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Prices and Asymptotics for Discrete Variance Swaps

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Abstra

We stud ogeneous stoch choöbel–Zhu stoch Broadie and Jain (200 riance swaps. I 797) in the case of t the fair strike of ous variance g price and its volati e discrete variance swaps and compare our results with those of Broadie and Jain (2008a. The

effect of jumps and discrete sampling on volatility and variance swaps. International Journal of Theoretical and Applied Finance, 11(8), 761–797), Jarrow et al. (2013. Discretely sampled variance and volatility swaps versus their continuous approximations. Finance and Stochastics, 17(2), 305–324) and Keller-Ressel and Griessler (2012. Convex order of discrete, continuous and predictable quadratic variation and applications to options on variance. Working paper. Retrieved from http://arxiv.org/abs/1103.2310).

Key Words:

Discrete variance swap | Heston model | Hull–White model | Schöbel–Zhu model

View correction statement:

Erratum

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1. [1] See, ff, Forsyth, and Vetz in (2008b).

2. [2] Thes ge the order of integr

3. [3] Thanks to the anonymous referee for pointing out this general expression.

4. [4] The impact of stochastic interest rates on variance swaps is studied by Hörfelt and Torné (2010). Long-dated variance swaps will usually be sensitive to the interest rate volatility.

5. [5] This formula has been implemented in Matlab and its code is available at http://www.runmycode.org/CompanionSite/Site135 or upon request from authors as well as for all other formulas that appear in this paper.

6. [6] We shall note that here $m(V_t) = V_t$ (where $m(\cdot)$ is defined in (1)) instead of , thus the process V_t models the volatility and not the variance. In particular, in the Schöbel–Zhu model, the variance process follows .

7. [7] See Proposition 6.7 for an explicit expansion.

8. [8] See Definition 2.6 on p. 112 of Keller-Ressel and Muhle-Karbe (in press).

9. [9] This can be easily seen from the fact that for all , , and note that here .

10. [10] It reduces to studying the sign of . It is an increasing function of , so it is larger than , which is always positive because its minimum is 0 obtained when .

11. [11] For the two sets of parameters above, we compute the critical interest rate as defined in Remark 2.1. Set 1: ; Set 2: , and we can see that the interest rates are both larger th

12. [12] Th root of what is denot

13. [13] N tsov (2008) and our

14. [14] = 0, 1, ..., n.