

Abstract

The concern of this article is to derive a regime switching model that can be utilized to price European call options for a financial market that exhibits structural changes with time. The model is formulated based on the fact that the underlying asset process is described by a geometric Brownian motion that is modulated by a continuous-time Markov chain with two regimes. Moreover, by an application of the change of measure technique, an option price is derived under the risk neutral valuation and the model parameter estimates is performed by use of the maximum likelihood estimation. The model implementation is carried out by utilizing the Russell 2000 and Facebook in dices data sets. The model results are compared with that of the Black-Scholes model in order to establish the model with better results in terms of predicting the European call option prices. In general, the data sets have common characteristics of financial time series across the regimes and the volatility process spends longer time in regime 2 than it stays in regime 1. The predicted call option prices from both models are more or less similar across the market indices; however, the results of the Black-Scholes model are a bit closer to the market prices than that of the regime-switching model across the two markets. Therefore, the Black-Scholes model slightly gives better results for the Russell 2000 and Facebook indices data sets as compared with the RS model.