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Option Pricing with Economic Regime Shifts

Assuming that one-period logarithmic returns of the underlying asset follow a hidden Markov process, we develop a valuation model for European call options. Unlike existing option pricing models, our pricing mechanism relies on the optimal non exponential-affine stochastic discount factor characterized with economic strength. Monthly S&P 500 index options for the period from January 2014 to October 2018 are used for model validation. It is found that risk/return profiles under the optimal risk neutral probability measure associated with a non exponential-affine stochastic discount factor are drastically different across the regimes of economic strength. We use both the absolute pricing error and the model implied volatility criteria to examine the model performance. In comparison with alternative models, empirically-evidenced unbalance pricing errors for deeply in-the-money and deeply out-of-the-money options are substantially reduced.