

Application of a variable default boundary to the pricing of vulnerable European options: the use of a three dimensional binomial tree

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Abstract

This paper investigates the significance of using a variable default boundary when pricing European Black-Scholes options that are subjected to credit risks. We apply numerical method and combine Klein [1], and Johnson and Stulz [2] to link the payout ratio proportionally to the assets of the option writer. We also link the payout ratio to the value of the assets of the writer. Numerical examples compare our results with Klein [1], and Johnson and Stulz [2] based on alternative assumptions, and illustrate when the application of variable default boundary becomes important.

Keywords : Pricing, variable default boundary, options, credit risks.

1. Introduction

In recent years the *Over-The-Counter* (OTC) markets have become increasingly important and also extremely popular among a diverse set of counterparties. Many financial institutions actively trade a variety of forward contracts, swaps, and options with financial institutions and corporate clients. As there is usually no intermediate exchange to act as the buffer and clearing house between the options writer and the options holder, the possibility of the option writer being unable to make

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