# On the European logistic-type option pricing with jump diffusion

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Black- Scholes formed the foundation of option pricing. However, some of its assumptions like constant volatility and interest among others are practically impossible to implement hence other option pricing models have been explored to help come up with a much reliable way of predicting the price trends of options. Black-scholes assumed that the daily logarithmic returns of individual stocks are normally distributed. This is not true in practical sense especially in short term intervals because stock prices are able to reproduce the leptokurtic feature and to some extent the volatility smile". To address the above problem the Jump-Diffusion Model and the Kou Double-Exponential Jump-Diffusion Model were presented. But still they have not fully addressed the issue of reliable prediction because the observed implied volatility surface is skewed and tends to flatten out for longer maturities; the two models abilities to produce accurate results are reduced. The study ventures into a research that will involve European logistic-type option pricing with jump diffusion which has not been addressed anywhere in the financial literature. The knowledge of logistic Brownian motion will be used to develop a logistic Brownian motion with jump diffusion model for price process. Existence of jump diffusion will be tested using Augmented Dickey-Fuller (ADF) test. Finally, estimation of volatility will be done using the formed model. The methodology will involve analysis of jump diffusion models for pricing process in particular Vasicek model. Logistic Brownian motion that incorporates jump diffusion process will be considered and then volatility will be estimated using maximum likelihood estimates. Data collected from Nairobi Security market will be analyzed to check the reliability of the formed model. It is hoped that this model will be used by long-term investors to know the impact of jump diffusion behavior of stocks on assets before allocating decisions and profitability of trading strategies. Furthermore, it will help investors to know whether or not stock returns exhibit jump diffusion.

Keywords: Jump-Diffusion; Brownian motion; Augmented Dickey-Fuller (ADF) test