

Heston, Steven L.

A closed-form solution for options with stochastic volatility with applications to bond and currency options. (English) [Zbl 1384.35131](#)

Rev. Financ. Stud. 6, No. 2, 327-343 (1993).

Summary: I use a new technique to derive a closed-form solution for the price of a European call option on an asset with stochastic volatility. The model allows arbitrary correlation between volatility and spot-asset returns. I introduce stochastic interest rates and show how to apply the model to bond options and foreign currency options. Simulations show that correlation between volatility and the spot asset's price is important for explaining return skewness and strike-price biases in the Black-Scholes [*F. Black* and *M. Scholes*, *J. Polit. Econ.* 81, No. 3, 637-654 (1973; [Zbl 1092.91524](#))] model. The solution technique is based on characteristic functions and can be applied to other problems.

MSC:

[35Q91](#) PDEs in connection with game theory, economics, social and behavioral sciences

[91G20](#) Derivative securities (option pricing, hedging, etc.)

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