Heston-Type Stochastic Volatility with a Markov Switching Regime[*]

Robert J. Elliott[†] , Katsumasa Nishide[‡] and Carlton-James U. Osakwe[§]

(Very preliminary as of April 9, 2014)

DO NOT CITE OR CIRCULATE!!

Abstract. We construct a Heston-type stochastic volatility model with a Markov switching regime for a stock option price. An analytic solution which contains a matrix ODE is obtained and numerically calculated. Our model is flexible enough to induce a wide variety of volatility surfaces wit both flat and steep smiles/smirks for the same parameter values but different regimes.

Keywords: Stochastic volatility, Markov switching.

JEL classification: G12, E32,

[†]School of Mathematics, University of Adelaide, Center for Applied Financial Studies, University of South Australia, Haskayne School of Business, University of Calgary. E-mail: `relliott@ucalgary.ca`.

[‡]Department of Economics, Yokohama National University. 79-4 Tokiwadai, Hodogaya-ku, Yokohama 240-8501, Japan. E-mail: `knishide@ynu.ac.jp`.

[§]Mount Royal University.