Journal of Futures Markets / Volume 25, Issue 11 / pp. 1025-1044

Research Article

A contango-constrained model for storable commodity prices

Diana R. Ribeiro, Stewart D. Hodges

First published: 16 September 2005

https://doi.org/10.1002/fut.20180

PDF

Abstract

This article presents a model of commodity price dynamics under the risk-neutral measure where the spot price switches between two distinct stochastic processes depending on whether or not inventory is being held. Specifically, the drift of the spot price is equal to the cost of carry when the stock is positive. Conversely, whenever the drift of the spot price is less than the cost of carry, no inventory is being held. The properties of the spot price and the forward curves implied by this model are illustrated and analyzed with the use of numerical examples. A comparison with the single-factor model by E. S. Schwartz (1997) is also provided. © 2005 Wiley Periodicals, Inc. Jrl Fut Mark 25:1025–1044, 2005

BIBLIOGRAPHY

Black, F., & Karasinski, P. (1991, July/August). Bond and option pricing when short rates are log normal. *Financial Analysis Journal*, **47**, 52–59.

Google Scholar

Clewlow, L., & Strickland, C. (1998). *Implementing derivatives models*. London: Wiley.

Google Scholar

Epstein, N., Mayor, P., Schonbucher, A., Whalley, E., & Wilmott, P. (1998). The valuation of a firm advertising optimally. *The Quarterly Review of Economics and Finance*, **38**, 149–166.

Google Scholar

Gibson, R., & Schwartz, E. S. (1990). Stochastic convenience yield and the pricing of oil contingent claims. *The Journal of Finance*, **45**, 959–976.

Web of Science® Google Scholar

Hilliard, J., & Reis, J. (1998). Valuation of commodity futures and options under stochastic convenience yields, interest rates, and jump diffusions on the spot. *The Journal of Financial and Quantitative Analysis*, **33**, 61–86.

Web of Science® Google Scholar

Ho, T., & Lee, S. (1986). Term structure movements and pricing of interest rate claims. *The Journal of Finance*, **41**, 1011–1029.

Web of Science® Google Scholar

Hull, J., & White, A. (1990). Valuing derivative securities using the explicit finite difference method. *The Journal of Financial and Quantitative Analysis*, **25**, 87–100.

Web of Science® Google Scholar

Hull, J., & White, A. (1993). One-factor interest rate models and the valuation of interest-rate derivative securities. *Journal of Financial and Quantitative Analysis*, **28**, 235–254.

Web of Science® Google Scholar

Hull, J., & White, A. (1994, Fall). Numerical procedures for implementing term structure models I: Single-factor models. *Journal of Derivatives*, **2**, 7–16.

Miltersen, K. R., & Schwartz, E. S. (1998). Pricing of options on commodity futures with stochastic term structures of convenience yields and interest rates. *The Journal of Financial and Quantitative Analysis*, **33**, 33–59.

Web of Science® | Google Scholar

Ribeiro, D. R., & Hodges, S. D. (2004a). *Equilibrium storage model for commodity price dynamics: Competitive and monopolistic markets (FORC Preprint PP04–130)*. Coventry, United Kingdom: University of Warwick.

Google Scholar

Ribeiro, D. R., & Hodges, S. D. (2004b). *A two-factor model for commodity prices and futures valuation (FORC Preprint PP04–132)*. Coventry, United Kingdom: University of Warwick.

Google Scholar

Routledge, B., Seppi, D. J., & Spatt, C. (2000). Equilibrium forward curves for commodities. *The Journal of Finance*, **52**, 923–973.

Google Scholar

Schwartz, E. S. (1997). The stochastic behavior of commodity prices: Implications for valuation and hedging. *Journal of Finance*, **52**, 922–973.

Web of Science® | Google Scholar

Citing Literature

Download PDF