

Lars Kirkby, J.; Deng, Shi-Jie

Swing option pricing by dynamic programming with b-spline density projection. (English)

Zbl 1430.91113

Int. J. Theor. Appl. Finance 22, No. 8, Article ID 1950038, 53 p. (2019).

MSC:

91G20 Derivative securities (option pricing, hedging, etc.)
60G40 Stopping times; optimal stopping problems; gambling theory
90C39 Dynamic programming

Cited in 1 Document

Keywords:

swing options; American option; early-exercise; optimal multiple stopping; exotic options; fast Fourier transform; Lévy processes; basis; characteristic function; FFT; multiple exercise

Full Text: DOI

References:

- [1] Bardou, O., Bouthemy, S. \& Pages, G. (2009) Optimal quantization for the pricing of swing options, Applied Mathematical Finance1 (2), 183-217. · Zbl 1169.91337
- [2] Bardou, O., Bouthemy, S. \& Pagés, G. (2010) When are swing options bang-bang and how to use it, International Journal of Theoretical and Applied Finance13 (6), 867-899. · Zbl 1233.91255
- [3] Barrera-Esteve, C., Bergeret, F., Dossal, C., Govet, E., Mesiou, A., Munos, R. \& Reboul-Salze, D. (2006) Numerical methods for the pricing of swing options: A stochastic control approach, Methodology Computing in Applied Probability8, 517-540. · Zbl 1142.91502
- [4] Basei, M., Cesaroni, A. \& Vargiolu, T. (2014) Optimal exercise of swing contracts in energy markets: An integral constrained stochastic optimal control problem, SIAM Journal on Financial Mathematics5 (1), 581-608. · Zbl 1308.91155
- [5] Bender, C. (2011a) Dual pricing of multi-exercise options under volume constraints, Finance and Stochastics15 (1), 1-26. · Zbl 1303.91167
- [6] Bender, C. (2011b) Primal and dual pricing of multi exercise options in continuous time, SIAM Journal on Financial Mathematics2 (1) 562-586. · Zbl 1270.91090
- [7] Benth, F., Kallsen, J. \& Meyer-Brandis, T. (2007) A non-Gaussian Ornstein-Uhlenbeck process for electricity spot price modeling and derivative pricing, Applied Mathematical Finance14, 153-169. · Zbl 1160.91337
- [8] Benth, F. E., Jukka, L. \& Nilssen, T. K. (2012) On the optimal exercise of swing options in electricity markets, The Journal of Energy Markets4 (4), 3-28.
- [9] Boogert, A. \& Jong, C. D. (2008) Gas storage valuation using a Monte Carlo method, The Journal of Derivatives15 (3), 81-98.
- [10] S. Boyarchenko \& S. Levendorskii, Non-Gaussian Merton-Black-Scholes Theory, Advanced Series on Statistical Science \& Applied Probability, Vol. 9. River Edge, NJ: World Scientific.
- [11] Carmona, R. \& Dayanik, S. (2008) Optimal multiple-stopping of linear diffusions and swing options, Mathematics of Operations Research33 (2), 446-460. · Zbl 1221.60061
- [12] R. Carmona \& M. Ludkovski (2005) Gas storage and supply guarantees: An optimal switching approach, Working Paper, Princeton University.
- [13] Carmona, R. \& Touzi, N. (2008) Optimal multiple stopping and valuation of swing options, Mathematical Finance18 (2), 239-268. · Zbl 1133.91499
- [14] Carr, P., Geman, H., Madan, D. B. \& Yor, M. (2002) The fine structure of asset returns: An empirical investigation, Journal of Business75, 305-332.
- [15] Christensen, S. \& Jurgens, S. (2013) Optimal multiple stopping with random waiting times, Sequential Analysis: Design Methods and Applications32 (3), 297-318. · Zbl 1303.60032
- [16] Christensen, S. \& Lempa, J. (2015) Resolvent-techniques for multiple exercise problems, Applied Mathematics \& Optimization71 (1), 95-123. · Zbl 1356.60066
- [17] Clewlow, L. \& Strickland, C. (2000) Energy Derivatives: Pricing and Risk Management. London: Lacima Publications.
- [18] Cont, R. \& Tankov, P. (2004) Financial Modelling with Jump Processes. Boca Raton, FL: Chapman \& Hall/CRC Press. · Zbl 1052.91043
- [19] Cui, Z., Kirkby, J. L. \& Nguyen, D. (2017) A general framework for discretely sampled realized variance derivatives in stochastic volatility models with jumps, European Journal of Operational Research262 (1), 381-400. · Zbl 1403.91334

- [20] Cui, Z., Kirkby, J. L. & Nguyen, D. (2019) A general framework for time-changed Markov processes and applications, *European Journal of Operational Research*273 (2), 785-800. · [Zbl 1403.91335](#)
- [21] Dahlgren, M. (2005) A continuous-time model to price commodity-based swing options, *Review of Derivatives Research*8, 27-47. · [Zbl 1134.91406](#)
- [22] S. Deng (2000) Stochastic models of energy commodity prices and their applications: Mean-reversion with jumps and spikes, Power Working Paper No. 073, Energy Institute, University of California.
- [23] M. D. Donno, P. Zbigniew & J. Tumilewicz (2017) Double continuation regions for American and swing options with negative discount rate in Lévy models, Working Paper, arXiv:1801.00266 [q-fin.MF].
- [24] M. Eriksson, J. Lempa & K. N. Trygve, Swing options in commodity markets: A multidimensional Lévy diffusion model, *Mathematical Methods of Operations Research*79 (1), 31-67. · [Zbl 1287.91140](#)
- [25] Fang, F. & Oosterlee, C. W. (2008) A novel pricing method for European options based on Fourier cosine series expansions, *SIAM Journal on Scientific Computing*31, 826-848. · [Zbl 1186.91214](#)
- [26] M. Figueroa (2006) Pricing multiple interruptible-swing contracts, *Bibbeck Working papers in Economics and Finance* No. 606, Department of Economics, Mathematics & Statistics, Birbeck: London's Evening University.
- [27] Gibson, R. & Schwartz, E. (1990) Stochastic convenience yield and the pricing of oil contingent claims, *The Journal of Finance*45, 959-976.
- [28] Haarbrucker, G. & Kuhn, D. (2009) Valuation of electricity swing options by multistage stochastic programming, *Automatica*45 (4), 889-899. · [Zbl 1177.90299](#)
- [29] B. Hambly, S. Howison & T. Kluge, Modelling spikes and pricing swing options in electricity markets, *Quantitative Finance*9 (8), 937-949. · [Zbl 1182.91176](#)
- [30] Hirsch, G. (2009) Pricing of hourly exercisable electricity swing options using different price processes, *Journal of Energy Markets*2, 1-44.
- [31] Ibanez, A. (2004) Valuation by simulation of contingent claims with multiple early exercise opportunities, *Mathematical Finance*14 (2), 223-248. · [Zbl 1090.91051](#)
- [32] P. Jaillet, E. Ronn & S. Tompadis, Valuation of commodity-based swing options, *Management Science*50, 909-921. · [Zbl 1232.90340](#)
- [33] Jaimungal, S. & Surkov, V. (2011) Lévy-based cross-commodity models and derivative valuation, *SIAM Journal Financial Mathematics*2 (1), 464-487. · [Zbl 1236.91143](#)
- [34] E. Kao & M. Wang (2017) Finite element method for pricing swing options under stochastic volatility, Working Paper.
- [35] Keppo, J. (2004) Pricing electricity swing options, *Journal of Derivatives*11, 26-43.
- [36] Kiesel, R., Gernhard, H. & Stoll, S. O. (2010) Valuation of commodity-based swing options, *Journal of Energy Markets*3 (3), 91-112.
- [37] Kirkby, J. L. (2015) Efficient option pricing by frame duality with the fast Fourier transform, *SIAM Journal of Financial Mathematics*6 (1), 713-747. · [Zbl 1320.91155](#)
- [38] Kirkby, J. L. (2016) An efficient transform method for Asian option pricing, *SIAM Journal of Financial Mathematics*7 (1), 845-892. · [Zbl 1357.91053](#)
- [39] Kirkby, J. L. (2017a) Robust barrier option pricing by frame projection under exponential Lévy dynamics, *Applied Mathematical Finance*24 (4), 337-386. · [Zbl 1398.91672](#)
- [40] Kirkby, J. L. (2017b) Robust option pricing with characteristic functions and the B-spline order of density projection, *Journal of Computational Finance*21 (2), 61-100.
- [41] Kirkby, J. L. & Deng, S. J. (2019) Static hedging and pricing of exotic options with payoff frames, *Mathematical Finance*29 (2), 612-658. · [Zbl 1411.91567](#)
- [42] Kirkby, J. L., Nguyen, D. & Cui, Z. (2017) A unified approach to Bermudan and barrier options under stochastic volatility models with jumps, *Journal of Economic Dynamics and Control*80, 75-100. · [Zbl 1401.91533](#)
- [43] Kjaer, M. (2008) Pricing of swing options in a mean reverting model with jumps, *Applied Mathematical Finance*15 (5), 479-502. · [Zbl 1156.91377](#)
- [44] M. Kobylanski, M.-C. Quenez & E. Rouy-Mironescu, Optimal multiple stopping time problem, *The Annals of Applied Probability*21 (4), 1365-1399. · [Zbl 1235.60040](#)
- [45] Kudryavtsev, O. & Zanette, A. (2013) Efficient pricing of swing options in Lévy-driven models, *Quantitative Finance*13 (4), 627-635. · [Zbl 1281.91167](#)
- [46] Lari-Lavassani, A., Simchi, M. & Ware, A. (2001) A discrete valuation of swing options, *Canadian Applied Mathematics Quarterly*9 (1), 35-74. · [Zbl 1073.91035](#)
- [47] I. B. Latifa, J. F. Bonnans & M. Mnif, A general optimal multiple stopping problem with an application to swing options, *Stochastic Analysis and Applications*33 (4), 715-739. · [Zbl 1327.60098](#)
- [48] Li, L., Qu, X. & Zhang, G. (2016) An efficient algorithm based on eigenfunction expansions for some optimal timing problems in finance, *Journal of Computer and Applied Mathematics*294, 225-250. · [Zbl 1334.60065](#)
- [49] Longstaff, F. A. & Schwartz, E. S. (2001) Valuing American options by simulation: A simple least-squares approach, *Review of Financial Studies*14, 113-147.
- [50] Meinshausen, N. & Hambly, B. M. (2004) Monte carlo methods for the valuation of multiple-exercise options, *Mathematical Finance*14 (4), 557-583. · [Zbl 1169.91372](#)

- [51] Schoutens, W. (2003) *Levy Processes in Finance: Pricing Financial Derivatives*. New York: Wiley.
- [52] Tashiro, Y. (2011) Pricing swing options with typical constraints, *Journal of the Operations Research Society of Japan*54 (2-3), 86-100. · [Zbl 1235.91174](#)
- [53] A. C. Thompson, Valuation of path-dependent contingent claims with multiple exercise decisions over time: The case of take-or-pay, *Journal of Financial Quantitative Analysis*30, 271-293.
- [54] Villeneuve, B. \& Creti, A. (2003) Long-term contracts and take-or-pay clauses in natural gas markets, *Energy Studies Review*13, 75-94.
- [55] Wahab, M. I. M. \& Lee, C. G. (2011) Pricing swing options with regime switching, *Annals of Operations Research*185, 139-160.
- [56] Wilhelm, M. \& Winter, C. (2008) Finite element valuation of swing options, *Journal of Computational Finance*11 (3), 107-132.
- [57] Zhang, B. \& Oosterlee, C. W. (2013) An efficient pricing algorithm for swing options based on Fourier cosine expansions, *Journal of Computational Finance*16 (4), 1-32.
- [58] Zhegal, A. B. \& Mnif, M. (2006) Optimal multiple stopping and valuation of swing options in Lévy models, *International Journal of Theoretical and Applied Finance*9 (8), 1267-1298.

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.