

*Abstract of Doctoral Dissertation*

## **Determining the Efficiency of the Black & Scholes Model in Pricing of Nifty Stock Options after addressing the Negative Cost of Carry Problem<sup>1</sup>**

RAJESH KUMAR\*

### **I. Introduction**

THE OPTION CONTRACTS are used by the capital market participants for risk management and trading purpose which are priced under the Black-Scholes model (1973). This option pricing model has occupied an important place in the financial derivative market but this model also misprices option considerably on the several parameters used under this model. "Can option pricing errors produced under the Black-Scholes model (B&S model) be minimized"? is a big questions faced by the participants of the derivative market. This research makes an attempt to answer this question to some extent. Traders, investors, stock exchanges and investment banks etc., prefer this model for pricing options contract written on stocks and index but this model exhibits certain pricing such as pricing biasness, money biasness, and maturity biasness, etc.

One of the possible reasons for the option pricing bias can be the negative cost of carry problem found in the Indian stock market where the prices of future contracts are quoted less than their corresponding spot market prices. The future prices of stock and index should be higher than their corresponding spot prices because of the interest rate element under the cost of carry model. Based on the concept of cost of carry, the spot and future act as substitute and hence, they can be substituted. This problem obviously causes deviation between the market (actual) prices of the option contracts and prices of the option contracts which are calculated under the B&S model for the European style of index options and hence, needs to be shown.

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\* Assistant Professor, GLA University, 17 KM. Stone, NH-2, Mathura Road, Post-Chaumuha, Mathura, Uttar Pradesh, 281406, INDIA

shows less pricing error in comparison to the B&S model while ATM Options should be priced using the B&S model. Stock Call Near Month and Next month Option should be priced under the modified B & S model as it shows less pricing error in comparison to the B&S model while far month options should be priced under the B&S model.

#### 5.1.2 Index Nifty 50 Call option

Index Nifty 50 Call option should be priced under the modified B & S model as it shows less pricing error in comparison to the B&S model. Nifty 50 Call ITM and OTM options should be priced under the modified B&S model as it shows less pricing error in comparison to the B&S model. Nifty 50 Call Next month and Far month options should be priced under the modified B & S model as it shows less pricing error in comparison to the B&S model while the Near Month options should be priced under the B&S model.

#### 5.1.3 Stock Put Options

Stock Put options should be priced under the B&S model as it shows less pricing error including its ITM, ATM, OTM, and option maturity contracts such as the near month options, next month options and the far month options.

#### 5.1.4 Index Nifty 50 Put options

Index Nifty50 Put options should be priced under the B&S model including its ITM, ATM, OTM, near month, next month and far month options contracts.

#### 5.2 Contribution

The purpose of derivative market is to provide products and techniques applicable for risk hedging, price discovery, and also for price accuracy to the participants of the capital market. This research has entirely focused on the produced pricing errors by the B&S model and how can pricing errors be minimized. Less pricing errors will be produced, if traders and investors price stock call options and Index Nifty50 call options on the basis of discounted value of future price instead of the spot price in the original B&S model. Hence, the model, which shows less pricing errors in the calculation of different types of options' prices written on different types of underlying assets will create and maintain confidence level among the various stock market participants.

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