on selling firm's asset to finance coupon and dividend payout, the investment decision of realized tax benefit influence the process of firm's asset value, the possibility of default, and the maximum debt value (or debt capacity) that can be reached by tuning the leverage ratio. Although modelling the aforementioned problem is analytically intractable, this paper proposes a robust numerical method to analyze how the investment decisions of retaining the realized tax benefits influence the bankruptcy decisions of equity holders, and in consequence the analysis of optimal capital structure. We show that a higher debt capacity can be attained by retaining the realized tax benefits and investing them safely. Besides, the existence of exogenous default boundary (due to positive net-worth bond covenant) can prevent the equity holder from increasing his value at the expense of debt value by investing the firm's asset or the realized tax benefit riskily. Our numerical model can be easily extended to analyze the effects on allowing selling firm's asset to finance the coupon or dividend payout. We compare two common asset-sale assumptions: one allows a fixed proportion of firm's asset to be sold and another one assumes that the total coupon and dividend payments are fully financed by selling firm's asset. While the former assumption lower the debt capacity, the optimal leverage ratio and debt capacity under the latter assumption are much higher. The equity holder's decisions on default and the effects of realized tax benefits are clearly analyzed to explain the aforementioned discrepant phenomenon.

Keywords: credit risk, structural model, realized tax benefit, capital structure

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