This paper assumes a structural credit model with underlying stochastic volatility combining the Black/Cox approach with the Heston model. We model the equity of a company as a barrier call option on its assets. The assets are assumed to follow a stochastic volatility process; this implies an equity model with most documented stylized facts incorporated. We derive the price of this option under a general framework where the barrier and strike are different from each other, allowing for richer financial applications. The expression for the probability of default under this framework is also provided. As the calibration of this model gets much more complex, we present an iterative fitting algorithm with which we are able to nicely estimate the parameters of the model, and we show via simulation the consistency of the estimator. We also study the sensitivity of the model parameters towards the difference between the barrier and strike price.
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