JOURNAL ARTICLE

Stock Options and Credit Default Swaps: A Joint Framework for Valuation and Estimation

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Abstract

We propose a dynamically consistent framework that allows joint valuation and estimation of stock options and credit default swaps written on the same reference company. We model default as controlled by a Cox process with a stochastic arrival rate. When default occurs, the stock price drops to zero. Prior to default, the stock price follows a jump-diffusion process with stochastic volatility. The instantaneous default rate and variance rate follow a bivariate continuous process, with its joint dynamics specified to capture the observed behavior of stock option prices and credit default swap spreads. Under this joint specification, we propose a tractable valuation methodology for stock options and credit default swaps. We estimate the joint risk dynamics using data from both markets for eight companies that span five sectors and six major credit rating classes from B to AAA. The estimation highlights the interaction between market risk (return variance) and credit risk (default arrival) in pricing stock options and credit default swaps.

JEL: C13 - Estimation: General, C51 - Model Construction and Estimation, G12 - Asset Pricing; Trading volume; Bond Interest Rates, G13 - Contingent Pricing; Futures Pricing

Issue Section: Article