

ABSTRACT

The Black-Scholes-Merton model of 1973 has been used and improved upon by various scholars and practitioners to model stock price, interest rates, options and other financial derivatives. Derived from this model are various term structure models and their jump diffusion counterparts. In particular the pure diffusion process is one of the term structure models nested in the Chan, Karolyi, Longstaff and Sanders (CKLS) model that has not been combined with the jump processes. We therefore used the Pure diffusion model (PDP) combined with the Poisson jump process, Bernoulli jump process and mean reversion process to create new models namely; Bernoulli jump diffusion (BJD), mean reverting Bernoulli jump diffusion (MRBJD) and Poisson jump diffusion (PJD) models. The application of interest rate models has also been mainly restricted to the developed countries, and for the first time here we study their application in Kenya. We fitted the weekly changes in the risk free 91 day Kenyan treasury bills rates rather than the rates themselves into these models. Using the Maximum likelihood estimation methodology (MLE) we estimated the parameters and found evidence of jumps but no evidence of mean reversion in these rates. We also found that the Poisson Jump diffusion (PJD) model outperforms the Bernoulli jump diffusion (BJD), mean reverting Bernoulli jump diffusion (MRBJD) and the Pure diffusion (PDP) models with respect to these rates. This study may help traders in forecasting, pricing and investment decisions.