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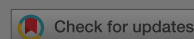
Original Articles

Prices and Asymptotics for Discrete Variance Swaps

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Abstract

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Key Words:

- Discrete variance swap
- Heston model
- Hull-White model
- Schöbel-Zhu model

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[Erratum](#)

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No

1. ¹ See, for example, Jarrow et al. (2013) and Vetzal (2008) and Forsyth, in (2008b).

2. ² These are the order of integrations.

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 σ , thus the process V_t models the volatility and not the variance. In particular, in the Schöbel-Zhu model, the variance process σ^2 follows $d\sigma^2 = \kappa(\sigma^2 - \bar{\sigma}^2)dt + \eta\sigma dW_t$.
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 σ , σ^2 , and note that here $\sigma^2 = V_t$.
10. ¹⁰ It reduces to studying the sign of Δ . It is an increasing function of σ , so it is larger than $\Delta(\sigma=0)$, which is always positive because its minimum is 0 obtained when $\sigma=0$.
11. ¹¹ For the two sets of parameters above, we compute the critical interest rate r^* as defined in Remark 2.1. Set 1: $r^* = 0.05$; Set 2: $r^* = 0.06$, and we can see that the interest rates are both larger than r^* .
12. ¹² The function Δ is the root of what is denoted by Δ in the paper.
13. ¹³ Note that Δ is always positive (see [Gyöngy and Karatzas \(2008\)](#)) and our Δ is always positive.
14. ¹⁴ For $i = 0, 1, \dots, n$.



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