Aspects of Optimal Capital Structure and Default Risk

In this thesis, we have dealt with two modeling approaches of the credit risk, namely the structural (firm value) and the reduced form. In the former one, the firm value is modeled by a stochastic process and the first hitting time of this stochastic process to a given boundary defines the default time of the firm. In the existing literature, the stochastic process, triggering the firm value, has been generally chosen as a diffusion process. Therefore, on one hand it is possible to obtain closed form solutions for the pricing problems of credit derivatives and on the other hand the optimal capital structure of a firm can be analyzed by obtaining closed form solutions of firm's corporate securities such as; equity value, debt value and total firm value, see Leland(1994). We have extended this approach by modeling the firm value as a jump-diffusion process. The choice of the jump-diffusion process was a crucial step to obtain closed form solutions for corporate securities. As a result, we have chosen a jump-diffusion process with double exponentially distributed jump heights, which enabled us to analyze the effects of jump on the optimal capital structure of a firm. In the second part of the thesis, by following the reduced form models, we have assumed that the default is triggered by the first jump of a Cox process. Further, by following Schönbucher(2005), we have modeled the forward default intensity of a firm as a geometric Brownian motion and derived pricing formulas for credit default swap options in a more general setup than the ones in Schönbucher(2005).