

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>

Citations: 10

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](#)

Clewlow, L., & Strickland, C. (2000). *Energy derivatives: Pricing and risk management*. London: Lacima.

[Google Scholar](#)

Dixit, A. K., & Pindyck, R. S. (1994). *Investment under uncertainty*. Princeton, NJ: Princeton University Press.

[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.

 | [Google Scholar](#) |

Metcalf, G. E., & Hasset, K. A. (1995). Investment under alternative return assumptions comparing random walks and mean reversion. *The Journal of Economic Dynamics and Control*, **19**, 1471–1488.

 | [Web of Science®](#) | [Google Scholar](#) |

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](#)

ABOUT WILEY ONLINE LIBRARY

- Privacy Policy
- Terms of Use
- About Cookies
- Manage Cookies
- Accessibility

Wiley Research DE&I Statement and Publishing Policies
Developing World Access

HELP & SUPPORT

- Contact Us
- Training and Support
- DMCA & Reporting Piracy

OPPORTUNITIES

Subscription Agents
Advertisers & Corporate Partners

CONNECT WITH WILEY

The Wiley Network
Wiley Press Room

Copyright © 1999-2025 John Wiley & Sons, Inc or related companies. All rights reserved, including rights for text and data mining and training of artificial intelligence technologies or similar technologies.

WILEY