

## MASTER'S THESIS

# An empirical test of variance gamma options pricing model on Hang Seng index options

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*Date of Award:*  
2000

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**An Empirical Test of Variance Gamma Options Pricing Model  
on Hang Seng Index Options**

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A thesis submitted in partial fulfillment of the requirements for  
the degree of  
Master of Philosophy

July 2000

Hong Kong Baptist University

# Abstract

The variance gamma option pricing model (VGOPM) proposed by Madan, Carr and Chang (1998) is a European option pricing model. Compared with the Black-Scholes option pricing model, the VGOPM has two new parameters: the risk aversion parameter and the excess kurtosis parameter. These parameters enhanced the VGOPM in dealing with long tailed and skewed return distribution. For the Hong Kong case, since the return distribution for the Hang Seng index (HSI) is skewed and has a long tail, therefore, using the Black-Scholes option pricing model developed under normal density assumptions may not be correct. The main purpose of this paper is to test the pricing quality of VGOPM on Hang Seng index options, then compare the results with that of the Black-Scholes model. This comparison is particular meaningful because the HSI option is an European option and both the option pricing models are on options of European style. In this study, we will apply two approaches to test the models: historical approach and implied approach, and use hundred thousands of intraday data of traded options to produce the most reliable results.

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