

# A Structural Approach to Credit Risk in a Markov Modulated Market

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The problem of pricing defaultable bonds in a Markov modulated market is studied. Using Merton's structural approach it is shown that various types of defaultable bonds are combination of European type contingent claims. Thus pricing a defaultable bond is tantamount to pricing a contingent claim in a Markov modulated market. Since the market is incomplete, the method of quadratic hedging and minimal martingale measure is used to derive locally risk minimizing derivative prices, hedging strategies and the corresponding residual risks. The price of defaultable bonds are obtained as solutions to a system of PDEs with weak coupling subject to appropriate terminal and boundary conditions. The system of PDEs are solved numerically. Numerical investigation for the defaultable bond prices are carried out. Credit spreads are compared with some of the existing models. Higher spreads is observed in the Markov modulated market.

**Key words:** Structural approach, defaultable bond, quadratic hedging, minimal martingale measure, credit spread.