

University of Macau
Faculty of Science and Technology
Department of Mathematics

FST-SEM/00032/2015

Analytic Pricing of Discrete Exotic Variance

Swaps and Timer Options

By

Prof. Yue Kuen KWOK, Department of Mathematics,
Hong Kong University of Science and Technology, Hong Kong
Joint work with Wendong ZHENG

Date: 13 March 2015 (Friday)

Time: 3:00 p.m. - 4:00 p.m.

Venue: E11- 1041

Abstract

In this talk, We consider pricing of exotic variance swaps and timer option written on the discretely sampled realized variance of an underlying asset under stochastic volatility models. Timer options are barrier style options in the volatility space. A typical timer option is similar to its European vanilla counterpart, except with uncertain expiration date. The finite-maturity timer option expires either when the accumulated realized variance of the underlying asset has reached a pre-specified level or on the mandated expiration date, whichever comes earlier. Thanks to the analytical tractability of the joint moment generating functions of the affine models, we manage to derive closed form analytic formulas for variance swap products with corridor features. Interestingly, the closed form pricing formulas of the continuously sampled counterparts can be deduced from those of the discretely sampled variance swaps, while direct derivation of pricing formulas of the corridor type variance swaps based on continuously sampling may appear to be insurmountable. We also propose an effective analytic approach for pricing finite-maturity discrete timer options under 3/2-model by decomposing into a portfolio of timelets. The challenge in the pricing procedure is the incorporation of

the barrier feature in terms of the accumulated realized variance instead of the usual knock-out feature of hitting a barrier by the underlying asset price.

Biography

Prof. Yue-Kuen Kwok is a professor at Hong Kong University of Science and Technology. Prof. Kwok obtained his PhD degree from Brown University. Currently he is the Program Director of BSc in Mathematics and Economics and MSc in Financial Mathematics. Prof. Kwok's research interest includes Financial mathematics; Derivatives pricing theory; Credit risk theory.

All are Welcome!