Manowattanakul, R., a, Boonvorachote, T., b
Volatility estimation of underlying assets for valuing low liquidity call options

a University of Thai Chamber of Commerce, Bangkok, Thailand
b Department of Agro-industrial Technology, Kasetsart University, Bangkok, Thailand

Abstract
This study explored optimal models for estimating the implied volatility of the SET50 index on the Thailand Futures Exchange (TFEX). Our data covered a 12-year period from Jan 1, 2000 to Dec 31, 2011. The volatility-estimating models used were GARCH (1,1) and historical models. Our results showed that one-day, lagged, historical volatility is equivalent to the conditional variance form of the GARCH (1,1) model. We used estimated volatility from both the GARCH (1,1) and historical models for pricing call options with the Black-Scholes model. We also compared estimated call option values to actual call option market prices. Our results showed that 6-month historical volatility outperforms for estimating call option values compared to the conditional variance from the GARCH (1,1) model. Because call option trading liquidity on the TFEX is low, therefore, call option values estimated using constant implied volatility from long-period historical volatility are superior to call option value estimation using time-varying volatility. In order to boost financial risk management by using derivatives on the TFEX, exchange regulators should focus on an increase in derivatives trading liquidity. © 2015, Kasetsart University. All rights reserved.

Author Keywords
Black-Scholes model; GARCH model; Historical model

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